



JOINT EFFECT OF DIVIDEND POLICY AND EARNINGS MANAGEMENT ON FIRM VALUES OF LISTED CONSUMER GOODS FIRMS IN NIGERIA

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DOI: <https://doi.org/10.70382/caijmsbar.v9i7.034>

ABSTRACT

Earnings Management and dividend policy remain the two pivotal financial strategies influencing firm value. These mechanisms, while instrumental in corporate decision-making, can have profound implications on investor perception and market valuation. This study examined the joint impact of earnings management and dividend policy on the firm values of listed consumer goods firms in Nigeria. A correlational research design in a sample of 16 firms for a period of 12 years (2012-2023) was applied in the study. Panel regression technique of data analysis was used, and the study found after controlling for the effect of firm size that earnings management significantly and positively affects the market values of listed consumer goods firms in Nigeria. The study concludes, after controlling for firm size, that the dividend payout ratio is a strong determinant of firm value in the Nigerian consumer goods sector. The finding confirms that investors appear to reward firms with consistent and higher dividend payouts, reflecting a preference for current income and reduced uncertainty. Lastly, the study found, after controlling for firm size, that dividend per share alone is insufficient to drive firm value, and that a consistent payout policy is likely more important to investors than the amount paid per share. Additionally, firm size does not significantly influence market valuation, implying that efficiency and strategic positioning, rather than asset base alone, are more critical in determining firm value in Nigeria's consumer goods sector. The study recommends, amongst others, that regulatory bodies such as the Financial Reporting Council of Nigeria (FRCN) and the Securities and Exchange Commission (SEC) should enhance surveillance and monitoring mechanisms to detect and curb earnings management. Although the study found a positive short-term relationship between earnings management and firm value, this practice undermines the integrity of financial reporting and may lead to long-term harm to the firm's reputation and investor trust.

Keywords: Dividend Policy, Earnings Management, Firm Value, Modified Jones Model, Nigerian Consumer Goods Firms, Corporate Governance.

INTRODUCTION

In the evolving landscape of corporate finance, the maximization of firm value continues to be a fundamental pursuit for stakeholders, including shareholders, managers, and regulators. Firm value, commonly captured through indicators such as market-to-book ratios and share prices, reflects the overall financial strength, operational efficiency, and future growth prospects of a firm. Among the

financial strategies that play a central role in shaping firm value are earnings management (EM) and dividend policy. These two mechanisms, while integral to corporate decision-making, have far-reaching implications for investor perceptions and market valuation.

Earnings management refers to the intentional alteration of reported financial results by managers, typically within the limits of accounting standards, to achieve targeted objectives. Supporters argue that it may provide valuable signals to investors regarding the firm's prospects, while critics contend that it misrepresents a company's actual performance and can lead to misguided investment decisions. In Nigeria, Shittu et al. (2023) investigated listed manufacturing firms, including those in the consumer goods sector, and found that accrual-based earnings management significantly diminishes firm value, whereas real earnings management has a positive and significant effect. This divergence illustrates the complex and multifaceted influence of earnings management on firm valuation.

Similarly, dividend policy—captured through dividend payout ratios and dividend per share—serves as a powerful medium of communication between firms and their investors. Dividend decisions are generally perceived as signals of management's confidence in the firm's profitability and future earnings potential. Empirical evidence from Nigeria supports this view. For instance, Emeh et al. (2024), in a study covering firms listed on the Nigerian Stock Exchange between 2016 and 2020, reported that dividend payments are strongly associated with higher firm value, with a 1% rise in dividends translating into a 95% increase in valuation. In the same vein, Omoregie and Ige (2025) demonstrated that both dividend payout ratios and dividend per share have significant positive effects on firm value in the Nigerian manufacturing industry.

The consumer goods sector, a major contributor to Nigeria's GDP and employment, is central to the nation's economy. However, firms within this sector often face numerous challenges, including inflationary pressures, fluctuating consumer demand, and regulatory uncertainties, all of which directly influence both earnings management practices and dividend policies. Understanding the combined impact of these financial strategies on firm value in this sector is thus essential for managers, investors, and policymakers.

Despite the global attention paid to earnings management and dividend policy, their joint effect on firm value within the Nigerian consumer goods sector remains insufficiently explored. This gap is significant because, while some firms in the sector report consistent earnings and sustain dividend payouts, their market valuations remain volatile. Such inconsistencies raise doubts about the credibility of reported earnings and the signaling effectiveness of dividend policies. The reliance on dividend announcements by Nigerian investors—largely due to the underdevelopment of the capital market and limited access to advanced financial analysis—further underscores the need for clarity in understanding how these practices jointly shape firm valuation.

Previous studies have predominantly examined these two variables in isolation. For instance, Shittu et al. (2023) focused on accrual and real earnings management, while Emeh et al. (2024) and Omoregie and Ige (2025) analyzed the role of dividend policy. Few studies have examined their combined effect, particularly within the consumer goods sector, which possesses unique features such as seasonal demand variations and cost-driven pricing strategies. In addition, many existing studies rely on static panel models or cross-sectional analyses that do not sufficiently address firm-level heterogeneity or potential endogeneity, thereby limiting the robustness of their conclusions. Furthermore, dividend policy has

often been proxied by a single measure—typically the payout ratio—without testing the reliability of findings using multiple indicators.

Consequently, there is a strong need for a comprehensive, sector-specific investigation that integrates earnings management and dividend policy into a unified framework to evaluate their joint effect on firm value. Employing rigorous econometric methods and focusing specifically on listed consumer goods firms in Nigeria, this study aims to fill this gap in the literature. By doing so, it seeks to generate insights that can enhance managerial financial decisions, strengthen investor confidence, and provide valuable guidance for regulators in ensuring greater transparency and efficiency in Nigeria's capital markets.

Objectives of the Study

The main objective of the study is to examine the joint effect of earnings management and dividend policy on the firm values of listed consumer goods firms in Nigeria. The specific objectives of the study are to:

- i. To assess the impact of earnings management on the firm value of listed consumer goods firms in Nigeria
- ii. To evaluate the impact of dividend payout ratio on the firm value of listed consumer goods firms in Nigeria.
- iii. To examine the impact of dividend per share on the firm value of listed consumer goods firms in Nigeria.

Research Hypotheses

The following hypotheses are formulated in null form for the study:

H01: Earnings management has no significant impact on the firm value of listed consumer goods firms in Nigeria.

H02: Dividend payout ratio has no significant impact on the firm value of listed consumer goods firms in Nigeria.

H03: Dividend per share has no significant impact on the firm value of listed consumer goods firms in Nigeria.

The research contributes to the literature by integrating earnings management and dividend policy within a unified framework, offering sector-specific insights from a developing economy. It is expected to benefit regulators such as the Financial Reporting Council of Nigeria (FRCN), the Securities and Exchange Commission (SEC), and the Nigerian Exchange Group (NGX) in enhancing disclosure standards and governance codes. For managers and executives, it provides evidence on balancing short-term financial pressures with long-term value creation. Investors and analysts will gain practical insights into interpreting dividend signals and identifying potential earnings manipulation. Additionally, it serves as a foundation for future researchers to conduct comparative or longitudinal analyses within Nigeria and across other emerging markets.

LITERATURE REVIEW

Firm value represents the overall worth of a company as reflected in market capitalization and share prices, and it is influenced by factors such as dividend policy, earnings growth, risk, and investor expectations. Classic theories debate whether dividends matter: while the Bird-in-Hand Theory (Lintner, 1956; Gordon, 1962) argues that investors prefer certain dividends to uncertain future gains,

the Dividend Irrelevance Theory (Miller & Modigliani, 1961) maintains that payout policy does not affect value under perfect markets. In practice, market imperfections make dividend policy a crucial determinant of firm value.

Earnings Management (EM) arises from discretion in accounting standards, allowing managers to adjust reported earnings either through accrual-based choices or real activities manipulation (Dechow & Skinner, 2000; Cohen & Zarowin, 2010). While sometimes used to signal stability, EM often raises concerns about credibility and agency costs.

Dividend Policy refers to management's decision on how much profit to distribute versus retain (Egbeonu et al., 2016). It serves as a key signal of financial health, shaped by firm-specific factors such as profitability, cash flow, leverage, and size, as well as external influences like macroeconomic conditions. Dividend payouts can reduce agency costs by limiting free cash flow at managers' discretion (Jensen & Meckling, 1976).

Empirical evidence largely supports a positive link between dividend policy and firm value, especially in emerging markets such as Nigeria, where dividends are a critical signal to investors (Osakwe et al., 2019; Sanyaolu et al., 2019). However, results vary globally, with some studies reporting negative or insignificant effects during crises or in high-growth sectors.

The relationship between earnings management and dividend policy remains mixed. Some studies show a positive association, as managers may manipulate earnings to sustain stable dividend payouts (Im, Kim, & Choi, 2015; Amar et al., 2018). Others report a negative or moderating effect, with dividends acting as a governance mechanism that limits earnings manipulation (Savov, 2006; Vieira, 2017; Ajide & Aderemi, 2014).

Overall, the literature suggests that while EM often undermines firm value by reducing reporting credibility, dividend policy tends to enhance firm value through signaling and agency cost mitigation. The interaction of these two variables is particularly important in Nigeria's consumer goods sector, where dividends may either cushion or amplify the impact of EM on firm value.

This study draws on several financial and governance theories to explain the joint effect of earnings management and dividend policy on firm value. The Bird-in-Hand Theory (Lintner, 1956; Gordon, 1962) posits that investors prefer immediate dividends to uncertain future gains, implying that higher dividends enhance firm value, particularly in volatile markets. Agency Theory (Jensen & Meckling, 1976) highlights conflicts between managers and shareholders, where earnings management can arise as an agency cost, while dividend payments help reduce free cash flow under managerial control. Signaling Theory (Spence, 1973) suggests that both dividends and reported earnings act as signals to investors—dividends as credible indicators of profitability and stability, and earnings management as a potentially distorted signal.

Complementary perspectives refine these insights. Modigliani and Miller's Dividend Irrelevance Proposition (1958) argues that payout policy does not matter in perfect markets, but imperfections (taxes, transaction costs, information asymmetry) make dividends relevant. The Pecking Order Theory (Myers & Majluf, 1984) emphasizes preference for internal financing, while the Free Cash Flow Theory (Jensen, 1986) shows how dividends can curb agency problems. Additional views, such as the Tax Preference Theory and Information Asymmetry Theory, further explain dividend behavior.

Taken together, these theories provide a comprehensive framework: dividends enhance firm value through signaling and agency-cost reduction, while earnings management represents both a risk to value

and a potential signaling tool. Their integration helps explain how dividend policy may moderate or amplify the effects of earnings management on firm value in Nigeria's consumer goods sector.

Review of Empirical Studies

Extensive research has explored the linkages between earnings management, dividend policy, and firm value across different contexts. Findings are, however, mixed, reflecting variations in sectoral dynamics, methodological approaches, and market conditions.

Earnings Management and Firm Value

Earnings management continues to attract scholarly attention because of its complex and often contradictory impact on firm value. In theory, EM may temporarily enhance reported performance and market valuation by smoothing earnings and reducing volatility, but it may also damage credibility and investor trust once manipulation is detected, thereby eroding firm value (Healy & Wahlen, 1999; Cohen & Zarowin, 2010).

In the Nigerian context, recent evidence reflects these contradictions. Isiaka et al. (2023), using panel data from consumer goods firms between 2013 and 2022, reported that discretionary accruals significantly enhanced firm value, suggesting that investors may initially reward earnings management practices that create the appearance of financial stability. Similarly, Iredele et al. (2022) found that creative accounting strategies such as adjustments in inventory valuation and asset reclassification were associated with increased shareholder wealth, while Aguguom and Salawu (2022) showed that earnings smoothing exerted a positive effect on share prices. Adewojo and Siyanbola (2021) further emphasized that when earnings quality is supported by sound capital structures, firm value improves significantly. Conversely, several studies highlight the adverse consequences of EM. Ahmed and Ali (2022) documented a negative relationship between earnings management and firm value in Nigerian oil and gas firms, attributing the decline to investor skepticism and regulatory scrutiny in that sector. Abogun et al. (2021) also observed that income smoothing eroded value in regulated industries, while earlier studies such as Uwuigbe, Peter, and Oyeniyi (2014) and Akinleye and Ogunmakin (2019) showed that discretionary accruals undermine reporting credibility, which in turn leads to discounted valuations once manipulation becomes apparent.

International evidence corroborates these divergent findings. In developed markets, Andreas and Leonidas (2022) identified a strong negative association between EM and dividend payout ratios among U.S. aerospace firms, implying that manipulation distorts payout decisions and investor trust. Similarly, Goncharov and Zimmermann (2022) demonstrated that aggressive EM practices reduced market capitalization across European listed firms. By contrast, Ekanayaka and Wijesinghe (2021) in frontier markets found no significant relationship between EM and firm value, suggesting that weaker regulatory enforcement and information asymmetry may neutralize the impact of EM on market valuations. More recently, Li and Zhao (2023) in China reported that real activities manipulation temporarily boosted stock performance, though the effect dissipated in subsequent periods as investors reassessed credibility. Overall, these findings suggest that the impact of EM on firm value is context-dependent. In emerging markets such as Nigeria, where governance structures and investor protection mechanisms are relatively weak, EM may initially be perceived positively, as it creates a façade of financial stability. However, over time, persistent manipulation increases agency costs, undermines transparency, and exposes firms to

reputational risks that ultimately reduce firm value. This dual nature underscores the need to examine EM not only in isolation but also in interaction with governance and payout policies that may constrain or amplify its effects.

Dividend Policy and Firm Value

Dividend policy remains one of the most debated determinants of firm value. Theoretically, the Bird-in-Hand Theory (Lintner, 1956; Gordon, 1962) posits that investors value certain dividends more highly than uncertain future capital gains, implying a positive link between dividends and firm value. Similarly, Signaling Theory suggests that dividend announcements convey credible information about firm profitability and stability, while Agency Theory emphasizes the role of dividends in reducing agency costs by limiting managerial discretion over free cash flows. In contrast, the Dividend Irrelevance Proposition (Miller & Modigliani, 1961) argues that payout decisions should not matter in perfect markets. These competing theories have inspired an extensive empirical debate.

In Nigeria, empirical evidence strongly suggests that dividend policy influences firm value. Ovbe (2023) reported that ownership concentration positively moderates the dividend–value relationship, highlighting the role of governance structure. Terungwa and Benedicta (2021) confirmed that dividend per share significantly boosts market value among listed consumer goods firms, although payout ratios and retention ratios showed weaker or inconsistent effects. Ozuomba and Ezeabasili (2017) found that both dividend per share and earnings per share exerted overwhelming positive influences on valuation. Earlier Nigerian studies (Adelegan, 2009; Olowe, Babajide, & Oyetayo, 2016) also demonstrated that dividends play a critical role in signaling profitability and mitigating agency problems in a market characterized by high information asymmetry.

More recent cross-country evidence aligns with these findings. Chinnaiah (2020) and Yudawisastra et al. (2018) reported that dividend payouts significantly enhance firm value in India and Indonesia, respectively, underscoring the signaling effect in emerging economies. Ahmed, Alrjoub, and Alrabba (2018) showed that higher dividend payouts in Jordan reduced stock price volatility, supporting the stability argument. However, other studies present mixed results. Cristea and Cristea (2018) in Romania, and Rozaimah et al. (2018) in Malaysia, documented that higher dividends increased stock price volatility and reduced long-term value, suggesting that excessive payouts may deplete resources needed for growth.

In developed markets, recent findings show more nuanced dynamics. Chen and Wang (2022) revealed that in U.S. firms, dividend announcements had only a short-term positive impact on firm value, with effects dissipating once earnings expectations were factored in. Similarly, Beiner and Schmid (2021) in Germany found that while dividends reduced agency conflicts, their long-run contribution to market value was weaker compared to governance mechanisms such as board independence.

Taken together, these studies highlight that the impact of dividend policy on firm value is highly context-specific. In emerging markets like Nigeria, where investors rely heavily on dividend signals due to limited access to credible information, dividends tend to exert strong positive effects. In contrast, in developed markets with stronger governance and disclosure regimes, the role of dividends is less pronounced, and sometimes overshadowed by reinvestment opportunities.

Thus, while the literature largely supports the view that dividends enhance firm value, the evidence is far from unanimous. These inconsistencies underscore the importance of exploring how dividends

interact with other governance mechanisms, such as earnings management, to jointly shape firm value an issue addressed in the next subsection.

Joint Influence of Earnings Management and Dividend Policy

The joint effect of earnings management and dividend policy on firm value has received increasing scholarly attention, particularly in emerging markets. While EM and dividends have been studied extensively as separate determinants of value, their interaction provides deeper insight into how governance mechanisms and payout policies combine to shape investor perception and market performance.

In Nigeria, empirical evidence suggests that dividend policy can mitigate the negative consequences of EM. Ogunleye and Sunday (2021), analyzing 35 listed firms, reported that dividend policy significantly moderated the adverse effects of EM on firm value, suggesting that stable and consistent dividend payouts serve as a governance tool that restrains managerial opportunism. Afolabi and Dare (2020) similarly found that although EM reduced firm value when considered in isolation, the effect was attenuated when firms simultaneously maintained strong dividend payouts. These findings are consistent with Agency Theory, which posits that dividends reduce free cash flow under managerial control, thereby limiting the scope for opportunistic earnings manipulation.

However, other studies highlight more complex dynamics. Ajide and Aderemi (2014) showed that firms engaging in aggressive EM tended to sustain dividend payments artificially to maintain investor confidence, a practice that created short-term value but eroded long-term credibility. Similarly, Im, Kim, and Choi (2015) found in South Korea that managers manipulated earnings to sustain stable dividend payouts, indicating that dividends could sometimes reinforce EM rather than constrain it. Amar et al. (2018) provided further evidence that EM may be used strategically to smooth dividends, thereby masking underlying volatility.

International evidence provides a mixed picture. Vieira (2017), examining European listed firms, concluded that dividend payouts functioned as a governance mechanism that reduced EM, thereby enhancing long-term firm value. In contrast, Savov (2006) and more recently, Li and Zhao (2023) in China, reported that dividend payouts did not fully offset the adverse impact of EM, as investors eventually discounted manipulated financial reports regardless of dividend consistency. This suggests that while dividends may delay market reactions, they cannot permanently disguise poor earnings quality.

Overall, the literature indicates that the interaction between EM and dividend policy is ambivalent and context-specific. In environments with weaker investor protection and higher information asymmetry, such as Nigeria, dividends appear to serve as a corrective mechanism that cushions the adverse effects of EM on firm value. By contrast, in markets with stronger disclosure regimes, dividends may have a weaker moderating role because investors can more easily detect manipulation.

Despite these insights, empirical studies that jointly examine EM, dividend policy, and firm value remain relatively scarce in Nigeria, particularly within the consumer goods sector. Most prior works either treat EM and dividends separately or focus on developed markets with different institutional settings. This gap underscores the importance of the present study, which investigates how dividend policy moderates the effect of EM on firm value in a context where dividends serve as one of the few credible signals available to investors.

RESEARCH METHODOLOGY

The study adopts the correlational exploratory design. The design is considered suitable because it is very effective in a cause-and-effect study, which is consistent with the objective of the study, which is to determine the joint impact of earnings management and dividend policy on the firm values of the listed consumer goods firms in Nigeria.

This study applies a two-stage design in which, in the first stage, a proxy of earnings management is estimated based on the Modified Jones Model by Kothari et al. (2005). In the second stage, the impact of earnings management and dividend policy on the firm values of the listed consumer goods firms in Nigeria is determined.

Population and Sample of the Study

The population of this study covers all the Twenty-Five (25) listed companies operating in the consumer goods sector of the Nigerian Exchange Group (NGX) as of 31st December 2023 (see Table 1). This population is considered useful for the study because of the incidences related to earnings management that have been happening in the sector, as it provides an appropriate opportunity to examine the research problem.

Table 1: Population of the Study

SN	Company Name	Year of Listing
1	Cadbury Nig. Plc	1976
2	Champion Brew. Plc	1983
3	Dangote Flour Mills Plc	2008
4	Dangote Sugar Refi. Plc	2008
5	BUA Foods Plc	2022
6	Flour Mill Nig. Plc	1979
7	DN Tyre & Rubber Plc	1970
8	Golden Guinea Brew. Plc	1979
9	Guinness Nigeria Plc	1965
10	Honeywell Flour Mills Plc	2009
11	International Brew. Plc	1995
12	Jos Int Brew. Plc	1975
13	PS Mandrid Plc	2004
14	McNichols Plc	2009
15	Multi-Trex Integrated Foods Plc	2010
16	National Salt Co. Plc	1992
17	Vitafoam Nig Plc	1973
18	Nigerian Brew. Plc	1973
19	Nestle Nigeria Plc	1979
20	Northern Nigeria Flour Mills Plc	1978
21	Nigerian Enamelware Plc	1991
22	Premier Brew. Plc	1980
23	PZ Cussons Nig Plc	1974
24	Unilever Plc	1973
25	Union Dicon Salt Plc	1993

Source: Nigerian Exchange Group (2023)

The sample size of the study constituted 16 Firms (see Table 2), which was arrived at using a filter and purposive sampling technique. Five companies (Premier Breweries Plc, Golden Guinness Breweries Plc, Multi-Trex Food Plc, Jos Breweries Plc, and Dangote Flour Mills Plc) were not on the NGX lists for some years during the period covered by the study (2012-2023), and they were dropped. Similarly, BUA Foods Plc was listed on the NGX in 2023, while DN Tyre and Rubber and P.S. Mandrid Plc were delisted from the exchange. Therefore, the study population becomes 16 firms, and hence constitutes the sample size of the study. The following criteria are used for the filter:

- i. A firm must be on the NGX listing from 2012-2023.
- ii. A firm must have its annual reports and accounts available and accessible for the period 2012-2023.

Table 2: Sample Size of the Study

SN	Company Name	Year of Listing
1	Cadbury Nig. Plc	1976
2	Champion Brew. Plc	1983
3	Dangote Flour Mills Plc	2008
4	Flour Mill Nig. Plc	1979
5	Guinness Nigeria Plc	1965
6	Honeywell Flour Mills Plc	2009
7	International Brew. Plc	1995
8	Mcnichols Plc	2009
9	National Salt Co. Plc	1992
10	Vitafoam Nig Plc	1973
11	Nigerian Brew. Plc	1973
12	Nestle Nigeria Plc	1979
13	Northern Nigeria Flour Mills Plc	1978
14	Nigerian Enamelware Plc	1991
15	PZ Cussons Nig Plc	1974
16	Unilever Plc	1973

Source: Nigerian Exchange Group (2023)

Data Collection and Analysis Technique

The study exploits the secondary sources of data to test the research hypotheses and achieve the objectives of the study. The choice of secondary data reflects the norms of the quantitative research strategy adopted. The data were extracted from the audited annual reports and accounts of the sample consumer goods companies, while the firm market prices were collected from the NGX daily price listing 90 days after a company's accounting date, based on the average monthly stock price.

The study employed the Panel Regression Technique of data analysis (cross-sectional and time series), the technique was chosen as it is a widely used estimation technique in longitudinal empirical studies. The technique, when its assumptions are satisfied, provides the best estimators possible. These assumptions include: linearity of the model, normality of the error term, homoscedasticity, absence of serial correlation, and absence of perfect multicollinearity among independent variables. Further, since the data of the study were panel (a combination of cross-sectional and time series), the study went further

to run fixed effect and random effect regressions. The Hausman specification test was also run to determine a choice between fixed and random effect regression. If the Hausman specification test favours random effect, the Lagrange multiplier test for random effect was conducted to determine the choice between random effect and pooled OLS regression estimates.

In addition, other techniques of data analysis, such as descriptive statistics and a correlation matrix, were used. Mean, standard deviation, minimum, and maximum were used to describe the data, while Pearson correlation was utilized to show the relationships among all the variables of the study. Similarly, robustness tests were performed to satisfy the restrictive assumptions for the use of OLS. These tests include the normality test of the error term, the multicollinearity test using the variance inflation factor (VIF), and the Breusch-Pagan/Cock-Weisberg test for Heteroskedasticity.

Variables Measurement and Model Specification

The dependent variable of the study is the firm value, while the independent variables are earnings management and dividend policy. The study used firm size to control for the effect of size. The measurements of the variables are presented in Table 3.

Table 3: Variables Measurement

Variable & Type	Measurement	Apriori Expectation	Source
Dependent Variable			
Firm Value (FMV)	Market Price of Equities		Adegbie et al. (2019), Oyedokun et al. (2019)
Independent Variables			
Earnings Management (EMG)	Discretionary accruals of the modified Jones model	Significant positive or negative	Sabrina et al. (2020)
Dividend Pay-out Ratio (DPR)	Total cash dividend over total earnings for the year	Significant positive	Hwang et al., (2013); Jabbouri, (2016); Ammar & Minhas (2022)
Dividend Per Share (DPS)	Total dividends divided by total equity shares outstanding	Significant positive	Jabbouri, (2016); Ammar & Minhas (2022)
Control variable			
Firm size (FSZ)	Natural Logarithm of Total Asset	Significant positive	Adegbie et al (2019)

Source: Researcher's compilation (2023)

Therefore, the Modified Discretionary Accruals Jones Model by Kothari et al. (2005) is used to measure earnings management. They suggest using the Modified Jones Model after introducing an additional independent variable, the current Return on Assets, to control for the impact of firm performance on discretionary accruals. Under this model, total accruals are defined as follows:

$$TAC_{it}/TA_{it-1} = \beta_0(1/TA_{it-1}) + \beta_2(\Delta REV_{it}-\Delta REC_{it}/TA_{it-1}) + \beta_3(\Delta PPE_{it}/TA_{it-1}) + \beta_4ROA_{it-1} + \varepsilon_{it} \dots \dots i$$

Where;

TAC_{it} = Total accruals of firm I in year t, measured as Net income minus Cash flow from operations

TA_{it-1} = Lag of total assets of firm I in year t

ΔREV_{it} = Changes in revenue of firm I in year t from the current year to last year

ΔREC_{it} = Changes in receivables of firm I in year t from the current year to last year

PPE_{it} = Property, plant, and equipment of firm I in year t at the end of the year

ROA_{it} = Return on assets of firm I in year t at the end of the year.

β_0 is the regression intercept, β_1 , β_4 are estimators, while ε_{it} is the residuals (absolute discretionary accruals- earnings management).

To examine the impact of earnings management and dividend policy on firm value, the study estimates the following econometric model;

$$FMV_{it} = \gamma_0 + \gamma_1 EMG_{it} + \gamma_2 DPR_{it} + \gamma_3 DPS_{it} + \gamma_4 FSZ_{it} + \mu_{it} \dots ii$$

Where;

FMV_{it} = the value of firm I in year t,

EMG_{it} = the earnings management of firm I in year t,

DPR_{it} = the dividend payout ratio of firm I in year t,

DPS_{it} = the dividend per share of firm I in year t,

FSZ_{it} = size of firm I in year t

γ_0 is the intercept, γ_1 to γ_4 are the coefficients, and μ_{it} is the stochastic error term/disturbances.

RESULT AND DISCUSSION

Descriptive Statistics

The descriptive statistical analysis of the data obtained on the dependent, explanatory, and control variables of the study is presented in this sub-section. It provides the summary statistics of the data collected, which include mean, standard deviation, skewness, kurtosis, and minimum and maximum values of the variables. The descriptive statistics of the variables are presented in Table 4.

Table 4: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis	Obs
FMV	92.330	271.98	0.500	1557	3.9321	17.833	192
EMG	-0.0134	0.7477	-4.1774	4.9302	0.6994	18.404	192
DPR	0.4356	0.1690	0.0275	0.9663	0.1172	2.9408	192
DPS	0.2589	0.2147	0.0056	1.1063	1.5161	4.9182	192
FSZ	17.146	2.3535	11.000	20.000	-0.9268	3.2570	192

Source: Results Output from STATA (Appendix)

The descriptive results from Table 4 revealed that the mean value of firm value (FMV) for the sampled consumer goods firms in Nigeria is N92,330, with a standard deviation of 271.98. The standard deviation indicates that there is a deviation of the data for FMV from both sides of the mean value by 271.98 during the period of the study. The minimum and maximum values of FMV are N0.500 and N1,557,

respectively. Similarly, the table revealed that the value of skewness of 3.9321 indicates that the data is negatively skewed, while the value of kurtosis of 17.833 shows the peakedness of the data, which suggests that the data is not normally distributed.

Table 4 revealed that the mean value of earnings management (EM) for the sampled consumer goods firms in Nigeria is -0.0135, with a standard deviation of 0.7477. The standard deviation implies that the data for EMG is widely dispersed from both sides of the mean by 0.7477. The minimum EMG is -4.1774, while the maximum value is 4.9302. Similarly, the table revealed that the value of skewness of 0.6994 indicates that the data is positively skewed, while the value of kurtosis of 18.4048 shows the peakedness of the data, which suggests that the data is not normally distributed.

Table 4 also revealed that the mean value of dividend payout ratio (DPR) for the sampled consumer goods firms in Nigeria is 0.4356 (43.56%), with a standard deviation of 0.1690. Hence, the sample firms have a 56.44% retention policy. The minimum and maximum values of DPR are 0.0275 and 0.9663, respectively. The standard deviation indicates that there is a deviation of the data for DPR from both sides of the mean value by 0.1690 during the period of the study. Similarly, the table revealed that the value of skewness of 0.1172 indicates that the data is positively skewed, while the value of kurtosis of 2.9408 shows the peakedness of the data, which suggests that the data is not normally distributed.

Table 4 revealed that the mean value of dividend per share (DPS) for the sampled consumer goods firms in Nigeria is 0.2589, with a standard deviation of 0.2147. The standard deviation implies that the data for DPS is widely dispersed from both sides of the mean by 0.2147. The minimum is 0.0056, while the maximum value is 1.1063. Similarly, the table revealed that the value of skewness of 1.5161 indicates that the data is positively skewed, while the value of kurtosis of 4.9183 shows the peakedness of the data, which suggests that the data is not normally distributed.

Table 4 revealed that the mean value of firm size (FSZ), which is the natural logarithm of the total assets for the sampled consumer goods firms in Nigeria, is 17.1458, with a standard deviation of 2.3535. The standard deviation implies that the data for FSZ is widely dispersed from both sides of the mean by 2.3535. The minimum value of FSZ is 11, while the maximum value is 20. Similarly, the table revealed that the value of skewness of -0.9268 indicates that the data is negatively skewed, while the value of kurtosis of 3.2570 shows the peakedness of the data, which suggests that the data is not normally distributed.

The analysis of the descriptive statistics revealed that the data for the variables of the study did not follow the normal distribution assumption of parametric analysis. However, to determine the statistical evidence with regards to the data normality, the study employed the Shapiro-Wilk Test for normal data. The results of the test are presented in Table 5.

Table 5: Data Normality Test

Variables	W	V	Z	Prob>Z	Obs
FMV	0.3505	93.519	10.420	0.0000	192
EM	0.2053	114.429	10.883	0.0000	192
DPR	0.4388	80.798	10.084	0.0000	192
DPS	0.9148	12.267	5.756	0.0000	192
FSZ	0.1858	117.230	10.939	0.0000	192

Source: Results Output from STATA (Appendix)

The Shapiro-Wilk test is a useful tool for testing normality. The null hypothesis principle is used in the Shapiro-Wilk (W) test for normal data; under the principle, the Null hypothesis that 'the data is normally distributed' is tested. Table 5 indicates that data from all the variables of the study are not normally distributed because the P-values are significant at a 1% level of significance (p-values of 0.0000). Therefore, the null hypothesis (that the data is normally distributed) is rejected for FMV, EM, DPR, DPS, and FSZ. This may lead to problems in OLS regression, hence the need for more generalized regression models.

Correlation Analysis

Table 6 shows the correlation coefficients between the dependent and the independent variables. The asterisk beside the correlation coefficient shows the coefficient's significance level. The correlation indicates the direction of the relationships as well as the strength of the relationship; values of the correlation coefficient range from -1 to 1. The sign of the correlation coefficient indicates the direction of the relationship (positive or negative), and the absolute value of the correlation coefficient indicates the strength, with larger values indicating stronger relationships.

Table 6: Correlation Matrix

Variables	FMV	EMG	DPR	DPS	FSZ
FMV	1.0000				
EM	0.0945	1.0000			
DPR	0.7837*	-0.0060	1.0000		
DPS	0.2226*	0.2068*	0.2441*	1.0000	
FSZ	-0.0381	-0.0083	-0.0143	0.0935	1.0000

* = Significant at 5% Level

Source: Results Output from STATA (Appendix)

The correlation results in Table 6 show that earnings management (EM) is positively related to firms' market value (FMV) with a correlation coefficient of 0.0945. This suggests that an increase in earnings management leads to an increase in the firm's value, but the results are not statistically significant. Similarly, the table shows that the dividend payout ratio (DPR) is positively related to FMV, with a correlation coefficient of 0.7837. That is, an increase in dividend payments to shareholders increases the market values of listed consumer goods firms in Nigeria, and the relationship is statistically significant at 5% level of significance.

The correlation results in Table 6 also show that dividends per share (DPS) are positively related to firms' market value (FMV) with a correlation coefficient of 0.2226. This suggests that an increase in dividends as well as profitability leads to an increase in the firm's value, and the results are statistically significant. On the other hand, the table shows that firm size (FSZ) is negatively related to FMV, from the correlation coefficient of -0.0381. That is, a decrease in firm size increases the market values of listed consumer goods firms in Nigeria, but the relationship is not statistically significant at all levels of significance.

In conclusion, the correlation results revealed that earnings management and dividend policy are significantly and positively related to the firm values of listed consumer goods firms in Nigeria during the period of the study.

Regression Diagnostic Tests

Consistent with the classical regression assumptions, the study conducted some robustness tests to ensure the validity and reliability of all the statistical inferences as well as the findings of the study. The tests include Data Normality, Heteroscedasticity, Multicollinearity, Model Specification Test, and the model fit test. When these assumptions are not met, the estimators are biased and cannot be used to draw any inference.

Table 7: Correlation Matrix

	Model 1		Model 2	
Variables	Coefficients	P-Value	Coefficients	P-Value
Hetest: Chi2	1.04	0.3073	0.08	0.7749
Mean VIF	1.05		1.06	
Hausman Test: Chi2	2.60	0.4574	3.28	0.5119
Random Effect LM Test	13.35	0.0001	0.12	0.3656
R Squared	0.3953		0.6250	
F-Statistic (Wald chi2)	124.12	0.0000	77.90	0.0000

Source: Results Output from STATA (Appendix)

This study subjected the models of the study to some robustness tests, due to the uncertainty as to the conformity with the classical regression assumptions and the panel nature of the data used. For instance, one of the classical regression assumptions is that the variance of the error terms is constant (Homoskedastic). From Table 7, the test conducted (Hetest- Breusch Pagan/Cook-Weisberg test) for Models 1 and 2 indicates a Chi-Square coefficient of 1.04 with p-value of 0.3073; 0.08 with p-value of 0.7749, respectively, confirming the absence of heteroskedasticity in all the models, that is, the variance of the error terms is constant.

The explanatory variables are also expected not to be perfectly correlated (absence of multicollinearity). The results provide evidence of the absence of perfect multicollinearity among the independent variables because all the mean Variance Inflation Factors (VIF) are less than 10. The rule of thumb for the VIF is that a value of 10 or above indicates perfect multicollinearity. Hence, Table 7 indicates that the Mean VIF for Models 1 and 2 is 1.05 and 1.06, respectively.

Table 7 also shows, with respect to model 1, that the Hausman Specification Test (Chi2 of 2.60 with prob-value of 0.4574), which is not statistically significant at all levels, suggests that the Random-Effect Regression Model is suitable for model 1. However, the Breusch and Pagan Lagrangian Multiplier Test for Random Effects indicated that there is a statistically significant difference among the Units of the Panel (Chibar2 of 13.35 with p-value of 0.0001), and therefore, the Random Effect regression model can be used for model 1 of the study. The study, therefore, measures the earnings management variable from the residuals of model 1 and uses it in model 2.

Similarly, Table 7 shows for model 2 that the Hausman Specification Test (Chi2 of 0.08 with prob-value of 0.7749), which is not statistically significant at all levels, suggests that the Random-Effect Regression Model is suitable for model 2. However, the Breusch and Pagan Lagrangian Multiplier Test for Random Effects indicated that there is no statistically significant difference among the Units of the Panel (Chibar2

of 0.12 with p-value of 0.3656), and therefore, the OLS regression model can be used for model 2 of the study.

For model 1, the results from Table 7 indicate that the explanatory variables explained 39.53% of the total variation in the dependent variable (total accruals) of the sampled consumer goods firms during the period of the study, from the R^2 value of 0.3953. The table also shows that model 1 is fit, as evidenced by the F-statistic of 124.12, which is at a 99% significance level (as indicated by the Prob-value of 0.0000). The model fit indices analyzed revealed that Model 1 of the study has a good model fit, indicating that the proposed model adequately captures the relationships among variables in the data. Hence, the result is fit for analysis.

For model 2, the results from Table 7 indicate that the explanatory variables explained 62.50% of the total variations in the dependent variable (Firm market value) of the sampled consumer goods firms during the period of the study, from the R^2 value of 0.6250. The table also shows that model 2 is fit, as evident by the F-statistic of 77.90, which is at a 99% significance level (as indicated by the Prob-value of 0.0000). The model fit indices analyzed revealed that Model 2 of the study has a good model fit, indicating that the proposed model adequately captures the relationships among variables in the data. Hence, the result is fit for analysis and hypothesis testing.

Regression Analysis and Hypothesis Testing

In this section, the regression results obtained are analyzed and interpreted to generate findings that address the research objectives. The results are presented in Table 8. The tables report the results for the effects of the dependent variables under both models.

Tables 8: OLS Regression Coefficients

Variables	Coefficient	t-value	Prob>t Value
EMG	0.4431	2.09	0.038
DPR	22.008	16.85	0.000
DPS	1.6826	0.31	0.755
FSZ	-0.6410	-0.61	0.542
Constant_	-14.0621	-0.15	0.879

Source: Results Output from STATA (Appendix)

Hypothesis One (H01)

Table 8 reveals that earnings management (EM) has a significant positive effect on the firm market value (FMV) of listed consumer goods firms in Nigeria during the period, with a coefficient of 0.4431 and with p-value of 0.038. This relationship is significant at the 5% level, and it implies that a unit increase in EMG of listed consumer goods firms in Nigeria would cause an increase in the firm value by 0.44k. Based on this evidence, the study rejects the null hypothesis (H01) of the study that earnings management has no significant effect on the firm value of listed consumer goods firms in Nigeria. The study, therefore, infers that earnings management influences the market values of listed consumer goods firms in Nigeria.

Hypothesis Two (H02)

Table 8 reveals that the dividend pay-out ratio (DPR) has a significant positive effect on the firm market value (FMV) of listed consumer goods firms in Nigeria during the period, with a coefficient of 22.008 and with p-value of 0.000. This relationship is significant at the 1% level, and it implies that a unit increase in DPR of listed consumer goods firms in Nigeria would cause an increase in the firm value by 22.00k. Based on this evidence, the study rejects the null hypothesis (H02) of the study that, dividend pay-out ratio has no significant effect on the firm value of listed consumer goods firms in Nigeria. The study, therefore, infers that dividend policy influences the market values of listed consumer goods firms in Nigeria.

Hypothesis Three (H03)

Table 8 reveals that dividend per share (DPS) has an insignificant positive effect on the firm market value (FMV) of listed consumer goods firms in Nigeria during the period, with a coefficient of 1.6826 and with p-value of 0.755. This relationship is not significant at all levels, and it implies that a unit increase in DPS of listed consumer goods firms in Nigeria would cause an increase in the firm value by 1.6826k. Based on this evidence, the study failed to reject the null hypothesis (H03) of the study that dividend per share has no significant effect on the firm value of listed consumer goods firms in Nigeria. The study, therefore, infers that the dividend per share did not influence the market values of listed consumer goods firms in Nigeria.

Lastly, Table 8 reveals that the FSZ has an insignificant negative effect on FMV, with a coefficient of -0.6410 and a p-value of 0.542. This relationship is not significant at all levels, and it implies that a unit increase in the asset size of listed consumer goods firms in Nigeria would cause a decrease in the firm value.

Discussion of Major Findings

This study investigated the impact of earnings management and dividend policy on the market value of listed consumer goods firms in Nigeria. The results from the regression analysis revealed that earnings management has a significant positive effect on firm market value, with a coefficient of 0.4431 and a p-value of 0.038. This indicates that for every unit increase in earnings management activities, there is an associated 0.44k increase in firm value. This finding is somewhat paradoxical but not unprecedented in the literature. It aligns with the findings of Isiaka et al. (2023) and Aguguom and Salawu (2022), who reported that certain forms of earnings management or earnings smoothing can have a value-enhancing effect in the short term, particularly in markets like Nigeria, where financial reporting and investor education may not be sufficiently robust to detect such manipulations.

This result suggests that the market may sometimes interpret managed earnings as a signal of stability or profitability, particularly when there is limited access to detailed financial analysis. However, this finding contradicts the conventional position of Agency Theory and studies such as Uwuigbe et al. (2014) and Ahmed and Ali (2022), who documented that earnings management generally erodes firm value by distorting financial information and undermining investor confidence. The discrepancy in findings underscores the complex role of earnings management in emerging markets, where such practices may sometimes go unchecked or even be rationalized as tools for managing stakeholder expectations.

In terms of dividend policy, the study found that the dividend payout ratio exerts a highly significant and positive impact on firm value, with a coefficient of 22.008 and a p-value of 0.000. This robust finding provides strong empirical support for the Signaling Theory and Bird-in-Hand Theory, both of which emphasize the importance of dividends in conveying financial health and reducing uncertainty among investors. It also aligns with numerous empirical studies (e.g., Ovbe, 2023; Ozuomba and Ezeabasili, 2017; Uwuigbe et al., 2012) that found dividend-paying firms to enjoy higher market valuations. The findings suggest that dividend payouts remain a vital mechanism through which firms communicate profitability and instill investor confidence, particularly in contexts characterized by high information asymmetry and weaker regulatory oversight.

Interestingly, the study found that dividend per share (DPS) had a positive but statistically insignificant impact on firm value. While this indicates that DPS may contribute to market valuation, its influence is not strong enough to be deemed statistically relevant. This supports the findings of Terungwa and Benedicta (2021), who similarly observed that dividend per share alone may not significantly affect market prices unless reinforced by consistent payout policies. This suggests that investors are more sensitive to the regularity and policy consistency of dividend distributions than to the absolute amount paid per share.

Lastly, firm size (FSZ), as measured by total assets, was found to have a negative but statistically insignificant effect on firm value, indicating that mere size does not guarantee improved market valuation. This may reflect inefficiencies in resource utilization or bureaucratic constraints often associated with large firms in Nigeria. It also aligns with the results from Gaiya et al. (2023) and Cristea and Cristea (2018), who found that firm size had limited or no significant influence on financial policy outcomes or market valuation.

CONCLUSION AND RECOMMENDATIONS

Based on the empirical findings, this study concludes after controlling for firm size that earnings management significantly and positively affects firm market value, although this may reflect short-term market reactions rather than sustainable value creation. The findings suggest that investors, possibly due to limited financial literacy or a lack of transparency in financial reporting, may not immediately penalize earnings management. Over time, however, such practices could lead to reputational damage and loss of investor trust, as highlighted in other studies.

Secondly, the study concludes after controlling for firm size that the dividend payout ratio is a strong determinant of firm value in the Nigerian consumer goods sector. This supports the notion that dividends play an essential signaling role in the market and are especially important in emerging economies where dividends are seen as tangible proof of profitability. Investors appear to reward firms with consistent and higher dividend payouts, reflecting a preference for current income and reduced uncertainty. The study also concludes, after controlling for firm size, that dividend per share alone is insufficient to drive firm value, and that a consistent payout policy is likely more important to investors than the amount paid per share. Additionally, firm size does not significantly influence market valuation, implying that efficiency and strategic positioning, rather than asset base alone, are more critical in determining firm value in Nigeria's consumer goods sector.

Based on these conclusions, several recommendations are proposed as follows:

- i. Regulatory bodies such as the Financial Reporting Council of Nigeria (FRCN) and the Securities and Exchange Commission (SEC) should enhance surveillance and monitoring mechanisms to detect and curb earnings management. Although the study found a positive short-term relationship between earnings management and firm value, this practice undermines the integrity of financial reporting and may lead to long-term harm to the firm's reputation and investor trust.
- ii. Listed consumer goods firms should adopt and maintain a clear, transparent, and consistent dividend policy. The findings suggest that the market values predictability and reliability in dividend distributions more than the actual dividend per share. Firms should therefore prioritize dividend policy as a strategic tool for investor relations and market positioning.
- iii. Managers and boards of directors should place more emphasis on operational efficiency and profitability rather than the expansion of the asset base. Since firm size was not a significant determinant of value, merely increasing assets without ensuring efficient resource allocation and productivity may not yield the desired market benefits.
- iv. Lastly, investors should be educated on how to critically analyze financial statements and detect signs of earnings manipulation. This will enhance the quality of decision-making and ensure that market reactions are based on accurate interpretations of financial performance.

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APPENDICES

```
. xtset firm_id year, yearly
      panel variable:  firm_id (strongly balanced)
      time variable:  year, 2012 to 2023
              delta:  1 year
. sum emv emg dpr dps fsz, detail
```

emv				
Percentiles	Smallest			
1%	.5	.5		
5%	1	.5		
10%	2	.5	Obs	192
25%	5	1	Sum of Wgt.	192
50%	14		Mean	92.33073
75%	34	Largest	Std. Dev.	271.9816
90%	125	1380	Variance	73974
95%	850	1420	Skewness	3.932147
99%	1500	1500	Kurtosis	17.83354

emg				
Percentiles	Smallest			
1%	-2.9225	-4.1774		
5%	-.8394	-2.9225		
10%	-.4725	-1.7193	Obs	192
25%	-.297	-1.4591	Sum of Wgt.	192
50%	-.1034		Mean	-.0134396
75%	.29595	Largest	Std. Dev.	.7476729
90%	.6403	1.3976	Variance	.5590148
95%	.8718	2.4574	Skewness	.6994317
99%	2.5398	2.5398	Kurtosis	18.40483

dpr				
Percentiles	Smallest			
1%	.1063	.0275		
5%	.15	.1063		
10%	.1888	.1085	Obs	192
25%	.32695	.1104	Sum of Wgt.	192
50%	.43615		Mean	.4355734
75%	.55865	Largest	Std. Dev.	.1690124
90%	.6356	.7846	Variance	.0285652
95%	.6936	.9467	Skewness	.1171716
99%	.9467	.9663	Kurtosis	2.940763

dps				
Percentiles	Smallest			
1%	.0102	.0056		
5%	.0289	.0102		
10%	.0567	.0115	Obs	192
25%	.119	.0138	Sum of Wgt.	192
50%	.19145		Mean	.2588589
75%	.3133	Largest	Std. Dev.	.2146602
90%	.5894	.8585	Variance	.046079
95%	.7846	.8638	Skewness	1.51614
99%	.9663	.9663	Kurtosis	4.918279

fsz				
Percentiles	Smallest			
1%	11	11		
5%	12	11		
10%	13	11	Obs	192
25%	16	11	Sum of Wgt.	192
50%	18		Mean	17.14583
75%	19	Largest	Std. Dev.	2.353472
90%	20	20	Variance	5.538831
95%	20	20	Skewness	-.92677
99%	20	20	Kurtosis	3.257006

```
. swilk tac rev_rec ppe roa
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
tac	192	0.23160	110.636	10.806	0.00000
rev_rec	192	0.90479	13.709	6.011	0.00000
ppe	192	0.62266	54.330	9.173	0.00000
roa	192	0.79530	29.473	7.769	0.00000

```
. reg tac rev_rec ppe roa
```

Source	SS	df	MS	Number of obs	=	192
Model	75.4989306	3	25.1663102	F(3, 188)	=	40.97
Residual	115.477101	188	.614239897	Prob > F	=	0.0000
				R-squared	=	0.3953
				Adj R-squared	=	0.3857
Total	190.976031	191	.999874509	Root MSE	=	.78373

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
tac					
rev_rec	-.4463343	.0978362	-4.56	0.000	-.6393321 -.2533365
ppe	.1802512	.1621021	1.11	0.268	-.1395215 .5000239
roa	3.516814	.323847	10.86	0.000	2.877974 4.155655
_cons	.016551	.1449756	0.11	0.909	-.2694369 .3025389

```
. hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
 Ho: Constant variance
 Variables: fitted values of tac

chi2(1) = 1.04
 Prob > chi2 = 0.3073

```
. vif
```

Variable	VIF	1/VIF
rev_rec	1.07	0.935727
roa	1.06	0.940241
ppe	1.01	0.991566
Mean VIF	1.05	

```
. xtreg tac rev_rec ppe roa, fe
```

Fixed-effects (within) regression
 Group variable: firm_id

Number of obs = 192
 Number of groups = 16

R-sq:
 within = 0.4956
 between = 0.0009
 overall = 0.3944

Obs per group:
 min = 12
 avg = 12.0
 max = 12

corr(u_i, Xb) = -0.3166
 F(3,173) = 56.67
 Prob > F = 0.0000

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
tac					
rev_rec	-.4856231	.1155517	-4.20	0.000	-.7136957 -.2575504
ppe	.1576	.1762422	0.89	0.372	-.1902617 .5054617
roa	4.212077	.3258826	12.93	0.000	3.568859 4.855295
_cons	.0105132	.1572214	0.07	0.947	-.299806 .3208324
sigma_u	.38602054				
sigma_e	.7273501				
rho	.21976528	(fraction of variance due to u_i)			

F test that all u_i=0: F(15, 173) = 3.02
 Prob > F = 0.0003

```
. est store fe
```

```
. xtreg tac rev_rec ppe roa, re

Random-effects GLS regression           Number of obs   =       192
Group variable: firm_id                 Number of groups  =       16

R-sq:                                Obs per group:
    within = 0.4948                      min =          12
    between = 0.0000                     avg =         12.0
    overall = 0.3953                      max =          12

Wald chi2(3) =       124.12
corr(u_i, X) = 0 (assumed)              Prob > chi2       =       0.0000
```

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
rev_rec	-.4472167	.0981055	-4.56	0.000	-.6395	-.2549334
ppe	.1802523	.162288	1.11	0.267	-.1378264	.498331
roa	3.533553	.3236602	10.92	0.000	2.899191	4.167915
_cons	.0160401	.14542	0.11	0.912	-.2689779	.3010582
sigma_u	.03574587					
sigma_e	.7273501					
rho	.00240945	(fraction of variance due to u_i)				

```
. est store re
. hausman fe re, sigmamore
```

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
rev_rec	-.4856231	-.4472167	-.0384064	.0761331
ppe	.1576	.1802523	-.0226523	.0976548
roa	4.212077	3.533553	.6785243	.133783

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

```
Test: Ho: difference in coefficients not systematic
      chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
           =      2.60
      Prob>chi2 =      0.4574
```

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

```
tac[firm_id,t] = Xb + u[firm_id] + e[firm_id,t]
```

Estimated results:

	Var	sd = sqrt(Var)
tac	.9998745	.9999373
e	.5290382	.7273501
u	.0012778	.0357459

```
Test:   Var(u) = 0
           chibar2(01) =    13.35
           Prob > chibar2 =    0.0001
```

```
. xtreg tac rev_rec ppe roa, re
```

```
Random-effects GLS regression           Number of obs   =       192
Group variable: firm_id                 Number of groups  =       16

R-sq:                                Obs per group:
    within = 0.4948                      min =          12
    between = 0.0000                     avg =         12.0
    overall = 0.3953                      max =          12

Wald chi2(3) =       124.12
corr(u_i, X) = 0 (assumed)              Prob > chi2       =       0.0000
```

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
rev_rec	-.4472167	.0981055	-4.56	0.000	-.6395	-.2549334
ppe	.1802523	.162288	1.11	0.267	-.1378264	.498331
roa	3.533553	.3236602	10.92	0.000	2.899191	4.167915
_cons	.0160401	.14542	0.11	0.912	-.2689779	.3010582
sigma_u	.03574587					
sigma_e	.7273501					
rho	.00240945	(fraction of variance due to u_i)				

```
. predict residualerror
(option xb assumed; fitted values)
```

. swilk fmv emg dpr dps fsz

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
fmv	192	0.35048	93.519	10.420	0.00000
emg	192	0.20525	114.429	10.883	0.00000
dpr	192	0.43884	80.798	10.084	0.00000
dps	192	0.91480	12.267	5.756	0.00000
fsz	192	0.18580	117.230	10.939	0.00000

. pwcorr fmv emg dpr dps fsz, star (0.05) sig

	fmv	emg	dpr	dps	fsz
fmv	1.0000				
emg	0.0945 0.1923	1.0000			
dpr	0.7837* 0.0000	-0.0060 0.9342	1.0000		
dps	0.2226* 0.0019	0.2068* 0.0040	0.2441* 0.0006	1.0000	
fsz	-0.0381 0.5999	-0.0083 0.9086	-0.0143 0.8442	0.0935 0.1971	1.0000

. reg fmv emg dpr dps fsz

Source	SS	df	MS	Number of obs	=	192
Model	8829942.14	4	2207485.53	F(4, 187)	=	77.90
Residual	5299000.53	187	28336.9012	Prob > F	=	0.0000
Total	14128942.7	191	73973.5218	R-squared	=	0.6250
				Adj R-squared	=	0.6169
				Root MSE	=	168.34

fmv	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
emg	.4430598	.2120097	2.09	0.038	.0248217 .8612979
dpr	22.00804	1.305917	16.85	0.000	19.43182 24.58426
dps	1.682646	5.376041	0.31	0.755	-8.922837 12.28813
fsz	-.6410071	1.048212	-0.61	0.542	-2.708847 1.426832
_cons	-14.06214	92.18714	-0.15	0.879	-195.9226 167.7983

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance
 Variables: fitted values of fmv

chi2(1) = 0.08
 Prob > chi2 = 0.7749

. vif

Variable	VIF	1/VIF
dps	1.13	0.887293
dpr	1.07	0.935558
emg	1.05	0.952952
fsz	1.01	0.988859
Mean VIF	1.06	

```
. xtreg fmv emg dpr dps fsz, fe

Fixed-effects (within) regression              Number of obs   =       192
Group variable: firm_id                      Number of groups =        16

R-sq:                                       Obs per group:
    within = 0.0099                        min           =        12
    between = 0.4570                       avg           =       12.0
    overall  = 0.3505                       max           =        12

corr(u_i, Xb) = 0.5741                      F(4,172)         =        0.43
                                           Prob > F          =       0.7878
```

	fmv	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	emg	-.0481324	.1064849	-0.45	0.652	-.2583178 .162053
	dpr	.9739717	1.055056	0.92	0.357	-1.108553 3.056497
	dps	4.825833	9.556659	0.50	0.614	-14.0376 23.68926
	fsz	-.2284609	.6363449	-0.36	0.720	-1.484512 1.02759
	_cons	6.686855	165.2478	0.04	0.968	-319.4878 332.8615
	sigma_u	259.25216				
	sigma_e	78.761327				
	rho	.91550304	(fraction of variance due to u_i)			

F test that all u_i=0: F(15, 172) = 45.48 Prob > F = 0.0000

```
. est store fe
```

```
. xtreg fmv emg dpr dps fsz, re

Random-effects GLS regression              Number of obs   =       192
Group variable: firm_id                      Number of groups =        16

R-sq:                                       Obs per group:
    within = 0.0068                        min           =        12
    between = 0.8096                       avg           =       12.0
    overall  = 0.5755                       max           =        12

Wald chi2(4) = 43.25
corr(u_i, X) = 0 (assumed)                 Prob > chi2       =       0.0000
```

	fmv	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
	emg	.1353155	.1509612	0.90	0.370	-.160563 .431194
	dpr	8.051047	1.338112	6.02	0.000	5.428395 10.6737
	dps	11.7235	7.848503	1.49	0.135	-3.659286 27.10628
	fsz	-.5267909	.8714307	-0.60	0.546	-2.234764 1.181182
	_cons	-138.2126	136.6972	-1.01	0.312	-406.1342 129.7091
	sigma_u	55.388422				
	sigma_e	78.761327				
	rho	.33090316	(fraction of variance due to u_i)			

```
. est store re
```

```
. hausman fe re, sigmamore
```

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
emg	-.0481324	.1353155	-.1834479	.026575
dpr	.9739717	8.051047	-7.077076	.7183244
dps	4.825833	11.7235	-6.897664	11.29799
fsz	-.2284609	-.5267909	.29833	.2822596

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 3.28
 Prob>chi2 = 0.5119

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

```
fmv[firm_id,t] = Xb + u[firm_id] + e[firm_id,t]
```

Estimated results:

	Var	sd = sqrt(Var)
fmv	.0245183	.1565832
e	.0075515	.0868993
u	.000059	.0076809

Test: Var(u) = 0

chibar2(01) = 0.12
 Prob > chibar2 = 0.3656