

Audit Quality and Market Value of Listed Industrial Goods Firms in Nigeria: The Moderating Role of Earnings Management

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ABSTRACT

This study examines whether earnings management conditions the relationship between audit quality and market value among listed industrial goods firms in Nigeria. Using a balanced panel of 10 firms over the period 2015–2025, the study analyses 110 firm-year observations. Market value is measured by Tobin's Q, while audit quality is represented by audit fee, audit tenure and Big Four auditor status. Earnings management is measured by the absolute value of discretionary accruals. The hypotheses are estimated using pooled panel regressions with firm-clustered standard errors, complemented by alternative specifications incorporating firm size, leverage, return on assets and year effects. Given the small number of firms, the interaction effects are further evaluated using wild-cluster bootstrap inference. The results show that audit fee and audit tenure are positively associated with market value, whereas Big Four auditor status has no significant direct relationship with Tobin's Q. Earnings management is negatively associated with market value and weakens the positive relationships of audit fee and audit tenure with market value. Robustness analysis, however, indicates that the moderating effect is stronger and more stable for audit tenure; the audit-fee interaction becomes only marginal under few-cluster inference, while the Big Four interaction remains insignificant. The findings suggest that the valuation relevance of audit-quality attributes depends partly on the credibility of reported earnings, with audit tenure providing the most robust conditional evidence.

Keywords: Audit quality; earnings management; market value; audit fee; audit tenure; Tobin's Q; Nigeria

INTRODUCTION

Investors rely heavily on published financial statements when forming expectations about the value and prospects of listed companies. The usefulness of those statements, however, depends on the confidence investors place in the numbers reported by management. External auditing is intended to strengthen that confidence by providing independent assurance over financial reporting. The difficulty is that audit quality cannot be observed directly by investors. They consequently infer it from visible characteristics of the audit engagement, including the reputation of the audit firm, the amount paid for the audit and the length of the auditor-client relationship. These characteristics are frequently used as proxies for audit quality, yet their implications for market valuation remain far from settled. Evidence on Big Four status, audit fees and audit tenure continues to vary across markets and empirical settings (Francis, 2004; DeFond & Zhang, 2014). The issue is therefore not merely whether auditing matters for firm value, but whether particular features of an audit engagement provide information that investors continue to value when the credibility of reported earnings is uncertain.

This concern is especially relevant in the presence of earnings management. Accrual accounting requires management to exercise judgement over depreciation, impairment, provisions, revenue recognition, inventory valuation and several other estimates. Such discretion is a legitimate feature of financial reporting, but it becomes problematic when accounting choices are used to portray performance in a manner that departs from the underlying economic position of the firm (Healy & Wahlen, 1999). In such circumstances, audit quality and earnings quality may convey competing signals. A reputable auditor, substantial audit expenditure or a long-standing auditor-client relationship may ordinarily strengthen confidence in reported information, but that reassurance may be weakened when discretionary accruals are relatively high. Earnings management may

therefore influence not only firm value directly but also the extent to which investors attach value to observable audit-quality attributes.

The Nigerian market provides an important setting for examining this issue. Regulatory reforms, particularly the Financial Reporting Council of Nigeria's Audit Regulations 2020, have strengthened requirements relating to audit quality, independence and auditor rotation (FRCN, 2020). Despite these developments, empirical evidence from Nigeria remains inconsistent. Okolie (2014), for example, reports that auditor size significantly influences share prices, whereas Ajekwe and Ibiamke (2017), Aondoakaa and Achika (2022), and Ogbu et al. (2024) show that conclusions differ according to the audit-quality measure, sector and model employed. Evidence on the relationship between auditing and earnings management is similarly mixed. These differences suggest that the market consequences of audit quality may be more complex than a single direct relationship between an audit-quality proxy and firm value.

This complexity is particularly relevant to industrial goods firms. Their operations are typically capital intensive and involve substantial judgement in accounting for property, plant and equipment, depreciation, impairment, inventories, provisions and foreign-currency exposures. Such features create considerable scope for accrual estimation and make credible financial reporting especially important to investors. Yet Nigerian studies have largely considered audit quality either as a direct determinant of firm value or as a mechanism for constraining earnings management. Far less attention has been given to the possibility that the valuation effect of an audit arrangement itself may depend on the extent of earnings management. Studies combining audit quality, earnings management and valuation are relatively limited and generally treat earnings management as a mediator or audit quality as the moderating variable (Suwarno et al., 2021; Abu Afifa et al., 2023; Shaikh et al., 2026). The reverse question has received much less attention: does greater earnings management weaken the market relevance of audit-quality attributes?

This paper examines that question using listed industrial goods firms in Nigeria. Audit quality is represented separately by audit fee, audit tenure and Big Four auditor status rather than being treated as a single construct. Market value is measured by Tobin's Q, while the magnitude of discretionary accruals captures earnings management. The analysis first examines the direct relationships between the three audit-quality attributes and market value and subsequently evaluates whether those relationships change as earnings management increases. Treating the audit-quality proxies separately is important because audit fee, tenure and auditor size represent different aspects of the audit relationship and need not carry the same information to investors.

The paper contributes to the literature by shifting attention from whether audit quality or earnings management independently affects firm value to the conditions under which audit-quality attributes retain their valuation relevance. In particular, it examines whether the market significance of audit effort, accumulated auditor-client knowledge and auditor reputation changes when reported earnings contain greater discretionary adjustment. In doing so, the study provides evidence from a sector in which accounting judgement is especially important and offers a more conditional interpretation of the relationship between auditing and market valuation.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Conceptual and Theoretical Background

Audit quality is inherently difficult to observe because the processes that determine the quality of an audit take place largely within the auditor-client relationship. DeAngelo (1981) conceptualises audit quality in terms of the auditor's ability to detect material misstatement and willingness to report it, thereby emphasising competence and independence. Subsequent research has broadened this view by recognising that audit outcomes also reflect auditor incentives, expertise, engagement procedures and client characteristics (Francis, 2004; DeFond & Zhang, 2014). The International Auditing and Assurance Standards Board (IAASB, 2014) similarly treats audit quality as a multidimensional construct shaped by inputs, processes and the environment in which the audit is performed. Since these dimensions cannot be observed directly from archival data, empirical studies typically rely on measurable attributes that capture particular aspects of the audit rather than audit quality in its entirety.

This study focuses on audit firm size, audit fee and audit tenure because each reflects a different dimension of the audit relationship. Big Four status captures differences in organisational resources, specialist capacity and reputational exposure, but auditor brand alone does not reveal the level of professional scepticism or effort devoted to a specific engagement. Audit fee may provide information about the resources committed to the audit, although it may also reflect client complexity, engagement risk or economic dependence. Audit tenure captures accumulated client-specific knowledge, which can improve audit effectiveness, but prolonged relationships may also create familiarity threats to independence. Treating the three attributes separately therefore avoids the assumption that they are interchangeable measures of the same underlying phenomenon.

The outcome of interest is market value, measured using Tobin's Q. A market-based measure is appropriate because the study is concerned with investors' assessment of the firm rather than accounting performance alone. Tobin's Q captures the relationship between the market's valuation of the firm and the resources employed in generating that value. Earnings management, in turn, is represented by the absolute value of discretionary accruals. Building on Jones (1991) and the Modified Jones specification of Dechow et al. (1995), discretionary accruals are used to capture the component of accruals more closely associated with managerial judgement. Using their absolute value focuses attention on the magnitude of discretionary reporting behaviour, irrespective of whether management increases or decreases reported earnings.

Agency theory provides the principal explanation for why these variables may be related. The separation of ownership from control gives managers access to information that shareholders cannot observe directly and creates opportunities for managerial interests to diverge from those of investors (Jensen & Meckling, 1976). External auditing serves as an important monitoring mechanism within this setting. A well-resourced audit, a reputable auditor or the knowledge developed through repeated engagements may reduce information asymmetry by increasing confidence in reported financial information. Earnings management complicates this monitoring relationship. Where discretionary accruals remain relatively high, investors may question whether apparently strong audit arrangements have constrained managerial reporting discretion as effectively as expected.

Signaling theory provides the market dimension of this argument. Under information asymmetry, observable corporate choices may convey information about otherwise unobservable quality (Spence, 1973). The appointment of a reputable auditor, the resources committed to the audit and the continuity of the auditor-client relationship can therefore operate as signals of reporting credibility. Such signals, however, are unlikely to be interpreted independently of the financial statements themselves. Where reported earnings contain substantial discretionary adjustments, investors may discount the reassurance ordinarily associated with those audit characteristics. Positive Accounting Theory provides a complementary explanation by identifying the contractual and economic incentives that may encourage managers to exercise accounting discretion in response to compensation arrangements, debt covenants or political pressures (Watts & Zimmerman, 1986).

The theoretical argument is consequently conditional rather than purely direct. Audit-quality attributes may strengthen market confidence because they signal more effective monitoring, but the value attached to those signals should depend partly on the credibility of the earnings being assured. This reasoning provides the basis for examining earnings management not simply as another explanatory variable but as a factor capable of changing the relationship between audit quality and market value.

Empirical Review

Empirical evidence on audit firm size and market valuation remains divided. Nigerian studies by Okolie (2014) and Erasmus and Micah (2021) report positive valuation effects associated with larger audit firms, lending support to the argument that the technical resources and reputational capital of large audit networks strengthen investor confidence. Related international evidence also suggests quality differences within large audit networks. Francis and Yu (2009) associate larger Big Four offices with less aggressive earnings management, while Choi et al. (2010) report relationships among audit office size, audit quality and audit pricing. These findings are not universal, however. Ogbu et al. (2024) report a negative auditor-size effect among Nigerian financial-services firms, Kalita and Tiwari (2025) find a positive but insignificant relationship across SAARC countries, and Manoel et al. (2026) find no significant Big Four premium in the value investors attach to corporate cash in Latin

America. The evidence therefore suggests that auditor reputation may influence perceptions of quality without necessarily producing an independent valuation premium in every institutional or sectoral setting.

Audit fees present a similar interpretive difficulty. Higher fees may support additional audit hours, specialist involvement and more extensive review procedures, but they also reflect client size, complexity and engagement risk. Ogbu et al. (2024) find a positive relationship between audit fees and market value among Nigerian financial-services firms. Aly et al. (2026) likewise report evidence from Egypt linking audit fees positively with audit quality and audit quality with firm value. Other studies are less supportive. Erasmus and Micah (2021) obtain a negative but statistically insignificant audit-fee coefficient, while Kalita and Tiwari (2025) identify a nonlinear association between audit fees and Tobin's Q. These differences make it difficult to infer audit quality directly from the amount paid to the auditor. The more relevant empirical question is whether audit fees retain valuation relevance after other dimensions of the audit relationship and the credibility of reported earnings are taken into account.

Evidence on audit tenure is shaped by the competing effects of learning and familiarity. Longer engagements may allow auditors to acquire knowledge of the client's systems, controls, operating environment and recurring areas of judgement. Myers et al. (2003) and Ghosh and Moon (2005) provide evidence consistent with benefits from longer auditor-client relationships, while Adebayo et al. (2025) report a positive relationship between audit tenure and firm value among Nigerian banks. Prolonged tenure may nevertheless weaken independence if familiarity reduces professional scepticism. Erasmus and Micah (2021) report a negative tenure effect, Amuta and Egbe (2026) identify adverse long-run tenure effects among Nigerian banks, and Carey and Simnett (2006) document deterioration in some audit-quality indicators at extended partner tenure. The empirical literature therefore provides no basis for assuming that longer tenure is invariably beneficial or detrimental; its valuation effect appears to depend on whether the knowledge benefits outweigh the potential independence costs.

The literature connecting audit quality with earnings management further illustrates why audit-quality proxies should be considered separately. Becker et al. (1998) report larger discretionary accruals among clients of smaller auditors, while Francis and Yu (2009) find less aggressive earnings management among clients of larger Big Four offices. Nigerian evidence is more varied. Ajekwe and Ibiamke (2017) report a negative but insignificant association between auditor size and earnings management, whereas Aondoakaa and Achika (2022), studying listed industrial goods firms, find that audit tenure is relevant while audit firm size is not. Olajide et al. (2025) also report that normal audit fees are negatively associated with real earnings management among Nigerian non-financial firms. The differences across these studies suggest that audit fee, tenure and auditor size do not capture identical monitoring mechanisms and may therefore have different implications for managerial reporting behaviour.

Evidence on the market consequences of earnings management is equally unsettled. Ahmed and Ali (2022) find that earnings management is negatively associated with firm value among listed Nigerian oil and gas companies, while Malahim et al. (2022) report a negative but statistically insignificant relationship among Jordanian industrial firms. Isiaka et al. (2025), by contrast, find a positive relationship between discretionary accruals and Tobin's Q among Nigerian consumer-goods firms. These conflicting results may reflect differences in sectoral characteristics, institutional environments, investor interpretation and the estimation of discretionary accruals. They also caution against treating earnings management as having a uniform valuation effect across firms and markets.

The literature becomes considerably thinner when audit quality, earnings management and market value are examined jointly. Abu Afifa et al. (2023) find that earnings management mediates the relationship between audit quality and company value in Jordan, while Setyawan and Ghozali (2025) report that the mediating role of earnings management depends on the particular audit-quality proxy employed. Moderation studies also produce differing results. Suwarno et al. (2021) find no significant moderating effect of audit quality on the earnings management-firm value relationship, whereas Shaikh et al. (2026) report that stronger audit quality mitigates the adverse valuation consequences of earnings management. Although these studies demonstrate that the relationships are potentially conditional, their analytical direction differs from the one considered here. Earnings management is commonly treated as an outcome or mediator, while studies adopting moderation models tend to place audit quality in the moderating role.

What remains comparatively underexplored is whether the credibility of reported earnings conditions the market relevance of the audit arrangement itself. If investors interpret audit fee, tenure and auditor reputation as signals of assurance quality, the strength of those signals may depend on the level of discretionary accruals observed in the financial statements. Examining earnings management as the moderator therefore provides a different perspective on the same underlying reporting problem: it asks not whether audit quality constrains earnings management, but whether earnings management changes the value investors attach to observable audit-quality characteristics.

Research Gap and Hypotheses

The gap addressed by this study does not arise from an absence of research on audit quality, earnings management or firm value in Nigeria. Rather, it lies in how these relationships have generally been specified. Existing studies report inconsistent effects for audit firm size, audit fees and audit tenure, suggesting that the three proxies capture different dimensions of the audit relationship. Research on Nigerian industrial goods firms has focused largely on the direct effects of audit attributes or on whether audit quality constrains earnings management. At the same time, the relatively smaller body of research that combines audit quality, earnings management and valuation has generally treated earnings management as a mediator or outcome, or has assigned the moderating role to audit quality.

This leaves an important question unresolved. Mediation and moderation answer different theoretical questions. A mediation model asks whether earnings management is a mechanism through which audit quality is transmitted to firm value. The present moderation model instead asks whether the credibility of reported earnings changes the market relevance of the audit signal itself. Under signaling theory, this distinction is meaningful because the valuation content of an observable audit attribute should depend on whether other information in the financial statements reinforces or contradicts that signal. Under agency theory, high discretionary accruals may likewise indicate that a seemingly strong monitoring arrangement has not constrained reporting discretion as effectively as investors might expect. By treating earnings management as the conditioning variable and retaining the audit-quality proxies separately, the study therefore examines when particular audit signals retain valuation relevance rather than through what channel audit quality affects value.

Accordingly, the following hypotheses are tested:

H₁: Big Four auditor status is positively associated with the market value of listed industrial goods firms in Nigeria.

H₂: Audit fee is positively associated with the market value of listed industrial goods firms in Nigeria.

H₃: Audit tenure is positively associated with the market value of listed industrial goods firms in Nigeria.

H4a: Earnings management weakens the positive relationship between audit fee and the market value of listed industrial goods firms in Nigeria.

H4b: Earnings management weakens the positive relationship between audit tenure and the market value of listed industrial goods firms in Nigeria.

H4c: Earnings management weakens the positive relationship between Big Four auditor status and the market value of listed industrial goods firms in Nigeria.

METHODOLOGY

The study employs an ex post facto panel research design using observations from 10 listed industrial goods firms in Nigeria over the period 2015–2025. The balanced panel comprises 110 firm-year observations. An ex post facto design is appropriate because the study relies on historical corporate and market information over which the researchers have no control and seeks to examine associations among audit characteristics, earnings management and market valuation.

Market value is represented by Tobin's Q, while audit quality is examined through three observable attributes: audit fee, audit tenure and Big Four auditor status. These variables are treated as imperfect proxies rather than direct measures of an unobservable audit-quality construct. Audit fee can reflect audit effort but can also embody client size, complexity and engagement risk; audit tenure captures accumulated client knowledge but may also reflect persistent auditor-client characteristics; and Big Four status primarily captures auditor scale and reputation. Earnings management serves as the moderating variable and is represented by the absolute magnitude of discretionary accruals. The operational definitions are presented in Table 1.

Table 1 Measurement of Study Variables

Variable	Symbol	Operational Measurement	Role in Model
Market value	TobinQ	Tobin's Q, measured as the market value of equity plus the book value of debt, divided by total assets	Dependent variable
Audit fee	AFEE	Natural logarithm of annual audit fees	Audit-quality proxy
Audit tenure	ATEN	Number of consecutive years of the auditor-client relationship	Audit-quality proxy
Big Four auditor status	BIG4	Dummy variable coded 1 where the firm's external auditor is a Big Four audit firm and 0 otherwise	Audit-quality proxy
Earnings management	DA	Absolute value of discretionary accruals estimated using the Modified Jones approach; expressed in percentage points in the moderation analysis	Moderating variable

Note. AFEE = audit fee; ATEN = audit tenure; BIG4 = Big Four auditor status; DA = discretionary accruals. The absolute value of discretionary accruals captures the magnitude of accrual-based earnings management irrespective of direction.

The discretionary-accrual series used in the analysis was generated under the Modified Jones framework (Dechow et al., 1995). In that framework, accruals are scaled by lagged total assets and the nondiscretionary component is modelled using the change in revenue adjusted for the change in receivables together with property, plant and equipment; discretionary accrual is the residual component, and the study uses its absolute value so that the measure captures the magnitude rather than the direction of accrual discretion. The archived analytical dataset retained the final absolute DA series but did not retain the underlying first-stage firm-year inputs, signed residuals or coefficient estimates. Consequently, this revision does not claim to re-estimate the first-stage Modified Jones model or to verify whether its coefficients were estimated year-by-year or over a pooled estimation window. This limitation is stated explicitly because DA is central to the moderation analysis, and alternative signed, performance-matched or real-earnings-management measures cannot be reconstructed from the archived analytical file without returning to the underlying financial statements.

The empirical analysis proceeds in stages. Descriptive statistics are first used to examine the distribution and variation of the study variables, while Pearson correlation coefficients provide preliminary evidence on their pairwise associations. These analyses are followed by diagnostic tests designed to assess whether the regression estimates may be affected by multicollinearity or heteroskedasticity. Variance inflation factors are used to evaluate multicollinearity, while the Breusch–Pagan test is employed to examine whether the regression disturbances exhibit constant variance.

The principal equations are estimated using pooled panel regressions with standard errors clustered at the firm level. This choice is driven by the estimands in the study rather than by an assumption that firm heterogeneity is unimportant. BIG4 is constant within every sampled firm over the study period and would therefore be absorbed by firm fixed effects. Audit tenure also increases mechanically by one year within each firm; when firm and year effects are included jointly, ATEN becomes collinear with those effects and its direct coefficient cannot be separately identified. A two-way fixed-effects model therefore cannot estimate two of the three central direct audit-quality effects in the specification. Random-effects estimation would retain these variables, but it requires the firm-specific effect to be uncorrelated with audit fee, tenure, auditor choice and the other regressors, an

assumption that is difficult to defend in this setting. The pooled clustered model is therefore retained as the baseline association model, while firm fixed effects and year effects are used as sensitivity checks for the parameters that remain identified. The coefficients are interpreted throughout as conditional associations rather than causal effects.

The direct relationships between the audit-quality attributes and market value are examined using Model 1:

$$TobinQ_{it} = \beta_0 + \beta_1 AFEE_{it} + \beta_2 ATEN_{it} + \beta_3 BIG4_{it} + \varepsilon_{it}$$

where i denotes firm, t denotes year, and ε represents the disturbance term.

Model 2 introduces earnings management and the corresponding interaction terms to determine whether the valuation relevance of the audit-quality attributes changes with the level of discretionary accruals:

$$TobinQ_{it} = \beta_0 + \beta_1 AFEEc_{it} + \beta_2 ATENC_{it} + \beta_3 BIG4_{it} + \beta_4 DAC_{it} + \beta_5 (AFEEc \times DAC)_{it} + \beta_6 (ATENC \times DAC)_{it} + \beta_7 (BIG4 \times DAC)_{it} + \varepsilon_{it}$$

The continuous variables entering the interaction terms, AFEE, ATEN and DA, are mean-centred before estimation. Mean-centring does not alter the substantive interaction effect, but it makes the lower-order coefficients easier to interpret. Accordingly, the coefficients on AFEEc and ATENC indicate their respective associations with Tobin's Q when discretionary accruals are at their sample mean. The interaction coefficients are the principal parameters of interest because they indicate whether those associations strengthen or weaken as earnings management changes. In Model 2, discretionary accruals are expressed in percentage points to make the interaction coefficients more readily interpretable.

The moderation analysis is complemented by sensitivity tests designed to determine whether the focal coefficients depend on the baseline specification. Firm size, leverage and return on assets are introduced separately, and a further specification includes year effects. A combined specification containing all three firm-level controls was also examined as a diagnostic, but it produced severe multicollinearity in the interaction model: the VIFs were approximately 32.4 for DAC, 24.4 for leverage and 11.0 for firm size. Reporting the controls separately is therefore a deliberate parsimonious choice rather than a search for favourable significance levels. The controls are used to assess the stability of the focal coefficients, not to claim that endogeneity in audit fees or audit tenure has been eliminated.

A further inferential issue arises from the small number of firms. Although firm-clustered standard errors accommodate within-firm dependence, conventional cluster-robust inference can be unreliable with only 10 clusters. The principal interaction effects are therefore evaluated using a Webb-weight wild-cluster bootstrap-t procedure with 9,999 replications (Cameron et al., 2008; MacKinnon & Webb, 2017). The bootstrap results receive greater weight than conventional clustered p values when the two approaches differ. Statistical significance is assessed at the 5% level; bootstrap probabilities between 5% and 10% are described as suggestive or marginal rather than statistically significant.

RESULTS

Descriptive Statistics

The descriptive statistics in Table 2 indicate meaningful variation in both firm valuation and the audit-related characteristics included in the analysis. TobinQ averages 1.581, but ranges from 0.720 to 3.750, showing that the market valuation of the sampled firms differs considerably across observations. AFEE has a mean of 4.885, while ATEN averages 11.3 years and extends to 20 years in some firm-years. BIG4 has a mean of 0.600, indicating that 60 percent of the observations involve a Big Four auditor. DA averages 2.284 percent and ranges from 0.400 to 4.800 percent. The relatively long auditor tenures and the dispersion in DA are especially relevant because both variables enter directly into the moderation analysis.

Table 2 Descriptive Statistics

Variable	N	Mean	Std. Dev.	Minimum	Maximum
TobinQ	110	1.581	0.635	0.720	3.750
AFEE	110	4.885	0.627	3.892	6.619
ATEN	110	11.300	3.813	3.000	20.000
BIG4	110	0.600	0.492	0.000	1.000
DA (%)	110	2.284	1.038	0.400	4.800

Note. N = 110 firm-year observations. DA is reported in percentage points.

Correlation Analysis

The bivariate relationships reported in Table 3 provide an initial view of how the study variables move together. TobinQ is positively associated with AFEE ($r = 0.773$), ATEN ($r = 0.803$) and BIG4 ($r = 0.488$), whereas its relationship with DA is exceptionally strong and negative ($r = -0.900$). DA is also negatively related to AFEE ($r = -0.614$), ATEN ($r = -0.785$) and BIG4 ($r = -0.464$). These correlations do not establish causality, but the magnitude of the DA-TobinQ association requires particular caution because its squared correlation is approximately .810. Thus, DA alone is mechanically capable of accounting for a large share of the sample variation in TobinQ. The subsequent model-fit decomposition and robustness checks are therefore used to determine whether the very high R^2 of the moderation model reflects the DA main effect alone or whether the interaction terms contribute additional explanatory power.

Table 3 Pearson Correlation Matrix

Variable	TobinQ	AFEE	ATEN	BIG4	DA
TobinQ	1.000				
AFEE	0.773**	1.000			
ATEN	0.803**	0.503**	1.000		
BIG4	0.488**	0.652**	0.387**	1.000	
DA	-0.900**	-0.614**	-0.785**	-0.464**	1.000

Note. ** $p < .01$ (two-tailed).

Diagnostic Tests

The diagnostic results in Table 4 indicate that multicollinearity is manageable in the baseline models. Model 1 records a mean VIF of 1.701 and a maximum of 1.998. As expected in a model containing interaction terms, the VIFs increase in Model 2, but the mean value of 4.160 and maximum of 5.956 remain below levels normally associated with severe collinearity. The Breusch-Pagan statistics, however, reject the assumption of constant error variance in both Model 1 ($\chi^2 = 16.301$, $p = .001$) and Model 2 ($\chi^2 = 14.921$, $p = .037$). The reported inference therefore relies on firm-clustered robust standard errors, which provide a more appropriate basis for significance testing in the presence of heteroskedasticity and within-firm dependence.

Table 4 Diagnostic Tests

Diagnostic / Variable	Model 1	Model 2	Interpretation
VIF: AFEE / AFEEc	1.998	5.956	Acceptable; higher in interaction model

VIF: ATEN / ATENc	1.35	2.846	Acceptable
VIF: BIG4	1.755	2.374	Acceptable
VIF: DAc	-	5.919	Moderate but below 10
VIF: AFEEc × DAc	-	4.625	Acceptable for interaction term
VIF: ATENc × DAc	-	2.099	Acceptable for interaction term
VIF: BIG4 × DAc	-	5.305	Moderate but below 10
Mean VIF	1.701	4.16	No severe multicollinearity
Breusch-Pagan χ^2	16.301	14.921	Tests constant error variance
Breusch-Pagan p-value	0.001	0.037	Significant in both models
Decision	Heteroskedasticity present	Heteroskedasticity present	Use firm-clustered robust standard errors

Note. VIF = variance inflation factor; c denotes a mean-centered variable.

Regression Results

Direct Effect of Audit Quality on Market Value

Table 5 presents the regression estimates for the direct relationship between the three audit-quality attributes and market value.

Table 5 Direct Effect of Audit Quality on Market Value

Variable/Statistic	Coefficient	Clustered SE	t-statistic	p-value
C	-2.113	0.506	-4.172	.002
AFEE	0.554	0.111	4.978	.001
ATEN	0.093	0.015	6.426	<.001
BIG4	-0.112	0.165	-0.679	.514
R ²	0.832			
Adjusted R ²	0.827			
Cluster-robust F-statistic	35.648			<.001
N	110			

Note. Dependent variable = TobinQ. Standard errors are clustered at the firm level.

The direct-effect model is statistically significant ($F = 35.648$, $p < .001$), indicating that the audit-quality variables are jointly associated with the market value of the sampled firms. The model records an R^2 of .832 and an adjusted R^2 of .827, showing a strong fit within the sample. The explanatory power should nevertheless be interpreted as a feature of the estimated relationship rather than evidence of causality, given the observational nature of the data.

Audit fee has a positive and statistically significant coefficient ($\beta = .554$, $p = .001$). Holding audit tenure and audit firm size constant, higher audit fees are associated with higher TobinQ. The result provides support for H2 and suggests that the level of resources committed to the audit engagement contains information that is relevant to market valuation. The coefficient should not, however, be interpreted to mean that an increase in audit fees

mechanically increases firm value, since audit pricing may also reflect differences in engagement complexity and risk.

Audit tenure is also positive and statistically significant ($\beta = .093$, $p < .001$). This indicates that longer auditor-client relationships are associated with higher market value after accounting for audit fee and audit firm size. H3 is therefore supported. Within the estimated model, the result is consistent with the possibility that the knowledge accumulated by an auditor through successive engagements has valuation relevance.

BIG4, in contrast, has a negative but statistically insignificant coefficient ($\beta = -.112$, $p = .514$). There is consequently no statistical evidence that firms audited by Big Four audit firms command a higher TobinQ after audit fee and audit tenure are considered. H1 is therefore not supported. More importantly, the result indicates that auditor brand does not have an independent valuation effect in this sample merely because the auditor belongs to the Big Four category.

The direct-effect model therefore reveals an important distinction among the audit-quality proxies. Audit fee and audit tenure are positively associated with market value, whereas Big Four status does not independently explain market valuation. This distinction provides the basis for examining whether those relationships remain unchanged when the credibility of reported earnings is taken into account.

Moderating Effect of Earnings Management on the Audit Quality–Market Value Relationship

The moderation analysis is reported separately in Table 6. Audit fee, audit tenure and discretionary accruals were mean-centred before the interaction terms were constructed. Consequently, the main coefficients of AFEEc and ATENc represent their relationships with TobinQ when earnings management is at its sample mean. The interaction coefficients provide the principal evidence for determining whether these relationships change as earnings management increases.

Table 6 Moderating Effect of Earnings Management on the Audit Quality–Market Value Relationship

Variable/Statistic	Coefficient	Clustered SE	t-statistic	p-value
C	1.453	0.034	42.629	<.001
AFEEc	0.181	0.078	2.329	.045
ATENc	0.038	0.010	4.001	.003
BIG4	-0.028	0.042	-0.661	.525
DAc	-0.409	0.033	-12.214	<.001
AFEEc $\times$ DAc	-0.164	0.054	-3.047	.014
ATENc $\times$ DAc	-0.030	0.003	-9.933	<.001
BIG4 $\times$ DAc	0.048	0.038	1.271	.235
R ²	0.985			
Adjusted R ²	0.983			
Cluster-robust F-statistic	7163.280			<.001
N	110			

Note. Dependent variable = TobinQ. AFEEc, ATENc, and DAc denote mean-centered audit fee, audit tenure, and discretionary accruals, respectively. Standard errors are clustered at the firm level.

The moderation model is statistically significant ($F = 7163.280$, $p < .001$), with an R^2 of .985 and an adjusted R^2 of .983. The size of this R^2 is unusual and is not treated as evidence of causal explanatory power. A sequential comparison shows that the direct-effects model has $R^2 = .832$; adding DAc without the interaction terms raises R^2 to .916 ($\Delta R^2 = .084$); adding the three interactions raises it further to .985 (additional $\Delta R^2 = .068$). DA by itself yields $R^2 \approx .810$, which is consistent with the squared bivariate correlation between DA and TobinQ. The high fit therefore reflects both the strong DA-TobinQ association and additional interaction structure rather than centring or percentage-point scaling, neither of which changes model fit. These features warrant caution about possible shared trends, measurement structure and overfitting in a small panel.

At the mean level of earnings management, AFEEc remains positively associated with market value ($\beta = .181$, $p = .045$). The coefficient is smaller than the corresponding direct-effect estimate, indicating that the valuation relationship attached to audit fee is sensitive to the level of earnings management. ATENc likewise remains positive and statistically significant ($\beta = .038$, $p = .003$) when earnings management is at its mean. BIG4 remains statistically insignificant ($\beta = -.028$, $p = .525$), reinforcing the absence of an independent Big Four valuation premium in the estimated models.

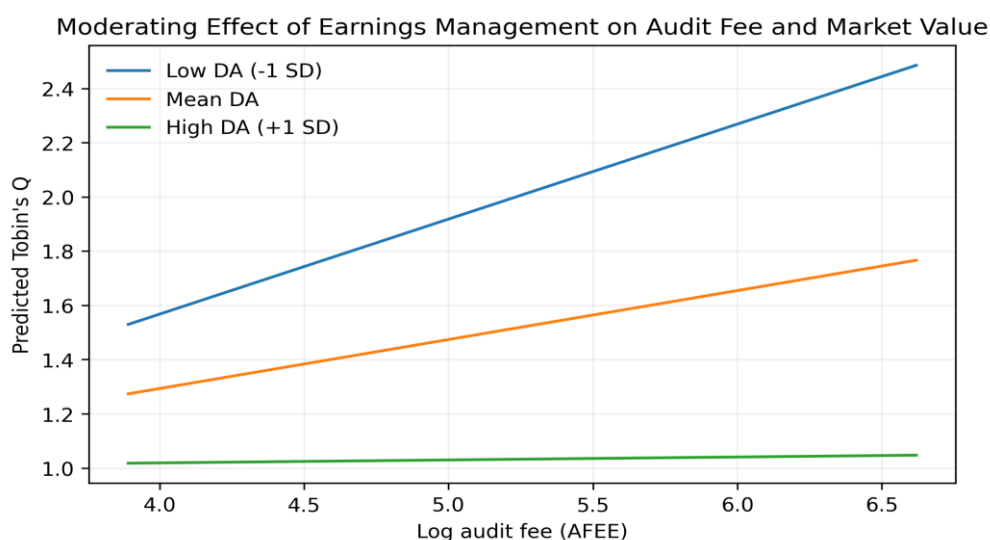
Earnings management itself has a negative and statistically significant coefficient (DAc: $\beta = -.409$, $p < .001$). Thus, at the reference values implied by the centred model, higher discretionary accruals are associated with lower market value. The magnitude and significance of this coefficient suggest that the credibility of reported earnings is an important consideration in understanding market valuation within the sample.

The AFEEc $\times$ DAc coefficient is negative under conventional firm-clustered inference ($\beta = -.164$, $p = .014$), indicating that the positive AFEE-TobinQ slope becomes flatter as discretionary accruals increase. In substantive terms, a one-percentage-point increase in DA reduces the estimated AFEE-TobinQ slope by about .164, holding the remaining terms at their reference values. This pattern is consistent with H4a in direction. However, because the panel contains only 10 firms, the conventional clustered result is not treated as decisive: the Webb-weight wild-cluster bootstrap gives $p = .083$. The audit-fee moderation evidence is therefore described as suggestive rather than statistically significant at the 5% level.

The ATENc $\times$ DAc interaction is negative and much more stable ($\beta = -.030$, conventional $p < .001$). The coefficient implies that each additional percentage point of discretionary accruals reduces the estimated marginal association between audit tenure and TobinQ by about .030. Unlike the audit-fee interaction, this result remains significant under the few-cluster bootstrap ($p = .002$). H4b is therefore supported: the valuation relevance associated with accumulated auditor-client knowledge is substantially weaker when discretionary accruals are high.

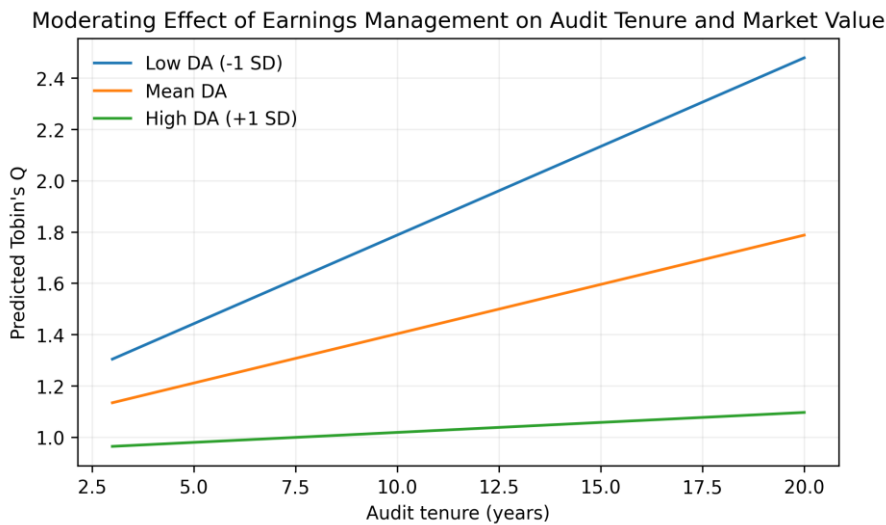
The economic meaning of these interactions becomes clearer from the conditional slopes. For audit fee, the estimated slope declines from .350 when earnings management is one standard deviation below its mean to .181 at the mean and only .011 when earnings management is one standard deviation above the mean. A similar pattern is observed for audit tenure, where the estimated slope declines from .069 to .038 and subsequently to .008 across the same levels of earnings management. These progressive reductions indicate that the positive valuation associations of audit fee and audit tenure are almost extinguished when discretionary accruals are relatively high. This is a more informative finding than the significance of the interaction coefficients alone because it demonstrates the substantive manner in which earnings management changes the relationships.

Figure 1 Conditional Relationship Between Audit Fee and Market Value at Different Levels of Earnings Management



Note. Predicted values are based on Model 2. Low and high DA correspond to one standard deviation below and above the sample mean, respectively. Other continuous predictors are held at their centred means and BIG4 is held at the non-Big Four reference category. The figure illustrates the flattening of the audit-fee slope as DA rises.

Figure 2 Conditional Relationship Between Audit Tenure and Market Value at Different Levels of Earnings Management



Note. Predicted values are based on Model 2. Low and high DA correspond to one standard deviation below and above the sample mean, respectively. Other continuous predictors are held at their centred means and BIG4 is held at the non-Big Four reference category. The attenuation of the tenure slope at high DA is visually pronounced.

The $BIG4 \times DAc$ interaction is positive but statistically insignificant ($\beta = .048$, conventional $p = .235$), and the Webb-weight bootstrap provides even less evidence against the null ($p = .374$). Earnings management therefore does not significantly alter the relationship between Big Four auditor status and market value. H4c is not supported.

The three interaction terms are jointly significant under conventional clustered inference, $F(3, 9) = 72.498$, $p < .001$. The individual few-cluster results, however, are more informative for the separate hypotheses. H4b receives the clearest support, H4a is supported only at a suggestive 10% level under the preferred few-cluster inference, and H4c is not supported. The moderation conclusion is therefore deliberately differentiated across the three audit-quality proxies rather than stated as a single omnibus finding.

Robustness Checks

Table 7

Specification	AFEE (Direct Model)	ATEN (Direct Model)	AFEEc $\times$ DAc	ATENC $\times$ DAc	BIG4 $\times$ DAc
Baseline	.554 (.001)	.093 (<.001)	-.164 (.014)	-.030 (<.001)	.048 (.235)
+ Firm size	.226 (.018)	.066 (.004)	-.197 (.028)	-.030 (<.001)	.074 (.222)
+ Leverage	.251 (.001)	.000 (.980)	-.168 (.020)	-.026 (<.001)	.056 (.216)
+ ROA	.238 (<.001)	.058 (<.001)	-.160 (.002)	-.026 (<.001)	.049 (.113)
+Year effects	.635 (<.001)	.012 (.813)	-.147 (.011)	-.035 (<.001)	.069 (.102)

Robustness Checks for Direct and Moderating Effects

Note. Entries are regression coefficients with p values in parentheses. Each sensitivity specification introduces the indicated control separately.

Table 7 examines whether the principal findings are sensitive to alternative model specifications. The results provide strong evidence that the positive association between audit fee and market value is reasonably robust. In the baseline model, AFEE has a positive and statistically significant coefficient of .554 ($p = .001$). The coefficient remains positive and significant after controlling separately for firm size (.226, $p = .018$), leverage (.251, $p = .001$), profitability measured by ROA (.238, $p < .001$), and year effects (.635, $p < .001$). Although the magnitude of the coefficient varies across specifications, its positive sign and statistical significance are preserved. This suggests that the observed association between audit fees and market value is not merely attributable to differences in firm size, capital structure, profitability or common year-specific influences.

The evidence for audit tenure is less stable. ATEN is positive and significant in the baseline specification (.093, $p < .001$) and remains significant after controlling for firm size (.066, $p = .004$) and ROA (.058, $p < .001$). However, its coefficient falls to virtually zero when leverage is introduced (.000, $p = .980$) and becomes statistically insignificant after controlling for year effects (.012, $p = .813$). The direct audit-tenure result should therefore be interpreted cautiously. While the baseline evidence suggests a positive association between tenure and market value, that relationship appears sensitive to firms' financing structure and to time-specific influences common across the sampled companies. Consequently, the evidence for a direct valuation effect of audit tenure is weaker than that obtained for audit fees.

Across the alternative clustered specifications, $AFEEc \times DAC$ remains negative, ranging from -.147 to -.197. These conventional results are useful for assessing coefficient stability but do not override the few-cluster bootstrap. The appropriate conclusion is therefore that the direction of the fee interaction is stable across model variants, while its statistical strength is only suggestive once the small number of clusters is taken seriously.

The $ATENC \times DAC$ interaction is more convincing. It remains negative in every sensitivity model, ranging from -.026 to -.035, and the few-cluster bootstrap also rejects the null. This consistency is especially important because the direct tenure coefficient is specification-sensitive: the conditional tenure result survives checks that weaken the unconditional association.

In contrast, the interaction between BIG4 and earnings management remains statistically insignificant throughout the robustness analysis. The coefficient is positive in every specification, ranging from .048 to .074, but none of the estimates reaches the 5% significance level. Even after introducing ROA ($\beta = .049$, $p = .113$) and year effects ($\beta = .069$, $p = .102$), the relationship remains insignificant. There is therefore no robust evidence that earnings management changes the relationship between Big Four auditor status and market value.

The robustness analysis therefore separates coefficient stability from inferential strength. The positive direct association of audit fee is relatively stable, whereas the direct effect of audit tenure is sensitive to leverage and year effects. For the moderation hypotheses, the tenure interaction is robust; the fee interaction has a stable negative sign but only marginal few-cluster evidence; and the BIG4 interaction is unsupported. These distinctions are carried into the discussion and conclusion rather than relying primarily on the conventional clustered p values.

Panel-Estimator, Model-Fit and Few-Cluster Checks

The reviewer-requested panel sensitivity analysis clarifies why pooled estimation is retained as the baseline while fixed effects are used as a check rather than as a replacement model. BIG4 has no within-firm variation and is absorbed by firm fixed effects. In addition, ATEN equals calendar year plus a firm-specific constant in this balanced panel, so a model containing both firm and year fixed effects cannot separately identify the ATEN main effect. In a firm fixed-effects sensitivity model, AFEE remains positive ($\beta = 5.751$, $p < .001$), whereas the direct ATEN coefficient becomes negative and borderline ($\beta = -.047$, $p = .050$). This instability reinforces the decision not to present the direct tenure effect as unconditional evidence.

For the moderation terms, the firm fixed-effects sensitivity results preserve the central directional pattern: $AFEEc \times DAC = -.257$ ($p = .007$), $ATENC \times DAC = -.022$ ($p = .008$), and $BIG4 \times DAC = .103$ ($p = .091$) under conventional clustered inference. Because these p values still rely on only 10 clusters, Table 8 places them alongside the Webb-weight bootstrap probabilities from the baseline specification rather than treating the fixed-effects significance levels as definitive.

Table 8 Panel-Estimator and Few-Cluster Sensitivity of the Moderation Effects

Specification / inference	AFEE (direct)	ATEN (direct)	AFEEc $\times$ DAC	ATENC $\times$ DAC	BIG4 $\times$ DAC
Baseline clustered	.554 (.001)	.093 (<.001)	-.164 (.014)	-.030 (<.001)	.048 (.235)
Firm fixed effects	5.751 (<.001)	-.047 (.050)	-.257 (.007)	-.022 (.008)	.103 (.091)
Webb wild-cluster bootstrap	—	—	$p = .083$	$p = .002$	$p = .374$

Note. Entries in parentheses are p values. BIG4 is absorbed as a main effect in the firm fixed-effects model because it is constant within firms. Webb bootstrap results use 9,999 replications and receive greater inferential weight because the panel has only 10 firm clusters.

The high R^2 of Model 2 was also decomposed rather than merely reported. Model 1 explains 83.2% of the sample variation in TobinQ. Adding DAC as a main effect raises R^2 to 91.6% ($\Delta R^2 = .084$), while the three interactions add a further 6.8 percentage points, bringing R^2 to 98.5%. Since DA alone produces R^2 of about .810, the unusually high fit is largely consistent with its very strong bivariate association with TobinQ, although the interactions also add non-trivial incremental fit. This decomposition does not remove the specification concern; instead, it shows precisely where the additional explanatory power enters and supports a cautious interpretation of the moderation coefficients.

DISCUSSION OF FINDINGS

The absence of a Big Four premium is informative because auditor brand is often treated as a convenient shorthand for audit quality. BIG4 is insignificant in the baseline models, and its interaction with DA is insignificant as well. This differs from the positive Nigerian evidence in Okolie (2014) and Erasmus and Micah (2021), but it is closer to the insignificant results reported by Kalita and Tiwari (2025) and Manoel et al. (2026). Ogbu et al. (2024) even report a negative auditor-size effect. For the firms examined here, the market appears to attach more information to features of the engagement than to the Big Four label by itself.

The audit-fee result requires a deliberately qualified reading. Its direct coefficient is positive and the sign survives the alternative specifications, which is consistent with Ogbu et al. (2024) and with the broader fee-quality-value evidence reported by Aly et al. (2026). Yet audit fee is not a pure quality measure: it can reflect hours and specialist effort, but also client size, complexity, risk and auditor-client bargaining. The moderation evidence is similarly nuanced. $AFEE \times DA$ is negative in the baseline and all sensitivity specifications, but the Webb-weight bootstrap yields $p = .083$. The study therefore treats the interaction as suggestive rather than conventionally significant and does not infer that audit expenditure itself creates value.

Tenure produces the clearest contrast between a direct effect and a conditional one. The positive baseline coefficient is compatible with the learning argument in Myers et al. (2003), Ghosh and Moon (2005) and Adebayo et al. (2025). Yet the direct association disappears when leverage or year effects are introduced. That sensitivity fits a literature divided between learning benefits and familiarity costs (Carey & Simnett, 2006; Erasmus & Micah, 2021; Amuta & Egbe, 2026). The interaction is more persistent. Even under few-cluster bootstrap inference, $ATEN \times DA$ remains significant. The result is therefore not that long tenure always raises firm value; rather, whatever valuation benefit accompanies accumulated auditor knowledge is substantially weaker when discretionary accruals are high.

DA is negatively associated with TobinQ in the moderation model. That direction agrees with Ahmed and Ali (2022) and with the negative valuation evidence in Abu Afifa et al. (2023) and Shaikh et al. (2026). Isiaka et al. (2025), however, report a positive effect for Nigerian consumer-goods firms, while Malahim et al. (2022) find a negative but insignificant relationship in Jordan. The disagreement matters because discretionary accruals need not carry the same information across sectors. In the present sample the sign is clearly negative, but the DA-TobinQ correlation is so strong that the magnitude of the coefficient should not be overinterpreted.

The interaction pattern is the most useful part of the analysis because it distinguishes the three audit-quality proxies. The tenure interaction remains negative under alternative controls, firm fixed effects and few-cluster bootstrap inference. The fee interaction also remains negative but does not meet the 5% threshold under the preferred bootstrap. The BIG4 interaction is unsupported. Economically, the conditional-slope figures show why this distinction matters: the positive AFEE and ATEN slopes become progressively flatter as DA rises, with the attenuation especially persuasive for audit tenure. The evidence is therefore about conditional valuation relevance, not about a universal effect of an abstract audit-quality construct.

This conditioning direction differs theoretically from the mediation and reverse-moderation approaches used in much of the three-variable literature. A mediation model asks whether earnings management transmits part of the effect of audit quality to firm value; studies such as Abu Afifa et al. (2023) and Setyawan and Ghazali (2025) are framed in that way. Suwarno et al. (2021) and Shaikh et al. (2026), by contrast, examine whether audit quality changes the valuation consequence of earnings management. The present model reverses that conditioning direction and asks whether earnings credibility changes the valuation content of the audit signal. This is meaningful under signaling theory because an audit attribute can only function as a credible market signal to the extent that other reporting evidence does not contradict it. The contribution is therefore not the mere combination of three familiar variables, but the identification of earnings management as a boundary condition on the market relevance of specific audit attributes.

CONCLUSION AND IMPLICATIONS

The study asked whether earnings management changes the market-value relevance of observable audit attributes among listed industrial-goods firms in Nigeria. In the baseline estimates, audit fee and audit tenure are positively associated with TobinQ, while Big Four status is not. The direct tenure coefficient is sensitive to leverage, year effects and firm fixed effects and should therefore not be presented as unconditional evidence. The moderation results are more differentiated. H4b is supported: the $ATEN \times DA$ interaction remains negative under the baseline, alternative controls, firm fixed effects and the Webb-weight wild-cluster bootstrap. H4a receives only suggestive support because the $AFEE \times DA$ interaction, although negative across specifications, has bootstrap $p = .083$. H4c is not supported. The central conclusion is consequently narrow: higher discretionary accruals most clearly reduce the valuation relevance of audit tenure, with weaker evidence for audit fee and no comparable evidence for Big Four status.

For audit committees, the findings argue against using auditor brand as a substitute for evaluating the engagement itself. Fee adequacy, the quality of accumulated client knowledge and the continuing independence of a long-serving auditor deserve separate attention. Earnings quality also belongs in that assessment: a strong-looking audit arrangement does not automatically neutralise the market concern associated with large discretionary accruals. Investors and regulators may therefore learn more from considering audit attributes together with evidence on earnings credibility than from reading BIG4, AFEE or ATEN as stand-alone assurance signals.

The results have important limits. The panel contains only 10 firms, so the effective number of clusters is small and the Webb-weight bootstrap is given greater inferential weight than conventional clustered p values. BIG4 is time-invariant within firms and ATEN follows a deterministic annual progression, which prevents a two-way fixed-effects model from identifying all central direct effects. DA is exceptionally strongly correlated with TobinQ, and the moderation model has an unusually high R^2 ; the model-fit decomposition clarifies but does not eliminate concerns about shared trends, measurement structure or overfitting. The archived analytical dataset contains the final absolute discretionary-accrual series but not the first-stage Modified Jones inputs or signed residuals, so alternative accrual measures cannot be reconstructed without returning to the source financial statements. Audit fee and tenure also remain potentially endogenous proxies for audit quality. Finally, the design

is observational and identifies conditional associations rather than causal effects. Future work should reconstruct the accrual measures from source data, compare signed, performance-matched and real-earnings-management measures, and use broader panels or stronger identification strategies.

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