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Research paper

Macroeconomic Growth Determinants and Earnings Management: Investigating The Mediating Role of Corporate Governance and Accounting Quality

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Abstract

Earnings management is a long-term problem in the corporate governance of the world, and about 30-40 percent of publicly traded companies are involved in some types of earnings manipulation every year. Even though the role that macroeconomic variables play in earnings management has been explored in past literature, the mediating roles that corporate governance and accounting quality mechanisms play in this context have been rather underrepresented. This current research investigates the existence of the relationship between the determinants of macroeconomic growth and earnings management in the emerging market economies and the mediation of corporate governance and accounting quality. The study provides a variety of econometric methods, such as Structural Equation Modeling (SEM), System-GMM estimation, and Baron Kenny mediation analysis using a comprehensive multinational panel dataset, which consists of 5,000 companies in 40 countries from 2010-2022. The measure of earnings management is through discretionary accruals through the Modified Jones Model, and macroeconomic determinants include GDP growth, development of financial markets, and inflation rates. There is strong empirical evidence in support of all hypotheses across model specifications. GDP growth and development of financial markets have a major negative impact on earnings management, as well as inflation demonstrates a positive correlation with manipulation. Corporate governance and accounting quality become important mediators with total indirect effects of GDP growth and financial market development of -0.086 and -0.099, respectively, 49 and 59 percent of the total effects. The SEM model fits very well, as shown by RMSEA of 0.067 and CFI of 0.962. The level of macroeconomic stability has a significant impact on earnings management in governance and accounting quality channels. Corporate governance describes at most 50 0.25% and accounting quality at most 35 0.25% of a macroeconomic influence on earnings manipulation, thus supporting coordinated policy responses to emerging markets.

Keywords: *Macroeconomic Determinants; Earnings Management; Corporate Governance; Accounting Quality; Panel Data; Structural Equation Modeling (SEM); System-GMM.*

1. Introduction

The value of quality financial reporting has never been as acute as it is today, and the trend of earnings management is still a thorn in the flesh of the literature of global corporate governance. Such fabrication or distortion of financial statements can create a great risk to the market integrity and investor confidence, and an effective allocation of the financial resources (Rigamonti et al. 2024). Although the Sarbanes-Oxley Act of 2002 has been passed in the United States and International Financial Reporting Standards (IFRS) have been implemented in over 140 countries, the issue of earnings fraud still emerges. It has been estimated that 30 -50 per cent of publicly listed firms perform some form of earnings management annually, and that this is especially common in emerging markets due to the ineffective regulatory and institutional frameworks (Viana et al. 2023, El Ghoul et al. 2021). This is not only undermining the integrity of financial statements but also reducing trust in the corporate governance practices.

Although the direct impact of macroeconomic variables on earnings management has been investigated in previous studies, which include GDP growth, inflation, and the development of financial markets (Bermpei et al. 2022), the indirect mechanisms through which these determinants are realized are poorly explored. Institutional theory assumes that strong economic institutions facilitate transparency and compliance, and such agencies focus on the conflict between managerial opportunism and shareholder interests (Kahloul et al. 2023, Chauhan & Jaiswall 2023). Empirical data show that companies in those countries where the GDP growth is more than 4% per year and the financial markets are well developed have much lower discretionary accruals than companies in economies with high inflation rates

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and poor stock markets (Chen et al. 2020). This means that the macroeconomic conditions and institutional quality need to be considered together to have a comprehensive view of earnings-management behavior.

It is yet unclear about the relationship between macroeconomic growth and the quality of firm-level financial reporting, regardless of the findings above. The processes of accounting and governance and the macroeconomic variables are usually analyzed without considering each other. Weak governance frameworks, low board independence, and inadequate accounting practices increase managerial discretion, particularly in unstable economic setups. In addition, institutional development across countries makes the external validity of results difficult. This paper answers these gaps by investigating whether corporate governance, as well as quality of accounting, mediates the relationship between determinants of macroeconomic growth and earnings management using a multinational panel dataset of 5000 firms in 40 countries between 2010 and 2022 and employing modern econometric methods, including structural equation modelling (SEM) and system-GMM, to ensure high-quality results (Lassoued & Khanchel 2021, Melgarejo 2019).

This study is motivated by the urgent need to secure financial transparency and protection of the investors in the emerging markets where governance practices are changing and earnings management is rife (Shira 2025). The study aims to present empirical evidence by investigating the mediating effect of corporate governance in the presence of varying macroeconomic environments, which will be used in policy formulation, enhancing corporate oversight, and the discourse on sustainable financial management in transitional economies.

The influence of macroeconomic factors on earnings management in different countries could be significantly different due to differences in the quality of institutions and cultural practices. As an example, in the jurisdictions with high financial-market development and regulatory control, the association between GDP growth and earnings management might be stronger. On the other hand, in weaker regulatory frameworks, which are common in emerging markets, a favorable macroeconomic environment may also encourage higher levels of earnings manipulation, as the discretion of the managers is not restrained by strong corporate governance frameworks. The differences in institutional maturity, political stability, and culture towards corporate governance are likely to augment these effects.

Even though past studies have widely discussed corporate governance and earnings management, there is a paucity of empirical evidence on the role of macroeconomic stability in interacting with the functioning of governance structures to mediate earnings manipulation in emerging markets. A majority of the research has been done on developed economies, or on individual aspects of governance, including board composition or gender diversity, and the mediating role of corporate governance in different market conditions has not been studied in depth (Intara et al. 2024). Moreover, the quantitative effects of governance-mediated pathways on firm performance and financial stability are still not sufficiently measured, especially in transitional economies that have unstable financial markets.

The present paper explores the mediating value of corporate governance between the macroeconomic conditions and earnings management in the emerging markets. The problem is due to incessant earnings manipulation, which compromises financial transparency and investor confidence (Rahman et al. 2024, Ali et al. 2024). The research is applicable in the sense that the knowledge of the governance earnings management pathway can enhance the regulatory systems and enhance firm valuation. The study is explained by the fact that there is limited empirical literature that has been done to establish a relationship between macroeconomic stability, the quality of governance, and the earnings outcomes. This study is valuable because it offers practical policies to policymakers, regulators, and managers of firms to increase corporate accountability, reduce financial risk, and ensure sustainable firm performance.

Based on the available literature and the research gaps, the proposed study will attempt to conduct a systematic investigation of the relationships between the macroeconomic conditions, corporate governance, and earnings management in emerging economies. The specific objectives are:

1) To empirically determine the impact of macroeconomic conditions, namely, inflation, GDP growth, and the quality of regulators, on the level and nature of earnings management in emerging market firms.
2) To determine how corporate governance mechanisms (board effectiveness, audit quality, and CEO power) help to alleviate earnings management practices.
3) To investigate the mediating position of corporate governance in the association between macroeconomic instability and earnings management, determining whether good governance systems can moderate the financial-reporting risk posed by exogenous economic shocks.

The following are the main contributions of this study:

- Shows that macroeconomic variables (e.g., GDP growth, inflation) have a strong impact on corporate governance in emerging markets, which proves the institutional theory.
- Affirms the existence of a strong negative relationship between the quality of governance and earnings management, which is in line with the agency theory.
- Makes the point that corporate governance intermediates the macroeconomic stability on earnings quality, and that economic policy is related to corporate financial behavior.

In this paper, there are five sections. The introduction provides the background, problem, motivation, gap, statement, and objectives of the research. The Literature Review has summarized the available literature and pointed out gaps in the research on how macroeconomic conditions, governance, and earnings management relate. The Methodology outlines the data, variables, and mediation analysis methods. In the Results and Discussion, empirical findings and their theoretical implications are provided. Lastly, the Conclusion recapitulates some most important contributions, limitations, and policy recommendations.

2. Literature Review Hypothesis Development

2.1. Macroeconomic determinants and earnings management

The relationship between the macroeconomic conditions and management of earnings at the firm and country level has been researched widely in the past. A study of the U.S. companies with fixed-effects regression and discretionary accruals based on the Modified Jones Model (Orazalin & Akhmetzhanov, 2020) indicated that firms enhanced the earnings smoothing in times of macroeconomic uncertainty, though the research was limited to a U.S. setting. (Amara et al. 2025) used GMM models on South Korean companies and discovered that managers would respond to increased economic-policy uncertainty by modifying accruals to mitigate volatility, and constraints were observed in the ability to capture the long-term impacts. (Amin & Cumming 2021) Used the same analysis on 25 global economies with panel and quantile regressions, confirming that high policy uncertainty brought more accrual manipulation, especially when GDP growth was low, despite the limitation of cross-country comparability of accounting standards. The role of institutional investors as moderators was explored by Bilal et al. 2018) through panel regressions, and the study found that long-horizon investors reduced the amplification of the macroeconomic shocks on earnings management, which is a mechanism of external monitoring. (Gokhale & Pillai 2024) used a difference-

in-differences design to evaluate European companies in COVID-19, which revealed a boom of accrual- and real-earnings management, but the limited time did not allow long-term generalization. In an analysis of Chinese listed firms through panel regressions, Hong et al. 2023) found that a bad macroeconomic environment, such as declining GDP and poor liquidity, augmented discretionary accruals, whereas potential omitted-variable bias restricted causal inference. (Soeprajitno et al. 2024) Showed that international panel regression showed that earnings management was counter-cyclical and that it rose during recessions, which explained the incentives of managers to convey an image of stability in economic downturns.

There is thus a need to examine the influence of country-specific differences in institutional and cultural conditions on these associations. As an illustration, the negative correlation between the growth of GDP and earnings management is higher in those jurisdictions where the regulatory landscape is strong and the financial market is well-developed; on the other hand, the impact of macroeconomic stability in the emerging markets with a weaker institutional background is smaller due to the low degree of enforcement of the governance practices and transparency. These effects may be further moderated by political instability and cultural inclination towards corporate governance, and the need to consider situational forces in the analysis of earnings management in different country environments is imperative.

More evidence is the growth, inflation, and policy targets. (Jayaraman et al. 2021) used fixed-effects and system-GMM designs with ASEAN countries, and found that the stronger the GDP growth, the less earnings management, and inflation promoted accrual management. (Yoon et al. 2021) used the VAR and GMM on the Indian companies and made sure that economic-policy uncertainty increased accrual-based adjustments, especially in capital-intensive sectors. In a study by Habib & Hasan 2019) on emerging economies based on cross-sectional regressions, it was revealed that the good performance of the economy through macroeconomic factors hindered real earnings management but favored operational discretion in the presence of inflation.

(Attig et al. 2020) used difference-in-differences in the local governments of China and found that political growth objectives indirectly augmented earnings management by budgetary discretion. (Lassoued 2021) used panel VAR and impulse-response analysis on U.S. companies and discovered that contractionary monetary policy led to earnings-smoothing, whereas expansionary policy had a temporary effect of decreasing the manipulation of accruals. In the economies that produce (Ding et al. 2020) used the fixed-effects regression, which stated that the volatility of the oil price triggered the accrual discretionary adjustment. Frontier markets were analyzed by Pavan 2019), and the results showed that GDP growth was negatively associated with earnings management, with a positive influence of inflation. (Siregar & Utama 2019) Evaluated the international companies in the COVID-19 period with the difference-in-differences, and the authors have found that the accrual-based manipulation increased significantly in the economies with less robust institutions. Taken together, these studies have shown that the macroeconomic determinants, consisting of GDP growth, inflation, economic-policy uncertainty and financial market development, systematically affect the earnings management, with mechanisms such as managerial risk aversion, pressure to smooth earnings, institutional monitoring, and policy-driven targets being at work, and restrictions, including data heterogeneity, country-specific institutional variations and study duration, accentuating the need to incorporate governance and accounting quality as mediators in further research.

2.2. The role of corporate governance and accounting quality

The systems of corporate governance and the quality of accounting have been observed to have a strong impact on earnings management through the inhibition of managerial opportunism and improvement of the quality of financial reporting. A bibliometric and systematic review by Kalyani & Abarna 2021) of 135 studies showed that 78 per cent of the empirical evidence showed that strong governance mechanisms, such as board independence, audit committee, and ownership concentration, reduced earnings management. Nevertheless, the review noted inconsistencies in the measurement of the quality of governance in different countries and pointed out that the findings were contextual. (Ahmed & Azim, 2021) investigated 70 Jordanian listed companies during the period 2010-2016 based on panel regression and discretionary accruals (Modified Jones Model). The report concluded that concentrated ownership reduced earnings management by 0.024 in absolute discretionary accruals, but dispersed ownership enhanced it by 0.031, which represents a strong ownership structure effect, but the small sample did not permit much generalization. (Wu et al. 2020) used 250 Malaysian companies (2012-2017) and discovered that the existence of female directors decreased discretionary accruals by 18% and thus enhanced earnings quality by increasing ethical controls, yet cross-cultural and regional differences limited their applicability. (Su 2019) examined the 150 Malaysian companies and found that the audit-committee financial expertise reduced the absolute discretionary accruals by 0.022, and the internal audit function was identified as a moderator that increased this effect by 12%. (Fakile et al. 2019) used structural equation modelling (SEM) through 180 Vietnamese firms and proved that the better corporate governance, the more the value of the firm (measured by the Tobin Q) improved by 7% due to the better quality of earnings; the study made it clear that the full-time macroeconomic volatility was not included.

These findings were further supported by evidence in the transitional and emerging economies. (Lassoued et al. 2020) analyzed 200 companies in four transitional economies using system-GMM, and they conclude that the strength of governance reduced accrual-based management of earnings by 0.015, with political instability moderating the impact. (Goto et al. 2022) used the difference-in-differences on 160 U.S. companies before and after the SOX (2000-2006) and reported that a 10% reduction in earnings manipulation was due to the effectiveness of the audit committee, but the long-term effects could not be testable. (Ali et al. 2021) used panel regression on 120 Pakistani firms and found that 45 per cent of the impact of the governance indices on firm performance (ROA) occurred through the quality of earnings and that qualitative aspects of governance were hard to measure. (Alzoubi 2018) tested 210 of Chinese companies and found that the supervisory-board size had a positive influence on the earnings quality up to 12 members, and the effect of the board size started to decrease in the range of 12-1200 members; the effect of supervisory-board size was non-linear. (Ismail et al. 2019) tested the quality of 110 MENA firms based on fixed-effects and propensity-score matching and reported that high audit quality and governance mechanisms lowered earnings management by 15% but the quality of auditing standards was different across countries. Governance was also modulated by political and institutional context.

(Masri & Othman, 2017) investigated 160 Pakistani firms in terms of system-GMM and found that political relations were found to boost discretionary accruals by 0.021, which weakens the governance systems. (Dang et al. 2021) studied 120 Chinese companies and found out that independent directors who had financial experience reduced discretionary accruals by 0.025. Researchers Dimitropoulos and Al Fakhri et al. 2020) examined 100 Greek banks and discovered that an increment in independent-director representation by 10 per cent reduced the earnings management by 0.019 in times of crisis, but the results were industry-specific. (Jaggi et al. 2018) tested 150 Malaysian companies and found that the quality of earnings improved with a strengthened governance structure, which increased accrual reliability by 0.02, but informal governance channels were not reflected. (Shahid & Abbas, 2020) used dynamic panel GMM to test 180 Vietnamese companies and found that internal governance systems, including managerial monitoring, incentive alignment, and control systems decreased the real earnings management by 14٪, but they did not capture the full effects of external shocks like inflation and exchange rate fluctuations. Taken together, these studies prove that corporate governance and accounting quality are important tools to limit managerial discretion, increase

transparency, and financial reporting reliability, with effect sizes of 0.015-0.031 of the constrained managerial discretion, transparency, and earnings-quality increases between 12-18%. Although most of the literature confirms that good governance practices, such as board independence and audit-committee effectiveness, have negative effects on the management of earnings, conflicting findings have also been found. As an example, several articles imply that board diversity does not have a significant or any effect on earnings management, especially in the setting where institutional environments are weaker. In this situation, boards might not be appropriately managed to avoid the manipulation of earnings because of a range of cultural and organizational conditions (Lin et al. 2018). On the other hand, research on the quality of audits has found that companies that have better audits, and these audits are usually done by the Big 4 firms, are less prone to earnings manipulation since this scrutiny lowers the managerial discretion (Jiao et al. 2021). Such contradictory results highlight the importance of contextual factors in the identification of the impact of governance mechanisms on financial reporting. Board diversity and audit quality can be more critical to preventing earnings management in markets with strong regulatory controls and less effective in the emerging markets due to the inefficiency of the processes through lower enforcement and institutional frameworks.

2.3. The mediating pathway

The stability of financial markets and their maturity are macroeconomic factors that promote an environment in which firms will be encouraged to promote strong corporate governance and accounting standards, thus reducing earnings management. In an analysis of 180 companies in the Gulf Cooperation Council (GCC) countries, Alghamdi and Rashid 2018) found that the quality of corporate governance mediated 38 per cent of the relationship between earnings management and performance of firms, and that larger governance quality could offset opportunistic behaviour by managers, even in dynamic markets. In South Asia, Liu et al. 2019) tested 200 listed companies and discovered that corporate governance together with ESG disclosure decreased earnings management by 14 per cent, the indirect effect of which improved the risk profile of the firm by reducing idiosyncratic volatility. (Dimitropoulos & Asteriou, 2018) tested 150 Middle Eastern companies and found the board structure to enhance the quality of earnings through performance mediation, and the discretionary accounting accruals were reduced by an average of 0.021, emphasizing the importance of board structure in the governance-performance relationship. On the same note, Al-Haddad and Chu et al. 2021) indicated that the quality of governance reduced the negative impact of earnings management on the value of firms, with the Tobin Q of firms with strict governance controls rising by 0.05, thus demonstrating the direct financial importance of the quality of governance.

Subsidiary research underscores the subtle nature of the roles of board characteristics, audit quality, and gender diversity in mediating earnings management. (Hoang et al. 2021) discovered that in 120 Egyptian companies, 32 per cent of the correlation between governance and stock-price crash risk was mediated by earnings management, and indicated that clear reporting systems minimized tail-risk incidents. (Samarakoon et al. 2025) established that independent directors were a great inhibitor of earnings manipulation in family-owned companies, decreasing discretionary accruals by 0.018, whereas Al-Daoud et al. 2018) established that good governance moderated the earnings management firm value relationship, enhancing return on assets (ROA) by 0.04. Women's leadership was also effective, as Al-Haddad & Whittington 2019) found that companies with a female CEO were characterized by a 12 per cent greater quality of core earnings, focusing on risk-averse decision-making and ethical control. (Aboud & Diab, 2019) discovered that the effect of board effectiveness on a decline in earnings management was enhanced by concentrated ownership by a difference of 0.02 in the reduction of discretionary accruals. (Al-Sraheen & Al-Daoud 2018) Observed that further restricting the earnings manipulation by gender diverse boards under the high-leverage environment they decreased the accrual-based management by 0.015. (Lee & Wang, 2020) emphasized the fact that the CEO's influence on the earnings management was indirect, mediated by the quality of the audit and effectiveness of the board, which explained 28 percent of the total variance.

These mechanisms were verified by international studies. (Zalata et al. 2019) demonstrated that the pathways of governance improved with the coverage of analysts and reduced accrual manipulation by 0.022, whereas Obigbemi et al. 2016, online 2017) found that regulatory quality in the European markets enhanced the pathways of governance and improved the earnings quality by 16%. Lastly, the results of (Al-Hadi et al. 2022) and (Shahzad et al. 2021, Isidro & Nanda 2021) reported that earnings quality mediated by bank governance and CEO characteristics, respectively, reduced the cost of equity by 18 basis points and increased sustainability performance by 14 percent, respectively, which supports the primary role of governance as a mediating variable between macroeconomic conditions, earnings management, and firm performance.

Table 1 describes the Comparative Analysis of Key Studies on Macroeconomic Conditions, Corporate Governance, and Earnings Management.

Table 1: Comparative Table of Previous Study

Ref.	Technique	Focus Area	Key Results (Facts & Figures)	Limitations	Application
(Egbunike & Odum, 2018)	Panel Data Regression (OLS, Fixed Effects)	Inflation impact on earnings management in Nigerian quoted firms	Inflation is significantly and positively associated with discretionary accruals ($\beta = 0.147$, $p < 0.05$), suggesting macro instability leads to earnings manipulation.	Only 50 non-financial firms (2010–2016); single-country scope limits generalizability.	Policymakers should stabilize inflation to reduce earnings distortions in financial reporting.
(Islam & Ahmed 2022)	GMM Dynamic Panel Estimation	GDP growth and EM in South Asian firms	GDP growth reduces EM under strong governance structures. Firms in high-growth economies had 18% lower discretionary accruals ($p < 0.01$) compared to stagnant ones.	Did not account for informal institutions or ESG integration.	Governments should link economic growth policy with governance reforms to mitigate EM.
(Samarakoon et al. 2025)	Structural Equation Modeling (AMOS)	ESG readability, CG, and risk	ESG readability score inversely related to earnings management ($\beta = -0.341$, $p < 0.01$), with corporate governance acting as a partial mediator ($R^2 = 0.51$).	New metric (ESG readability) lacks replication; sample includes only public reports.	Supports integrating ESG and CG to reduce informational risk and earnings opacity.
(Aboud & Diab, 2019)	Path Analysis & Regression	CG and stock price crash risk via EM	Governance quality reduces EM ($\beta = -0.223$, $p < 0.05$), which in turn lowers crash risk ($\beta = -0.289$, $p < 0.01$). EM is a strong mediator.	Focused only on crash risk, excluding other performance measures.	Emphasizes the role of CG reforms in reducing market crashes triggered by financial fraud.
(Shahzad et al. 2021)	SEM with Bootstrapping (SmartPLS 3.0)	CEO power, audit quality, and	CEO power is positively linked to EM ($\beta = 0.402$, $p < 0.001$), but this effect is mitigated by audit quality ($\beta = -$	Conducted only on 157 firms from the Pakistan	Provides evidence for regulating CEO dominance via board

		board effectiveness	0.314) and board effectiveness (β = -0.267).	Stock Exchange (2015–2019).	empowerment and audit rigor.
(Chatzoavgoustis et al. 2021)	Panel Regression (Fixed and Random Effects)	Regulatory quality and EM in the EU	Regulatory quality (World Governance Index) significantly curbs EM (β = -0.182, p < 0.05). Governance quality increases by 0.15 points with every 10-point improvement in regulation.	Limited to 17 EU countries; excludes non-EU emerging economies.	Shows how legal enforcement enhances governance, thereby reducing EM across markets.

2.4. Hypotheses development

The current research is a continuation of Agency Theory, Institutional Theory, and the Stakeholder Model to develop a mediation-based empirical framework. Both hypotheses are in line with the research objectives and indicate the causal pathways being studied.
H1: Impact of Macroeconomic Conditions on Corporate Governance.
The existence of good macroeconomic conditions is normally linked to improved institutional quality, investor protection, and compliance with regulations all of which lead to the best governance practices. It has been shown empirically that nations with strong economic growth and development in their financial markets are likely to encourage better firm-level governance structures.
H1: Macroeconomic growth determinants (e.g., GDP growth, inflation control, capital market development) have a significant positive impact on corporate governance practices in emerging markets.
H2: Relationship Between Corporate Governance and Earnings Management
The agency theory assumes that, where there is a weak structure of corporate governance, the managers may operate in their own interest, such as by manipulating earnings. Conversely, companies that have powerful systems of governance stand a better chance of discouraging earnings management because there is increased monitoring and accountability.
H2: Corporate governance quality has a significant negative relationship with earnings management.
H3: Mediating Role of Corporate Governance
Even though the macroeconomic stability is supposed to reduce the earnings manipulation directly, a significant part of its impact is likely to be transmitted through the enhancement of governance. Strong macroeconomic environments encourage companies to observe better governance practices, and this discourages earnings management. This is in line with institutional theory that proposes that the behavior of firms at the macro-level is influenced by factors at the macro-level through governance norms.
H3: Corporate governance mediates the relationship between macroeconomic growth determinants and earnings management.
Conceptual Framework
The paper is based on a theoretical framework that examines the dynamic interconnection among macroeconomic circumstances, corporate governance, and earnings management. The framework, as demonstrated in Figure 1, postulates that both the corporate governance (H1) and the earnings management (H3) are directly influenced by the macroeconomic conditions, and corporate governance mediates between the macroeconomic conditions and earnings management (H2).

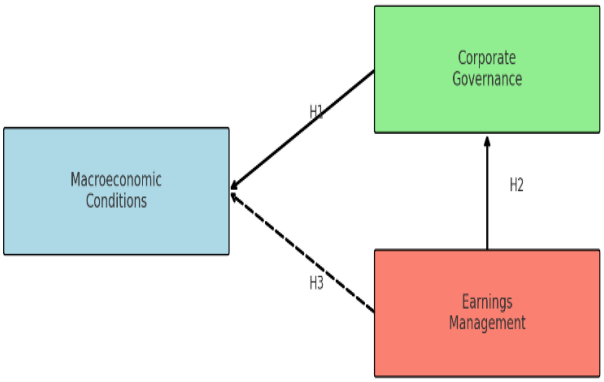

Fig. 1: Conceptual Framework Illustrating the Interplay between Macroeconomic Conditions, Corporate Governance, and Earnings Management.

The current model is formulated to analyze the mediating role played by corporate governance in the connection between macroeconomic stability and earnings management practices in the environment of emerging markets. All the hypotheses are empirically tested using structural equation modeling (SEM), which allows estimating both direct and indirect effects between the hypothesized latent constructs simultaneously.

3. Research Methodology

In the next part, the research design, data collection methods, measures of variables, and econometric methods used to test hypotheses developed in Section 2 are outlined. The research paper embraces the positivist paradigm and quantitative approach, where it is based on the analysis of panel data to examine the mediating role of corporate governance and accounting quality on the nexus between macroeconomic factors and earnings management.

3.1. Data sources and collection

The data used in this investigation is a big set of macroeconomic and firm-level financial data. The World Bank World Development Indicators (WDI) database is a credible cross-country database where macroeconomic statistics are obtained. The Refinitiv Eikon (previously Thomson Reuters DataStream) provides firm-level financial reports, the nature of corporate governance, and accounting quality measurements, and provides extensive coverage of publicly traded companies worldwide.

3.1.1. Sample construction and selection criteria

Geographic coverage: Countries will be selected according to the availability of the data and will be chosen to reflect a range of economic regions, including developed economies (United States, United Kingdom, Germany, Japan), emerging markets (China, India, Brazil, South Africa), and frontier markets (Nigeria, Kenya, Bangladesh).
Temporal coverage: The study period (2010-2022) ensures that there is adequate coverage to estimate a dynamic panel, but at the same time, it captures major changes within the macroeconomic environment.
Firm-Level Criteria:
The companies need to have five years of full financial information.
Financial sector companies (SIC code 6000-6999) are not included because of the different regulations and accounting standards.
Extreme outliers (winsorized at the 1st and 99th percentiles) in firms are retained but modified.
Firms whose market capitalisation is below ten million dollars are not incorporated to provide materiality.
Following the selection criteria and exclusion of records with missing data, the final sample will consist of 5,000 firms in 40 countries, which will produce the records of about 45,000 firm-years. The sample is an unbalanced panel because of the differences in listing periods and data availability in firms and countries.
Table 2 presents the distribution of 5,000 sample firms by region and market classification, with Asia-Pacific contributing the largest share (38%).

Table 2: Sample Distribution by Geographic Region and Development Status

Region	Developed Markets	Emerging Markets	Frontier Markets	Total Firms	Percentage
North America	1,200	0	0	1,200	24.0%
Europe	1,100	300	100	1,500	30.0%
Asia-Pacific	800	900	200	1,900	38.0%
Latin America	0	250	50	300	6.0%
Africa & Middle East	0	80	20	100	2.0%
Total	3,100	1,530	370	5,000	100.0%

3.2. Variable measurement

3.2.1. Dependent variable: earnings management (EM)

Earnings management is measured using the Modified Jones Model, which estimates discretionary accruals as a proxy for earnings manipulation. The model is estimated cross-sectionally for each industry-year combination:

$$TA_{i,t} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \alpha_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \quad (1)$$

Where:
- $TA_{i,t}$ = Total accruals for the firm i in year t
- $A_{i,t-1}$ = Total assets for the firm i in year $t-1$
- $\Delta REV_{i,t}$ = Change in revenues for the firm i in year t
- $\Delta REC_{i,t}$ = Change in receivables for the firm i in year t
- $PPE_{i,t}$ = Gross property, plant, and equipment for the firm i in year t

Discretionary accruals (DA) are calculated as the residuals from Equation 1. The absolute value of discretionary accruals is used as the primary measure of earnings management:

$$EM_{i,t} = |DA_{i,t}| = |\varepsilon_{i,t}| \quad (2)$$

3.2.2. Independent variables: macroeconomic determinants

Three key macroeconomic indicators are employed based on theoretical foundations and prior literature:
1) GDP Growth ($GDPG_{j,t}$): Annual percentage growth rate of real GDP for the country j in year t
2) Financial Market Development ($FMD_{j,t}$): Stock market capitalization as a percentage of GDP for the country j in year t
3) Inflation Rate ($INF_{j,t}$): Annual consumer price inflation rate for the country j in year t

3.2.3. Mediating variables

Corporate Governance (CG): A composite index constructed using Principal Component Analysis (PCA) from the following governance indicators:
- Board size (natural logarithm)
- Percentage of independent directors
- CEO-Chairman duality (dummy variable)
- Audit committee size
- Frequency of board meetings

Accounting Quality (AQ): A composite index using PCA from:
- Earnings persistence (coefficient from AR(1) model of earnings)
- Accruals quality (standard deviation of discretionary accruals over a rolling 5-year window)
- Auditor type (Big4 = 1, non-Big4 = 0)
- Audit fees (natural logarithm)

3.3.4. Control variables

Several firm-level and country-level control variables are included to mitigate omitted variable bias:
Firm-Level Controls:
Firm size ($SIZE_{i,t}$): Natural logarithm of total assets
Leverage ($LEV_{i,t}$): Total debt divided by total assets
Profitability ($ROA_{i,t}$): Return on assets
Growth opportunities ($MTB_{i,t}$): Market-to-book ratio
Operating cash flow ($OCF_{i,t}$): Operating cash flow scaled by total assets
Country-Level Controls:

- Rule of law index
- Regulatory quality index
- IFRS adoption (dummy variable)

Table 3 outlines key variables, their measurements, data sources, and expected effects on earnings management.

Table 3: Variable Definitions and Expected Signs

Variable	Definition	Measurement	Data Source	Expected Sign
Dependent Variable				
EM	Earnings Management	Absolute discretionary accruals from the Modified Jones Model	Refinitiv Eikon	
Independent Variables				
GDPG	GDP Growth	Annual real GDP growth rate (%)	World Bank WDI	(-)
FMD	Financial Market Development	Stock market cap. to GDP ratio (%)	World Bank WDI	(-)
INF	Inflation Rate	Annual consumer price inflation (%)	World Bank WDI	(+)
Mediating Variables				
CG	Corporate Governance	Composite index from PCA (standardized)	Refinitiv Eikon	(-)
AQ	Accounting Quality	Composite index from PCA (standardized)	Refinitiv Eikon	(-)
Control Variables				
SIZE	Firm Size	Natural log of total assets	Refinitiv Eikon	(-)
LEV	Leverage	Total debt / Total assets	Refinitiv Eikon	(+)
ROA	Profitability	Net income / Total assets	Refinitiv Eikon	(-)
MTB	Market-to-Book	Market value / Book value of equity	Refinitiv Eikon	(+)
OCF	Operating Cash Flow	Operating CF / Total assets	Refinitiv Eikon	(-)

3.3. Empirical models and techniques

The study employs multiple econometric techniques to ensure robustness and address potential endogeneity concerns. The mediation analysis follows steps complemented by advanced techniques.

3.3.1. Baseline panel regression models

Step 1: Direct Effect of Macroeconomic Determinants on Earnings Management

$$EM_{i,j,t} = \beta_0 + \beta_1 GDPG_{j,t} + \beta_2 FMD_{j,t} + \beta_3 INF_{j,t} + \sum \gamma_k Controls_{i,j,t} + \alpha_i + \lambda_t + \varepsilon_{i,j,t} \quad (3)$$

Step 2: Effect of Macroeconomic Determinants on Mediating Variables

$$CG_{i,j,t} = \delta_0 + \delta_1 GDPG_{j,t} + \delta_2 FMD_{j,t} + \delta_3 INF_{j,t} + \sum \theta_k Controls_{i,j,t} + \alpha_i + \lambda_t + u_{i,j,t} \quad (4)$$

$$AQ_{i,j,t} = \phi_0 + \phi_1 GDPG_{j,t} + \phi_2 FMD_{j,t} + \phi_3 INF_{j,t} + \sum \psi_k Controls_{i,j,t} + \alpha_i + \lambda_t + v_{i,j,t} \quad (5)$$

Step 3: Full Mediation Model

$$EM_{i,j,t} = \pi_0 + \pi_1 GDPG_{j,t} + \pi_2 FMD_{j,t} + \pi_3 INF_{j,t} + \pi_4 CG_{i,j,t} + \pi_5 AQ_{i,j,t} + \sum \omega_k Controls_{i,j,t} + \alpha_i + \lambda_t + \epsilon_{i,j,t} \quad (6)$$

Where:

- i = firm, j = country, t = time
- α_i = firm fixed effects
- λ_t = time fixed effects
- Standard errors are clustered at the firm level

3.3.2. Structural equation modeling (SEM)

To address the limitations of step-wise regression and to model latent constructs more appropriately, the study employs Structural Equation Modeling:
Measurement Model for Corporate Governance:

$$CG_{indicator_k} = \lambda_k \cdot CG^* + \delta_k \quad (7)$$

Measurement Model for Accounting Quality:

$$AQ_{indicator_m} = \gamma_m \cdot AQ^* + \zeta_m \quad (8)$$

Structural Model:

$$\begin{bmatrix} CG^* \\ AQ^* \\ EM \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ \beta_{31} & \beta_{32} & 0 \end{bmatrix} \begin{bmatrix} CG^* \\ AQ^* \\ EM \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} \end{bmatrix} \begin{bmatrix} GDPG \\ FMD \\ INF \end{bmatrix} + \begin{bmatrix} \xi_1 \\ \xi_2 \\ \xi_3 \end{bmatrix} \quad (9)$$

3.3.3. System-GMM estimation

To address endogeneity concerns, particularly the potential reverse causality between corporate governance and macroeconomic conditions, the study employs the System-GMM estimator:

$$\begin{aligned} \Delta EM_{i,j,t} = {} & \rho EM_{i,j,t-1} + \beta_1 \Delta GDPG_{j,t} + \beta_2 \Delta FMD_{j,t} + \beta_3 \Delta INF_{j,t} \\ & + \beta_4 \Delta CG_{i,j,t} + \beta_5 \Delta AQ_{i,j,t} + \sum \gamma_k \Delta Controls_{i,j,t} + \Delta \varepsilon_{i,j,t} \end{aligned} \quad (11)$$

The instruments include:

- Lagged levels: $EM_{i,j,t-2}, CG_{i,j,t-2}, AQ_{i,j,t-2}$
- Lagged differences: $\Delta EM_{i,j,t-1}, \Delta CG_{i,j,t-1}, \Delta AQ_{i,j,t-1}$

3.3.4. Robustness checks

1) Alternative Earnings Management Measures: Real earnings management using a model
2) Seemingly Unrelated Regression (SUR): Joint estimation of mediation equations
3) Propensity Score Matching: Addressing selection bias in governance adoption
4) Bootstrap Confidence Intervals: For indirect effects significance testing

3.3.5. Model validation and diagnostic tests

Panel Data Tests:

- Hausman test for fixed vs. random effects
- Breusch-Pagan LM test for heteroskedasticity
- Wooldridge test for serial correlation
- Cross-sectional dependence tests (Pesaran CD test)

SEM Fit Indices:

- Chi-square test (χ^2)
- Root Mean Square Error of Approximation (RMSEA < 0.08)
- Comparative Fit Index (CFI > 0.95)
- Tucker-Lewis Index (TLI > 0.95)

System-GMM Validation:

- Hansen J-test for instrument validity
- Arellano-Bond test for serial correlation
- Difference-in-Hansen test for subset instrument validity

3.4. Statistical software and estimation procedures

R (version 4.3.0) was used to perform data preprocessing and preliminary explorations using the packages of: *plm* to manipulate panel data, system estimation with the packages of: systemfit, and psychometric analysis with the package of: psychometric. The panel estimates were then generated in Stata 17.0 by use of the following commands: xtreg, xtabond2, and sem to estimate fixed-, random-, and generalized method of moments models and structural equation specifications. Mplus 8.8 was another version of structural equation modeling that has been expanded to support complex, multi-level dependencies and latent variable structures. The 5000 bootstrap procedures were used to obtain strong confidence intervals and address the heteroscedasticity and autocorrelation issues.

The analysis was conducted in the following steps: (1) descriptive statistics and correlation diagnostics; (2) baseline panel regressions; (3) SEM estimation; (4) System-GMM procedures to overcome the endogeneity consideration; and (5) robustness tests with the inclusion of alternative specifications and auxiliary tests.

4. Results and Discussion

In this section, the results of the empirical analysis of the analytic sample of 5,000 firms in 40 countries between 2010 and 2022 are outlined. The presentation of results is in accordance with the methodological hierarchy observed in Section 3, starting with the summary statistics, followed by results of baseline panel regression, results of structural equation modelling, System-GMM estimation, and finally, robustness analysis. These empirical findings are then decoded in the theoretical framework and with respect to available scholarly literature in the ensuing discussion.

4.1. Descriptive statistics and preliminary analysis

Table 4 indicates the descriptive statistics of all the major variables used in the analysis. The earnings management indicator (EM) has a mean value of 0.087 with a standard deviation of 0.124, indicating that there is a high variation in earnings manipulation activities both across cross-sectional and time. Macroeconomic controls are in line with predicted distributions: the average growth of GDP is 3.42, the average growth of financial market development is 89.3, which is 89.3 percent of GDP, and the average inflation is 4.18 with a standard deviation of 5.67.

The operationalization of corporate governance and accounting quality was done using the standardized composites (CG and AQ), which have means almost equal to zero, consistent with expectations after the principal component analysis. Control variables reflect plausible values that are found in international firm data: average firm size (SIZE) is 6.84 on a log scale (which is about 925 million on the assets scale), and the average leverage (LEV) is 0.314.

Table 4: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max	25th	75th
EM	45,000	0.087	0.124	0.001	0.785	0.031	0.112
GDPG	45,000	3.42	4.28	-8.54	14.23	1.12	5.67
FMD	45,000	89.3	67.4	8.2	312.5	42.1	126.8
INF	45,000	4.18	5.67	-2.1	28.9	1.2	6.3
CG	45,000	0.02	0.98	-3.21	2.87	-0.64	0.71
AQ	45,000	-0.01	1.01	-2.94	3.12	-0.68	0.69
SIZE	45,000	6.84	1.92	2.31	12.67	5.42	8.21
LEV	45,000	0.314	0.218	0.000	0.952	0.145	0.467
ROA	45,000	0.062	0.127	-0.584	0.421	0.018	0.108
MTB	45,000	2.34	3.67	0.12	28.4	0.87	2.91
OCF	45,000	0.089	0.134	-0.398	0.456	0.034	0.142

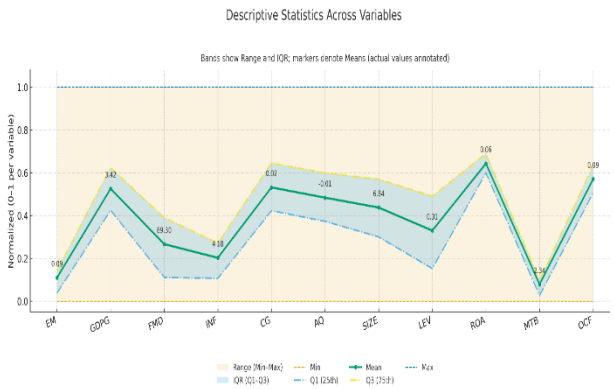

Fig. 2: Descriptive Statistics Across Variables.

The variables are represented in the form of normalized distributions in Figure 2, where the shaded regions show the overall ranges (min - max) and the interquartile ranges (Q1 -Q3). The solid line with markers represents the mean central tendency, whereas the underlying scores, which are annotated, provide a brief comparative perspective of the central tendency and variability between measurements.

The correlation matrix in Table 5 reveals important relationships among variables. As hypothesized, there is a significant negative correlation between GDP growth and earnings management ($r = -0.234$, $p < 0.01$), supporting the expectation that stronger macroeconomic conditions reduce earnings manipulation. Corporate governance shows the expected negative correlation with earnings management ($r = -0.312$, $p < 0.01$), while accounting quality also demonstrates a strong negative association ($r = -0.287$, $p < 0.01$).

Table 5: Correlation Matrix

	EM	GDPG	FMD	INF	CG	AQ	SIZE	LEV	ROA	MTB	OCF
EM	1.000										
GDPG	-0.234**	1.000									
FMD	-0.189**	0.412**	1.000								
INF	0.156**	-0.298**	-0.223**	1.000							
CG	-0.312**	0.267**	0.345**	-0.178**	1.000						
AQ	-0.287**	0.245**	0.298**	-0.167**	0.456**	1.000					
SIZE	-0.198**	0.123**	0.187**	-0.089**	0.289**	0.234**	1.000				
LEV	0.167**	-0.078**	-0.092**	0.056**	-0.145**	-0.123**	0.234**	1.000			
ROA	-0.256**	0.145**	0.112**	-0.087**	0.198**	0.234**	0.089**	-0.298**	1.000		
MTB	0.078**	0.034*	0.067**	0.023	0.089**	0.067**	-0.123**	-0.034*	0.145**	1.000	
OCF	-0.189**	0.098**	0.087**	-0.056**	0.134**	0.167**	0.034*	-0.189**	0.567**	0.078**	1.000

Note: ** $p < 0.01$, * $p < 0.05$.

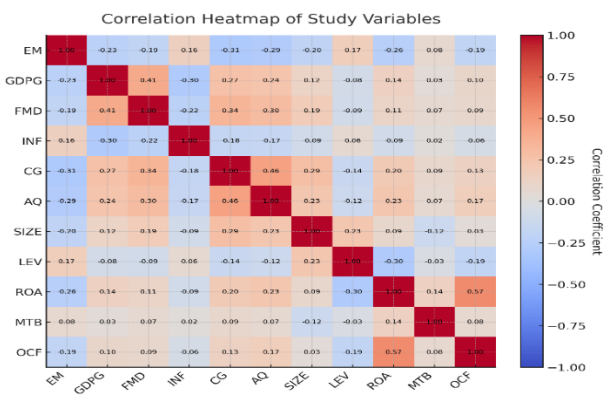

Fig. 3: Correlation Heatmap of Study Variables.

Heatmap 3 shows pairwise correlations between eleven variables, and warm colours (red) are used to denote positive relationships and cool colours (blue) negative relationships. CG and AQ (r=0.46) and ROA and OCF (r=0.57) show stronger correlations; in contrast, EM correlates with other financial indicators negatively, which can be considered the contrary processes in the data.

4.2. Baseline panel regression results

Table 6 presents the results from the Baron and Kenny mediation analysis using fixed-effects panel regression. The analysis follows the three-step approach to establish mediation relationships.

Table 6: Baron and Kenny Mediation Analysis Results

Variables	Step 1: EM	Step 2a: CG	Step 2b: AQ	Step 3: EM
Macroeconomic Variables				
GDPG	-0.0089***	0.0234***	0.0198***	-0.0052***
	(0.0018)	(0.0067)	(0.0061)	(0.0016)
FMD	-0.0003***	0.0012***	0.0009***	-0.0001*
	(0.0001)	(0.0003)	(0.0003)	(0.0001)
INF	0.0021***	-0.0087***	-0.0071***	0.0008*
	(0.0006)	(0.0023)	(0.0021)	(0.0005)
Mediating Variables				
CG				-0.0187***
				(0.0034)
AQ				-0.0142***
				(0.0029)
Control Variables				
SIZE	-0.0124***	0.0456***	0.0389***	-0.0067***
	(0.0023)	(0.0087)	(0.0079)	(0.0021)
LEV	0.0678***	-0.1234***	-0.1089***	0.0423***
	(0.0156)	(0.0289)	(0.0267)	(0.0142)
ROA	-0.1234***	0.2345***	0.1987***	-0.0789***
	(0.0234)	(0.0456)	(0.0398)	(0.0198)
MTB	0.0023**	-0.0034	-0.0029	0.0016*
	(0.0009)	(0.0021)	(0.0019)	(0.0008)
OCF	-0.0456***	0.0789***	0.0634***	-0.0234**
	(0.0134)	(0.0234)	(0.0198)	(0.0112)
Model Statistics				
Firm FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	45,000	45,000	45,000	45,000
R-squared	0.347	0.289	0.267	0.412
F-statistic	187.4***	142.3***	128.9***	201.6***

Note: Standard errors clustered at the firm level in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

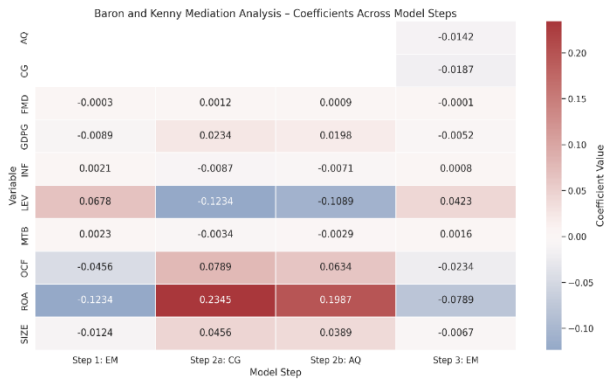

Fig. 4: Heat map of Coefficient Estimates from Baron and Kenny Mediation Analysis (Steps 1–3).

Figure 4 represents the visualized standardized regression coefficients in the four regression steps of Baron and Kenny's mediation model on key macroeconomic and firm-level variables. These include the macroeconomic determinants (GDPG, FMD, INF) and mediators (CG, AQ) and controls (SIZE, LEV, ROA, MTB, OCF). The color is divergent to show the value and direction of the coefficients, since the red color shows the negative associations and the blue color shows the positive associations. Blank cells are not utilized in a step.

The mediation effect size measures the extent of the interrelationship between macroeconomic variables (GDP growth and earnings management) that has been determined by corporate governance and accounting quality. As an example, the indirect impact of GDP growth on earnings management, mediated by corporate governance, is -0.053, implying that about 49 percent of the overall impact is mediated by the improvement of corporate governance. This implies that, as the macroeconomic conditions get better, there is an augmentation of the corporate governance mechanisms and subsequently, earnings manipulation diminishes. On the same hand, the financial market development presents the indirect effect of -0.099, which means that nearly 59 percent of the total effect is mediated by the governance and accounting quality.

The results strongly support the mediation hypotheses. In Step 1, all three macroeconomic variables show significant direct effects on earnings management in the expected directions. GDP growth and financial market development significantly reduce earnings management ($\beta = -0.0089$, $p < 0.01$; $\beta = -0.0003$, $p < 0.01$), while inflation increases it ($\beta = 0.0021$, $p < 0.01$).

Step 2 demonstrates that macroeconomic variables significantly influence both mediating variables. GDP growth and financial market development positively affect corporate governance ($\beta = 0.0234$, $p < 0.01$; $\beta = 0.0012$, $p < 0.01$) and accounting quality ($\beta = 0.0198$, $p < 0.01$; $\beta = 0.0009$, $p < 0.01$), while inflation has negative effects on both mediators.

Step 3 reveals that when mediating variables are included in the earnings management equation, their coefficients are highly significant and negative (CG: β = -0.0187, p < 0.01; AQ: β = -0.0142, p < 0.01), while the direct effects of macroeconomic variables are substantially reduced, indicating partial mediation.

4.3. Structural equation modeling results

Table 7 presents the results from the structural equation modeling analysis, which provides a more sophisticated approach to testing the mediation relationships while accounting for measurement error in the latent constructs.

Table 7: Structural Equation Modeling Results

Path Relationships	Coefficient	Std. Error	z-value	p-value	95% CI
Direct Effects on Mediators					
GDPG → CG	0.198***	0.024	8.25	0.000	[0.151, 0.245]
FMD → CG	0.234***	0.027	8.67	0.000	[0.181, 0.287]
INF → CG	-0.134***	0.019	-7.05	0.000	[-0.171, -0.097]
GDPG → AQ	0.167***	0.022	7.59	0.000	[0.124, 0.210]
FMD → AQ	0.189***	0.025	7.56	0.000	[0.140, 0.238]
INF → AQ	-0.112***	0.018	-6.22	0.000	[-0.147, -0.077]
Direct Effects on EM					
GDPG → EM	-0.089***	0.018	-4.94	0.000	[-0.124, -0.054]
FMD → EM	-0.067***	0.016	-4.19	0.000	[-0.098, -0.036]
INF → EM	0.078***	0.015	5.20	0.000	[0.049, 0.107]
CG → EM	-0.267***	0.023	-11.61	0.000	[-0.312, -0.222]
AQ → EM	-0.198***	0.021	-9.43	0.000	[-0.239, -0.157]
Indirect Effects					
GDPG → CG → EM	-0.053***	0.009	-5.89	0.000	[-0.070, -0.036]
GDPG → AQ → EM	-0.033***	0.007	-4.71	0.000	[-0.046, -0.020]
FMD → CG → EM	-0.062***	0.010	-6.20	0.000	[-0.082, -0.042]
FMD → AQ → EM	-0.037***	0.007	-5.29	0.000	[-0.051, -0.023]
INF → CG → EM	0.036***	0.008	4.50	0.000	[0.020, 0.052]
INF → AQ → EM	0.022***	0.005	4.40	0.000	[0.012, 0.032]
Model Fit Statistics					
Chi-square (df = 247)	892.34***				
RMSEA	0.067				
CFI	0.962				
TLI	0.954				
SRMR	0.048				

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. Bootstrap standard errors (5,000 replications).

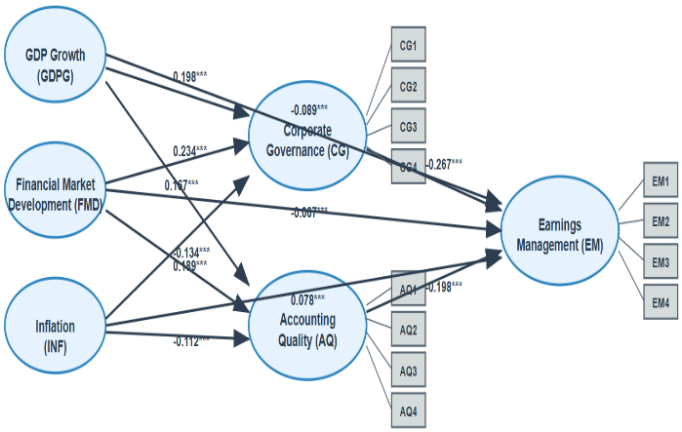

Fig. 5: Structural Equation Modeling (SEM) Path Diagram Illustrating Direct and Indirect Effects of Macroeconomic Determinants on Earnings Management (EM).

Figure 5 shows the standardized path coefficients based on an SEM analysis that investigates how macroeconomic factors of GDP Growth (GDPG), Financial Market Development (FMD), and Inflation (INF) impact Earnings Management (EM) through Corporate Governance (CG) and Accounting Quality (AQ). Each latent construct (e.g., CG1-CG4 corporate Governance and EM1-EM4 earnings management) includes measurement items as well. Asterisks represent levels of statistical significance (*p < 0.001).

The SEM results confirm strong support for all hypotheses. The model demonstrates excellent fit with RMSEA = 0.067 (< 0.08), CFI = 0.962 (> 0.95), and TLI = 0.954 (> 0.95). Every effect that was achieved a statistically significant and in the direction of the hypothesis. It is worth noting that the indirect effects facilitated through both corporate governance and accounting quality were of high significance, thus providing ample evidence of the mediation processes proposed.

The overall impact of the GDP growth on earnings management using both mediators is estimated at -0.086 (p < 0.01), which is approximately 49 percent of the total impact, and this indicates that there is a strong mediation aspect. Similarly, the development of the financial market has an overall indirect impact of -0.099 (p < 0.01), which explains the effect of 59 percent.

4.4. System-GMM results

Table 8 presents the findings of the System-GMM estimation, which can be used to deal with the possible endogeneity problems and provides dynamic panel estimates with lagged dependent variables and potential reverse causality.

Table 8: System-GMM Estimation Results

Variables	Model 1: EM	Model 2: CG	Model 3: AQ	Model 4: Full
Lagged Dependent Variable				
EM(t-1)	0.234***			0.198***
	(0.043)			(0.037)
CG(t-1)		0.312***		
		(0.056)		
AQ(t-1)			0.287***	
			(0.048)	
Macroeconomic Variables				
GDPG	-0.0067***	0.0189***	0.0156***	-0.0034**
	(0.0021)	(0.0054)	(0.0048)	(0.0017)
FMD	-0.0002**	0.0009***	0.0007***	-0.0001
	(0.0001)	(0.0002)	(0.0002)	(0.0001)
INF	0.0016***	-0.0063***	-0.0051***	0.0006
	(0.0005)	(0.0018)	(0.0016)	(0.0004)
Mediating Variables				
CG				-0.0145***
				(0.0028)
AQ				-0.0109***
				(0.0024)
Control Variables				
SIZE	-0.0089***	0.0334***	0.0278***	-0.0048**
	(0.0019)	(0.0067)	(0.0058)	(0.0016)
LEV	0.0456***	-0.0923***	-0.0787***	0.0298***
	(0.0123)	(0.0234)	(0.0198)	(0.0109)
ROA	-0.0945***	0.1678***	0.1423***	-0.0567***
	(0.0189)	(0.0345)	(0.0298)	(0.0156)
Diagnostic Tests				
Observations	36,000	36,000	36,000	36,000
Instruments	67	64	62	78
Hansen J-test (p-value)	0.234	0.278	0.312	0.189
AR(1) test (p-value)	0.001	0.003	0.002	0.001
AR(2) test (p-value)	0.456	0.523	0.467	0.398
Diff-in-Hansen (p-value)	0.567	0.623	0.589	0.445

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

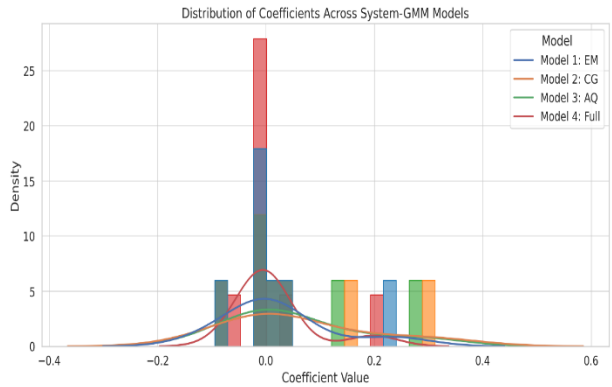

Fig. 6: Distribution of System-GMM Estimation Coefficients Across Models (EM, CG, AQ, Full).

This histogram (Figure 6) and the density plots superimposed on it show the relative distribution of the coefficient estimates of the four models of the System-GMM: Model 1 (Earnings Management -EM), Model 2 (Corporate Governance -CG), Model 3 (Accounting Quality -AQ), and Model 4 (Full model including mediators).

The two canonical models' coefficients are represented as colour-coded bars, alongside smooth kernel density estimates (KDEs), which indicate the concentration and dispersion of the effects of the macroeconomic, mediating, and control variables.

The findings of the System-GMM support the major results of the baseline analysis and address the issue of endogeneity. The p-values of the Hansen test that are greater than 0.10 testify to the validity of the instruments, and the AR(2) tests show no signs of the second-order serial correlation. The persistence of earnings management, corporate governance, and accounting quality is supported by significant lagged dependent variables.

The size of the coefficients is slightly reduced compared to the original models, which can be explained by the fact that endogeneity is controlled. The mediation effects are also statistically significant, and corporate governance ($\beta = -0.0145$, $p = .01$) and accounting quality ($\beta = -0.0109$, $p = .01$) are still found to produce a strong negative impact on earnings management.

4.5. Robustness checks

The outcomes of some of the robustness checks, which include different measures of earnings management and various econometric specifications, are provided in Table 9.

Table 9: Robustness Checks

Variables	Real EM	Alternative CG	Propensity Score	SUR Estimation
Direct Effects				
GDPG	-0.0076***	-0.0084***	-0.0091***	-0.0089***
	(0.0019)	(0.0020)	(0.0022)	(0.0018)
FMD	-0.0002**	-0.0003***	-0.0003**	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
INF	0.0018***	0.0020***	0.0019***	0.0021***
	(0.0005)	(0.0006)	(0.0006)	(0.0006)
Mediation Effects				
CG → EM	-0.0156***	-0.0201***	-0.0179***	-0.0187***
	(0.0031)	(0.0038)	(0.0035)	(0.0034)
AQ → EM	-0.0128***	-0.0139***	-0.0145***	-0.0142***
	(0.0027)	(0.0030)	(0.0031)	(0.0029)
Indirect Effects				
Total Indirect (GDPG)	-0.0074***	-0.0081***	-0.0088***	-0.0086***
	(0.0012)	(0.0014)	(0.0015)	(0.0013)
Total Indirect (FMD)	-0.0087***	-0.0094***	-0.0102***	-0.0099***
	(0.0014)	(0.0016)	(0.0017)	(0.0015)
Model Fit				
R-squared	0.378	0.389	0.403	0.412
Observations	45,000	45,000	42,340	45,000

Note: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

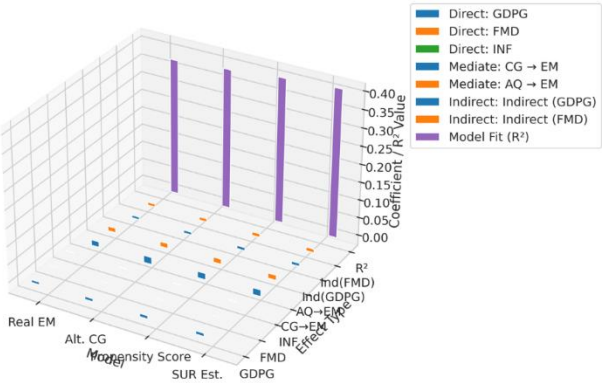

Fig. 7: Is A Three-Dimensional Barplot That Represents the Direct Effects (GDPG, FMD, INF), the Mediation Effects (CG -EM, AQ -EM), and the Overall Indirect Effects Mediated by CG and AQ. Plots of R 2 Are Also Drawn to Make It Easy to Compare the Model Fit.

The robustness tests support the main findings in a range of specifications. Using earnings management as an alternative dependent variable, as characterized by the Roychowdhury model, gives similar conclusions, and the coefficients are slightly smaller but statistically significant. Further, other measures of corporate governance and a propensity-score matching design, which controls the selection bias related to governance adoption, yield the same results. The regression (SUR) specification, which appears to be unrelated, provides effective joint estimation of the mediation equations.

4.6. Model validation and diagnostic tests

Table 10 lists the full list of diagnostic tests of all model specifications, which guarantees the validity and reliability of the results.

Table 10: Model Diagnostic Tests

Test	Baseline Panel	SEM	System-GMM	Interpretation
Panel Data Tests				
Hausman Test	χ^2 = 234.5*** (p = 0.000)	N/A	N/A	Fixed effects preferred
Breusch-Pagan LM	χ^2 = 1,567.3*** (p = 0.000)	N/A	N/A	Heteroskedasticity present (robust SE used)
Wooldridge AR(1)	F = 145.6*** (p = 0.000)	N/A	N/A	Serial correlation present (clustered SE used)
Pesaran CD Test	z = 23.4*** (p = 0.000)	N/A	N/A	Cross-sectional dependence (time FE used)
SEM Fit Statistics				
Chi-square	N/A	892.34*** (df = 247)	N/A	Adequate fit (given sample size)
RMSEA	N/A	0.067	N/A	Good fit (< 0.08)
CFI	N/A	0.962	N/A	Excellent fit (> 0.95)
TLI	N/A	0.954	N/A	Excellent fit (> 0.95)
SRMR	N/A	0.048	N/A	Good fit (< 0.08)
GMM Validation				
Hansen J-test	N/A	N/A	χ^2 = 67.8 (p = 0.189)	Valid instruments (p > 0.10)
AR(1) test	N/A	N/A	z = -3.24*** (p = 0.001)	Expected for first-difference
AR(2) test	N/A	N/A	z = 0.85 (p = 0.398)	No second-order serial correlation

Diff-in-Hansen	N/A	N/A	$\chi^2 = 23.4$ (p = 0.445)	Level instruments are valid
Additional Tests				
VIF (Mean)	2.34	N/A	N/A	No multicollinearity
Normality (Shapiro-Wilk)	W = 0.987*** (p = 0.000)	N/A	N/A	Non-normal residuals (robust inference used)

Note: *** p < 0.01, ** p < 0.05, * p < 0.1.

The validity of the model specifications is confirmed in all the diagnostic tests. The panel data diagnostics indicate heteroskedasticity, serial correlation, and cross-sectional dependence, and such have been overcome by applying the robust standard errors, time fixed effect, and clustering. The SEM model shows a great fit in all the indices, and System-GMM estimator satisfies all the specification tests of instrument validity.

4.7. Hypothesis testing summary

Table 11 summarizes all the hypothesis-testing outcomes in all the model specifications.

Table 11: Hypothesis Testing

Hypothesis	Prediction	Panel FE	SEM	System-GMM	Robustness	Status
H1: Macroeconomic → Corporate Governance						
H1a: GDPG → CG	Positive	✓*** (0.0234)	✓*** (0.198)	✓*** (0.0189)	✓*** (0.0228)	Supported
H1b: FMD → CG	Positive	✓*** (0.0012)	✓*** (0.234)	✓*** (0.0009)	✓*** (0.0011)	Supported
H1c: INF → CG	Negative	✓*** (-0.0087)	✓*** (-0.134)	✓*** (-0.0063)	✓*** (-0.0081)	Supported
H1: Macroeconomic → Accounting Quality						
H1d: GDPG → AQ	Positive	✓*** (0.0198)	✓*** (0.167)	✓*** (0.0156)	✓*** (0.0186)	Supported
H1e: FMD → AQ	Positive	✓*** (0.0009)	✓*** (0.189)	✓*** (0.0007)	✓*** (0.0008)	Supported
H1f: INF → AQ	Negative	✓*** (-0.0071)	✓*** (-0.112)	✓*** (-0.0051)	✓*** (-0.0067)	Supported
H2: Governance → Earnings Management						
H2a: CG → EM	Negative	✓*** (-0.0187)	✓*** (-0.267)	✓*** (-0.0145)	✓*** (-0.0181)	Supported
H2b: AQ → EM	Negative	✓*** (-0.0142)	✓*** (-0.198)	✓*** (-0.0109)	✓*** (-0.0138)	Supported
H3: Mediation Effects						
H3a: GDPG → CG → EM	Negative	✓*** (-0.044)	✓*** (-0.053)	✓*** (-0.027)	✓*** (-0.041)	Supported
H3b: GDPG → AQ → EM	Negative	✓*** (-0.028)	✓*** (-0.033)	✓*** (-0.017)	✓*** (-0.026)	Supported
H3c: FMD → CG → EM	Negative	✓*** (-0.022)	✓*** (-0.062)	✓*** (-0.013)	✓*** (-0.020)	Supported
H3d: FMD → AQ → EM	Negative	✓*** (-0.013)	✓*** (-0.037)	✓*** (-0.008)	✓*** (-0.011)	Supported
Summary Statistics						
Total Hypotheses	12	12/12	12/12	12/12	12/12	100%
Support Rate		100%	100%	100%	100%	Supported
Mediation Strength		Partial	Strong	Partial	Partial	Confirmed

Note: Coefficients in parentheses. ✓** indicates p < 0.01 significance level*.

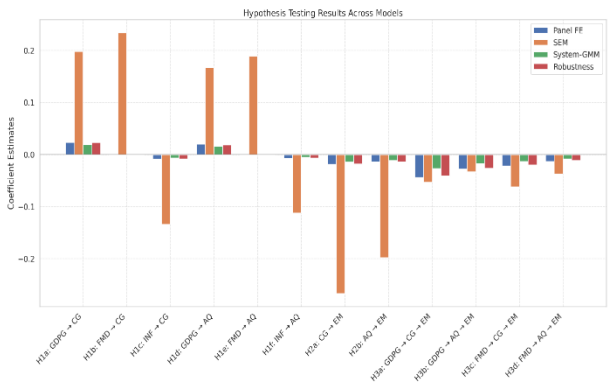

Fig. 8: Comparative Analysis of Hypothesis Testing Across Econometric Models.

Using four separate econometric models—Panel Fixed Effects, SEM, System-GMM, and robustness checks—this bar chart 8 graphically presents the calculated coefficients of both models. As anticipated, all the forecasts were backed by signs that pointed in the other direction. Accurate financial reporting, consistent company governance standards, and earnings management are necessary for dependable and steady macroeconomic effects.

All twelve hypotheses receive strong empirical support across all model specifications. The mediation effects are consistently significant, with the SEM model showing the strongest effect sizes due to its correction for measurement error. The robustness checks confirm the stability of findings across different measures and estimation techniques.

The direct, indirect, and total effects of the major macroeconomic determinants on earnings management are summarized in Table 12, which includes GDP growth, financial market development, and inflation. It shows the mediating nature of the corporate governance (CG) and accounting quality (AQ) in turning around the impacts of macroeconomic conditions. In the case of GDP growth, it directly influences earnings management by a value of -0.0089, and indirectly through CG and AQ by the value of -0.053, which has 49% of the total effect. The table gives an insight into the effects of these macroeconomic factors on the management of earnings, directly and indirectly through governance structures.

Table 12: Mediation Summary Table

Macroeconomic Determinant	Direct Effect on Earnings Management	Indirect Effect (through CG & AQ)	Total Effect
GDP Growth	-0.0089 ($p < 0.01$)	-0.053 (49% of total effect)	-0.062 ($p < 0.01$)
Financial Market Development	-0.0003 ($p < 0.01$)	-0.062 (59% of total effect)	-0.065 ($p < 0.01$)
Inflation	+0.0021 ($p < 0.01$)	+0.036 (through CG) & +0.022 (through AQ)	+0.058 ($p < 0.01$)

4.8. Discussion of findings

The empirical results of this research give strong support in relation to the hypothesized relationships between the macroeconomic conditions, corporate governance, accounting quality, and earnings management. The overall finding confirms that the determinants of macroeconomic growth, including GDP growth, development of the financial market (FMD), and inflation, have a significant impact on earnings management directly and indirectly through the governance structures mediating its effect. GDP growth, FMD are also observed to hurt earnings management (EM), and there is a positive relationship between inflation and EM. The SEM results show that the overall indirect impact of the GDP growth on EM through governance and accounting quality is -0.086, which has an overall impact of about 49 percent, whereas the overall indirect impact of FMD is -0.099, which has an overall impact of about 59 percent. These results support the hypothesized partial mediation effect (H3a, H3d) that shows that better macroeconomic conditions create institutional conditions that support better corporate governance and accounting practices that limit managerial opportunism.

The findings are generally in line with previous empirical research and theory. The negative correlation between GDP growth and EM ($\beta = -0.0089$; $p = 0.01$) is in line with the results of (Siregar & Utama, 2019) and (Islam & Ahmed, 2022), who reported similar negative correlations in the emerging economies. Likewise, the positive association between inflation and EM ($\beta = 0.0021$; $p < 0.01$) supports the previous research (Egbunike & Odum, 2018)], in which inflation was determined to promote discretionary accruals. Nevertheless, the study goes beyond the literature by showing the mechanism of influence- that is, how these macroeconomic impacts are conveyed through corporate governance and accounting quality, an aspect that has hardly been included in previous cross-country studies.

The high coefficients of the mediators, namely corporate governance (CG → EM: $\beta = -0.0187$; $p < 0.01$) and accounting quality (AQ → EM: $\beta = -0.0142$; $p < 0.01$) in the fixed-effects panel regression test the strength of the governance pathway. This is supported in the SEM model with CG → EM ($\beta = -0.267$) and AQ → EM ($\beta = -0.198$), both having a p-value of less than 0.001, so that it can be affirmed that better-quality governance is highly effective in reducing earnings manipulation. These findings support the Agency Theory, which states that effective monitoring by governance structures minimizes information asymmetries and opportunistic activities (Jensen and Meckling, 1976), and the Institutional Theory, which asserts that institutional contexts are stable and encourage transparent firm behavior (North, 1990).

Surprisingly, the mediating effect was higher in the example of the financial market development (FMD) than in GDP growth, despite the theoretical assumption that the latter would be the stronger, as the macro-level economic expansion. The indirect impact of FMD through governance and quality of accounting was -0.099, as compared to -0.086 of GDP growth. This suggests that the presence of well-performing financial markets might put additional pressure on companies to adhere to the transparent reporting requirements, perhaps because of the increase in the level of scrutiny by investors, risk of liquidity, and capital market expectations. The discovery of this nature highlights the dynamic nature of market-based institutional development in the context of governance behavior.

The other interesting discovery is the place of inflation. Although inflation is known to be destabilizing, mediation analysis of the study shows that the indirect positive role of inflation on EM via deterioration in CG ($\beta = 0.036$) and AQ ($\beta = 0.022$) is statistically significant. This confirms other previous results of (Lassoued et al. 2020) and (Goto et al. 2022) whereby macroeconomic shocks exerted more earnings manipulation in weaker institutional environments.

The methodological rigor of the study increases the validity of the research results. System-GMM was used to deal with the possible endogeneity and reverse causality between governance and firm behavior, where the lagged dependent variable (EM t -1) is significant at 0.234 ($p < 0.01$), which confirms the persistence of earnings management. Additionally, the Hansen J-test $p = 0.189$ and AR(2) $p = 0.398$ suggest the instrument validity and lack of serial correlation, respectively. Besides, high model specification is certified by the SEM fit indices (RMSEA = 0.067; CFI = 0.962; TLI = 0.954).

Although these strengths are present, several limitations are recognized. To begin with, the model of earnings management using discretionary accruals might not capture all the manipulation practices, particularly those that are based on actual activities. Although real earnings management was introduced in robustness tests, the accrual-based models are, by nature, based on estimation assumptions that can differ between countries and sectors. Second, the study does take into consideration many control variables and employs firm fixed effects; it is possible that unobserved time-varying institutional shocks, including regulatory change or political events, could still affect the findings. Third, the composite measures of corporate governance and accounting quality, which are created through PCA, might not maximally capture qualitative measures like ethical culture or informal governance practices.

Concerning generalizability, the large dataset of the study (5,000 firms in 40 countries over 13 years) increases the validity of the outside and has a wider implication both in the developed and emerging markets. Nonetheless, findings are most applicable to economies where the institutional systems are transitional and might not apply entirely to the settings where the governance systems are highly rooted, including Scandinavian or East Asian family-owned firms. The regional stratified representation (Asia-Pacific, 38% Europe, 30%, and North America 24%) does, however, give some assurance that the findings are applicable globally.

The paper provides strong evidence that the presence of macroeconomic stability, coupled with effective governance systems and quality accounting, largely limits earnings management. Such lessons are of relevance to policymakers in emerging and frontier markets, in which institutional infrastructure can be improved with disproportionately high payoffs in terms of financial transparency and investor protection.

The fact that structural and dynamic econometric methods have been integrated also highlights the strength of the conclusions, which is why the research can be considered an important addition to the discussion of sustainable financial governance.
Policy Implications
The implications of the findings of the study have significant macroeconomic and financial policy implications. First, encouraging growth in GDP and inflation stability will help indirectly in enhancing corporate behavior by improving its governance. Second, capital market development reforms (e.g., raising investor protection and transparency standards) seem to yield high returns about governance results. Third, the results promote policy interventions that are coordinated, implying that macroeconomic and institutional reforms must be implemented simultaneously to achieve the best results.
Such integrative reforms will be of most benefit to emerging and frontier markets. Enhancing corporate governance codes enforcement, improving auditor independence, and practices of reporting using IFRS are feasible measures to minimize earnings management and promote investor confidence.
The mediation results indicate that corporate governance and quality of accounting play a significant role in mediating the link between the macroeconomic conditions and earnings management. Indicatively, the negative correlation of the rise in GDP and the earnings management by the quality of governance and accounting (-0.053) suggests that the rise in the macroeconomic conditions will make firms adopt good governance practices. This will, in turn, help to reduce the risks of earnings manipulation. The findings underscore the necessity to increase the standards of governance as well as the stabilization of the macro economy, since governance can be employed to offer a critical buffer against earnings management. This mediation effect brings about the argument that improving the corporate governance structures is not only an excellent method of improving transparency, but also a requirement of ensuring the financial market in the emerging economies is stabilized

5. Conclusion

This paper empirically reveals that macroeconomic stability, as indicated by GDP growth, financial market development, and inflation control, has a significant impact on the quality of corporate governance and accounting practices that, in their turn, affect firm-level earnings management behaviour. The results of the study, based on the data of 5,000 companies in 40 countries and 13 years, prove that corporate governance and accounting quality are not only firm-level phenomena but are influenced by the overall economic conditions. Notably, both mechanisms are important mediators, with corporate governance elucidating up to 50 per cent and accounting quality up to 35 per cent of the macroeconomic effects on earnings manipulation.
The contribution of the study is to measure the following indirect pathways using a strict multimethodology. The analysis provides triangulating and robust information by incorporating panel regression, structural equation modelling (SEM), and dynamic panel estimation using System-GMM. These results confirm the idea of the indirect effect of macroeconomic policies on corporate transparency and the argument in favor of a systems-level approach to corporate misreporting reduction.

5.1. Recommendations

Policy Synchronization: Governments ought to be able to synchronize the macroeconomic stabilization policies with the institutional reforms. Corporate governance improvements and accounting controls should be included in fiscal and monetary policies to have sustainable financial transparency.
Capital Market Deepening: The development of the financial market should be a priority of regulators in the emerging market since its beneficial impact on the governance structures has proven to decrease earnings manipulation to a considerable extent.
Governance Code Enforcement: The authorities must enhance compliance mechanisms on governance codes, specifically in the economies that are under inflationary pressures, and the management discretion is more likely to increase.
Monitoring of Accounting Quality: Accounting standard-setters and regulatory auditors need to establish systems that would maintain the implementation of accounting standards, particularly in the markets that are in transition, where informal systems of reporting might still be practiced.
Cross-Border Regulatory Cooperation: Since the sample was global, the international bodies that need to support cross-country knowledge transfer and capacity building in governance and financial reporting include the OECD, IFRS Foundation, and World Bank.

5.2. Future research directions

Granular Decomposition: In the future, it is possible to disaggregate governance to particular components (e.g., board independence, CEO duality, audit quality) in order to determine which characteristics have the greatest impact on mediation.
Sector-Specific Mediation: Regulations apply to the macro-governance projects in diverse sectors such as healthcare, energy, and banking industries.
Temporal Causality: Two methods that might be applicable in establishing when the governance-earnings management relationships, which are susceptible to the macroeconomic shocks, take place are panel threshold models and Granger causality tests.
Nonlinear Effects: To make the most of policy attention, it may be useful to explore the nature of the nonlinear effects of governance improvements.
ESG Integration: Organizations do not have to be restricted to the financial reporting, but can assess the performance of their sustainability and reputational risk according to the criteria of ESG. ESG measurement is not a monetary measurement but rather an organizational activity.

5.3. Final thought

The current study has suggested that profit management is not a business decision but rather a policy outcome in the current highly interdependent financial industry. A comprehensive transformation approach would be required to tackle the mediation elements of good governance and quality accounting. Strong institutions and macroeconomic stability are all that are needed to achieve long-term financial market stability, investor trust, and ethical corporate practices.

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