

# UNVEILING FINANCIAL FRAUD: THE IMPACT OF PROFITABILITY, LIQUIDITY, AND LEVERAGE

Izzatul Nabbila Zulkiflee<sup>1</sup>  
Mohd Faizal Jamaludin<sup>2\*</sup>

<sup>1</sup> Faculty of Accountancy, Universiti Teknologi MARA, Puncak Alam, 42300, Selangor, Malaysia  
(E-mail: [izzanabbila@gmail.com](mailto:izzanabbila@gmail.com))

<sup>2</sup> Faculty of Accountancy, Universiti Teknologi MARA Kedah Branch, Sungai Petani Campus, Merbok 08400, Kedah, Malaysia  
(E-mail: [mfaizalj@uitm.edu.my](mailto:mfaizalj@uitm.edu.my))

\*Corresponding author: [mfaizalj@uitm.edu.my](mailto:mfaizalj@uitm.edu.my)

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**Abstract:** *This study explores the extent to which key financial indicators—profitability, liquidity, and leverage—are associated with fraudulent financial reporting among Malaysian publicly listed firms. Drawing upon a matched sample of 60 companies, comprising 30 firms classified as financially distressed (PN17 status) and 30 high-performing firms listed on Bursa Malaysia from 2020 to 2022, the study investigates whether these financial variables significantly influence the likelihood of financial misrepresentation. The findings reveal that both leverage and liquidity exhibit a statistically significant and negative relationship with fraudulent reporting, while profitability does not demonstrate a meaningful effect. These results underscore the importance of financial pressure—rather than profitability—as a central driver of fraudulent financial practices. By offering empirical insights into the financial characteristics of fraudulent firms, the study contributes to the growing literature on fraud detection and strengthens the theoretical underpinnings of the Fraud Triangle, Fraud Diamond, and Signalling Theory. It also offers practical implications for regulators, auditors, and policymakers in designing more robust early warning mechanisms for fraud detection in corporate financial reporting.*

**Keywords:** *Fraudulent Financial Reporting; Financial Leverage; Liquidity; Profitability; Corporate Fraud; Malaysia; Financial Distress; PN17 Firms.*

## Introduction

Fraudulent financial reporting (FFR) continues to pose a significant threat to the credibility of capital markets and the integrity of corporate reporting, particularly within emerging economies. In Malaysia, despite the regulatory oversight provided by Bursa Malaysia and the Malaysian Code on Corporate Governance (MCCG), the prevalence of fraudulent financial reporting persists, with multiple firms classified under PN17 due to severe financial distress or manipulated disclosures (Hasnan et al., 2020; Kamaluddin et al., 2023). These recurring incidents underscore a pressing need to revisit the financial determinants that may signal early signs of such malpractice.

The collapse of high-profile Malaysian companies, including Transmile Group Berhad and Megan Media Holdings Berhad, has not only eroded investor confidence but also called into question the efficacy of conventional audit and corporate governance mechanisms in curbing financial misrepresentation (Ismail et al., 2020; Mohammed et al., 2020). Existing studies highlight a range of red flags associated with fraud—including declining liquidity, excessive leverage, and inconsistencies in earnings performance—but a consensus remains elusive regarding which financial indicators are most predictive of fraudulent reporting in the Malaysian context (Zainudin & Hashim, 2016; Dalnial et al., 2014; Prasetyo et al., 2023).

Theoretical frameworks such as the Fraud Triangle (Cressey, 1953), Fraud Diamond (Wolfe & Hermanson, 2004), Signalling Theory (Spence, 1973), and Agency Theory (Jensen & Meckling, 1976) suggest that economic pressure, opportunity, rationalisation, and asymmetrical information collectively drive managers toward fraudulent conduct. Nevertheless, empirical research often offers fragmented or conflicting conclusions about the role of specific financial ratios—such as return on assets (ROA), current ratio (CR), and debt-to-equity ratio (DER)—in detecting fraud, particularly when contextualised within different institutional settings (Dechow et al., 1996; Gaganis, 2009; Skousen et al., 2009).

This study seeks to bridge this gap by examining the influence of profitability, liquidity, and leverage on the likelihood of fraudulent financial reporting among Malaysian public-listed companies. By employing a matched-pair sampling strategy between distressed (PN17) and non-distressed firms from 2020 to 2022, the research provides new insights into the financial characteristics that distinguish fraudulent entities from their healthier counterparts. This inquiry is both timely and policy-relevant, as it offers stakeholders—including regulators, auditors, and investors—empirical guidance on how to interpret financial signals that may precede corporate misstatements.

## Background of Research

Fraudulent financial reporting (FFR) continues to pose a critical challenge to global economic stability and investor confidence. As Prasetyo et al. (2023) argue, the reliability and relevance of financial statements are fundamental to informed decision-making by investors, creditors, and regulators. However, fraudulent financial reporting—through techniques such as revenue inflation, misallocation of expenses, overstatement of assets, or concealment of liabilities—undermines this trust and distorts the financial landscape (Devarajar et al., 2022).

Among the many tools available to identify financial irregularities, financial ratio analysis remains a widely used and accessible method (Chen, Hsu, & Wang, 2021). Common indicators such as leverage, profitability, and liquidity offer meaningful insights into a firm's financial health and potential red flags for misreporting (Amrizah et al., 2014; Prasetyo et al., 2023).

These ratios serve as both evaluative and predictive metrics, assisting stakeholders in detecting anomalies that may signal fraudulent intent (Evana et al., 2019).

Nonetheless, the empirical evidence remains inconclusive. Some studies have identified leverage and liquidity as statistically significant predictors of fraud, highlighting the role of financial pressure in motivating managerial misrepresentation (Evana et al., 2019). Others have argued for the inclusion of profitability and asset composition as additional or alternative indicators (Prasetyo et al., 2023). Given the increasing sophistication of fraud schemes—often involving layered transactions and complex reporting mechanisms—there is a growing need for continuous refinement of detection models and empirical validation of financial red flags (Norziaton & Arfa Aqila, 2022).

By re-examining the utility of traditional financial indicators in a contemporary context, this study seeks to contribute to the ongoing academic and policy discourse on fraud prevention. In particular, it explores how changes in financial structures post-COVID-19 may have altered the behavioural incentives and reporting patterns of firms, necessitating updated detection frameworks that account for evolving risks.

### **Problem Statement**

Despite decades of regulatory reform and corporate governance enhancement, fraudulent financial reporting (FFR) continues to plague both developed and emerging markets. Malaysia, in particular, has witnessed recurrent cases of financial misrepresentation—ranging from overstated revenues to concealed liabilities—resulting in significant financial losses and deteriorated investor confidence. The persistent classification of firms under PN17 by Bursa Malaysia underscores the systemic nature of the issue and the limitations of current detection mechanisms (Hasnan et al., 2020; Zainudin & Hashim, 2016).

Although financial ratios such as leverage, liquidity, and profitability are frequently cited as potential indicators of corporate distress and fraud risk (Evana et al., 2019; Prasetyo et al., 2023), the empirical findings across contexts remain inconsistent. This ambiguity is further compounded by the evolving complexity of financial fraud, which often eludes traditional models like the Beneish M-score or Altman Z-score (Devarajar et al., 2022). The theoretical frameworks commonly employed—such as the Fraud Triangle, Fraud Diamond, and Signalling Theory—acknowledge the interplay of pressure, opportunity, and rationalisation, yet offer limited predictive specificity when translated into ratio-based diagnostics (Wolfe & Hermanson, 2004; Spence, 1973).

In this light, there is a compelling need to reassess the diagnostic power of basic financial indicators in distinguishing fraudulent firms from legitimate ones, particularly in the context of emerging economies like Malaysia where financial irregularities often intersect with governance gaps. This study, therefore, investigates whether profitability, liquidity, and leverage are statistically significant predictors of FFR, using a matched-sample design comprising PN17 and high-performing firms listed on Bursa Malaysia from 2020 to 2022. By doing so, it aims to refine fraud detection heuristics and provide empirically grounded insights for practitioners, auditors, and regulators seeking to improve financial surveillance.

This study aims to investigate the extent to which specific financial indicators—namely financial leverage, profitability, and liquidity—are associated with fraudulent financial reporting among Malaysian publicly listed companies. In addressing the persistent challenges

of financial misrepresentation, particularly among PN17-designated firms, this research seeks to identify whether these financial metrics function as early warning signals for fraudulent practices.

To this end, the study employs a matched-sample design involving two distinct groups: financially distressed companies (PN17) and high-performing firms listed on Bursa Malaysia between 2020 and 2022. The analysis is grounded in the theoretical assumptions of the Fraud Triangle, Fraud Diamond, and Signalling Theory, which collectively posit that financial pressure, opportunity, capability, and misaligned incentives contribute to fraudulent behaviour.

The following research objectives guide this inquiry:

- i. To determine whether financial leverage significantly influences the likelihood of fraudulent financial reporting.
- ii. To assess whether profitability plays a meaningful role in predicting financial misrepresentation.
- iii. To examine the extent to which liquidity contributes to the occurrence of fraudulent financial reporting.

Aligned with these objectives, the study addresses three central research questions:

- i. Is there a statistically significant relationship between financial leverage and fraudulent financial reporting?
- ii. Is there a statistically significant relationship between profitability and fraudulent financial reporting?
- iii. Is there a statistically significant relationship between liquidity and fraudulent financial reporting?

Through this analytical framework, the study aims to enhance the understanding of financial red flags associated with corporate fraud, thereby contributing to both academic discourse and practical fraud detection mechanisms in the Malaysian capital market.

### **Significance of the Study**

This study carries theoretical, practical, and policy-related significance for multiple stakeholders, particularly in the context of emerging economies grappling with persistent issues of financial misrepresentation.

For businesses, the findings offer actionable insights into how key financial indicators—specifically, leverage and liquidity—may serve as early warning signals for fraudulent financial reporting. By understanding these dynamics, corporate managers can strengthen internal control systems, improve risk assessment processes, and mitigate reputational and legal risks associated with financial misconduct.

For regulatory bodies and policymakers, this study provides empirical evidence that can inform the development of more robust frameworks for financial surveillance and corporate governance. Lessons drawn from historical fraud cases in Malaysia, such as 1MDB and Transmile Group Berhad, underscore the necessity of early detection tools and stricter enforcement mechanisms to maintain capital market integrity (Rahman et al., 2021). The study's identification of liquidity and leverage as significant predictors offers a data-driven basis for revising financial reporting standards and enforcement strategies.

For academic researchers, this study contributes to the advancement of fraud detection theory by empirically testing the validity of financial ratios as fraud predictors within the Malaysian setting. The integration of recent data from the post-COVID-19 period addresses a notable gap in the literature, especially in light of structural changes in firm behaviour during economic disruptions (Dawood et al., 2023). The findings may serve as a theoretical platform for further empirical investigations that incorporate governance, institutional, or behavioural factors into fraud risk modelling.

For the wider community, this study promotes accountability and ethical financial practices, which are essential for sustainable economic development. Transparent reporting not only strengthens investor confidence but also improves the overall trust in financial institutions and markets.

### Research Gap

While previous studies have examined the relationships between financial leverage, profitability, liquidity, and fraudulent financial reporting (Amrizah et al., 2017), most rely on pre-pandemic data and do not reflect the evolving economic and regulatory landscape brought about by COVID-19. The pandemic has caused significant financial distress for many firms, altering reporting behaviours and potentially creating new incentives and pressures for fraudulent activity. This structural shift highlights the need to reassess whether traditional financial indicators remain robust predictors of fraud in a post-pandemic economy.

Earlier empirical work has yielded mixed findings. For example, while some studies affirm the predictive power of liquidity and leverage in identifying fraudulent firms, others suggest limited or inconclusive evidence regarding profitability as a consistent determinant (Evana et al., 2019; Zainudin & Hashim, 2016). Moreover, most existing models have not been calibrated to recent economic shocks or to industry-specific dynamics in Malaysia, particularly for PN17-designated firms that operate under financial duress.

Therefore, this study addresses a clear gap by integrating financial data from 2020–2022 and focusing on the Malaysian context—a market characterised by active regulatory reforms and high-profile fraud scandals. By applying well-established fraud theories (Fraud Triangle, Fraud Diamond, and Signalling Theory) to contemporary data, the study offers an updated understanding of how financial indicators behave under new economic realities. In doing so, it seeks to refine the predictive value of key financial ratios and contribute to more adaptive and evidence-based frameworks for fraud detection in emerging markets.

### Theoretical Framework

This study draws upon three primary theoretical lenses to explain the phenomenon of fraudulent financial reporting (FFR): the Fraud Triangle Theory, the Fraud Diamond Theory, and Signalling Theory. Each framework provides a distinct yet complementary perspective on the motivations, opportunities, and behaviours underpinning corporate fraud.

### Fraud Triangle Theory

Originally proposed by Cressey (1953), the Fraud Triangle posits that FFR arises from the convergence of three elements: pressure, opportunity, and rationalisation. In financially distressed firms, pressure may stem from declining liquidity or high leverage, incentivising managers to manipulate earnings to meet performance expectations or avoid regulatory sanctions (Puspitaningrum et al., 2019). Weak internal controls or opaque financial systems



provide the opportunity for such manipulation, while rationalisation occurs when individuals justify unethical behaviour as a necessary means of survival or continuity (Skousen et al., 2009). In the Malaysian context, financial reporting manipulation often emerges in firms with concentrated ownership and limited board oversight, further validating this theoretical lens (Irwandi et al., 2020).

### **Fraud Diamond Theory**

Wolfe and Hermanson (2004) extend the Fraud Triangle by introducing a fourth dimension: capability. This theory argues that even when pressure, opportunity, and rationalisation exist, the perpetrator must also possess the skills, authority, and confidence to commit and conceal the fraud. In the case of Malaysian public-listed firms, top executives—particularly those with financial acumen—may exploit complex reporting mechanisms or loopholes in accounting standards to mask financial distress (Rahman et al., 2021). The presence of capable actors in senior management thus increases the likelihood and sophistication of fraudulent activities (Verolika et al., 2024).

### **Signalling Theory**

Signalling Theory (Spence, 1973) offers a behavioural perspective, highlighting how firms—particularly those in financial decline—attempt to send positive signals to investors and stakeholders, even if those signals are misleading. In times of distress, companies may manipulate earnings, overstate assets, or delay loss recognition to project financial stability (Miharsi et al., 2023; Wisnu et al., 2023). These actions are especially prevalent in firms operating within weak regulatory environments or with poor transparency practices. From this viewpoint, financial statements become strategic instruments of impression management rather than accurate representations of economic reality.

By integrating these three theoretical perspectives, this study provides a comprehensive framework to understand how financial pressures, managerial intent, and contextual governance weaknesses collectively influence the incidence of fraudulent financial reporting. This multidimensional lens strengthens the study's conceptual foundation and informs the selection of profitability, liquidity, and leverage as key variables of interest.

### **Literature Review**

The growing incidence of fraudulent financial reporting (FFR) continues to challenge the reliability of corporate disclosures and the effectiveness of traditional financial surveillance mechanisms. Despite decades of research and regulatory interventions, financial manipulation persists across markets, including in jurisdictions with evolving governance systems such as Malaysia. While numerous studies have explored the role of financial indicators—such as profitability, leverage, and liquidity—in predicting fraudulent behaviour, the findings remain inconclusive and context-dependent. Furthermore, most prior investigations rely on pre-pandemic data, failing to account for the structural and behavioural shifts in corporate reporting that have emerged in the post-COVID-19 landscape. This review synthesises the theoretical and empirical literature on FFR, focusing on how specific financial metrics have been used to detect fraudulent behaviour and where gaps in understanding persist, particularly in high-risk and emerging-market contexts.

### **Conceptualising Fraudulent Financial Reporting**

Fraudulent financial reporting (FFR) refers to the intentional misstatement or omission of material information in a company's financial statements to deceiving stakeholders and altering

perceptions of financial health (Association of Certified Fraud Examiners [ACFE], 2022). Unlike errors or negligence, FFR involves deliberate manipulation of accounting policies, earnings, or asset values to present a distorted view of performance and position (Dechow, Sloan, & Sweeney, 1996). Common manifestations include fictitious revenue recognition, understatement of liabilities, capitalisation of expenses, and inflation of asset valuations (Skousen, Smith, & Wright, 2009).

High-profile scandals such as Enron, WorldCom, and, in the Malaysian context, 1Malaysia Development Berhad (1MDB) and Transmile Group Berhad, have amplified global attention on corporate fraud and its consequences. These cases have revealed that FFR not only causes financial losses but also undermines public trust, destabilises markets, and exposes governance failings (Ismail, Kamarudin, & Ibrahim, 2020; Kamaluddin, Sanusi, & Khairuddin, 2023).

Importantly, fraudulent reporting has grown more sophisticated over time, often concealed within complex transactions, off-balance sheet arrangements, or non-transparent disclosures. As corporate environments evolve, so too do the strategies employed to perpetrate fraud, making traditional detection methods increasingly insufficient (Amiram, Bozanic, & Rouen, 2021). This evolution necessitates an ongoing re-evaluation of the financial indicators most indicative of fraudulent intent, especially in settings characterised by regulatory fragmentation, political entanglements, and limited enforcement reach—factors commonly observed in emerging economies like Malaysia.

### **Empirical Studies on Financial Indicators and Fraudulent Financial Reporting**

The use of financial indicators to predict fraudulent financial reporting (FFR) has long been a focal point in the accounting and auditing literature. While profitability, liquidity, and leverage are frequently employed as diagnostic tools in fraud detection models, the empirical findings remain fragmented, context-sensitive, and at times contradictory. This section critically reviews prior research on each of these financial dimensions to highlight both their theoretical relevance and empirical ambiguity.

#### **Profitability and Fraud**

Profitability is often posited as a key determinant of fraud, with declining earnings perceived as a primary source of pressure prompting managerial manipulation (Skousen et al., 2009; Dechow et al., 1996). In line with the Fraud Triangle, managers of poorly performing firms may resort to earnings inflation to meet market expectations, retain investor confidence, or avoid violation of performance-linked compensation contracts. Empirical support for this perspective is evident in studies by Zainudin and Hashim (2016) and Dalnial et al. (2014), who found a significant negative relationship between return on assets and fraudulent behaviour in Malaysian companies.

However, the role of profitability is not universally confirmed. Amrizah et al. (2014) and Miharsi and Sari (2023) present evidence that profitability is not a statistically significant predictor of fraud in their respective samples. Some studies even suggest that high profitability may induce fraud, as firms attempt to sustain favourable trends and earnings trajectories—a concept aligned with the “earnings management trap,” where prior success locks firms into a cycle of performance manipulation (Spathis, 2002; Huang & Sun, 2022). This paradox underscores a methodological challenge: profitability may signal both distress-driven and expectation-driven fraud, depending on the temporal, industry, and governance context.

Furthermore, profitability is often affected by accounting discretion itself—raising endogeneity concerns in empirical fraud models. As such, while profitability is theoretically relevant, its explanatory value may be conditional upon other factors such as liquidity pressure, governance quality, or managerial intent.

### **Liquidity and Fraud**

Liquidity has consistently emerged as one of the most reliable financial red flags for FFR. Unlike profitability, which can be massaged through accruals and provisions, liquidity shortages represent real economic constraints. Firms under liquidity stress may manipulate working capital components or inflate revenue to conceal short-term insolvency risks (Evana et al., 2019; Amiram et al., 2021). The Fraud Triangle conceptualises this as pressure, which can tip ethical boundaries in the face of cash flow crises. Empirical studies by Handoko et al. (2022) and Verolika et al. (2024) have confirmed that current ratios and working capital measures are significantly associated with fraud-prone firms, particularly those at risk of bankruptcy or regulatory classification such as PN17 in Malaysia.

In addition, liquidity is a variable often linked to real-time financial stress rather than cumulative underperformance. As such, it functions not only as a diagnostic signal but as a behavioural trigger, influencing how managers perceive short-term survival and reputational risk. Moreover, liquidity manipulation—via overstated receivables, deferred expenses, or aggressive revenue recognition—is typically easier to implement and harder to detect using standard audit procedures, increasing its appeal to perpetrators.

Despite its predictive strength, few models adequately theorise how liquidity interacts with other variables such as leverage or profitability. This study aims to contribute to this underexplored intersection by examining how liquidity behaves alongside other pressures in shaping fraud incentives.

### **Leverage and Fraud**

Leverage has long occupied a central position in the fraud literature, though its effects are arguably the most contested. Classical agency theory argues that firms with higher debt levels are more prone to misreporting, as managers attempt to avoid covenant breaches, signal financial stability to creditors, or suppress going-concern doubts (Jensen & Meckling, 1976; Agrawal & Chatterjee, 2015). Empirical studies in the Malaysian context, including Dalnial et al. (2014) and Prasetyo et al. (2023), support this view, identifying a positive correlation between debt ratios and fraud risk.

Yet a competing strand of literature views debt not as a fraud risk but as a disciplinary mechanism. According to signalling theory and monitoring hypothesis, firms with significant institutional debt are subject to greater scrutiny from banks, bondholders, and regulators—reducing the freedom to engage in deceptive practices (Zainudin & Hashim, 2020; Amiram et al., 2021). In such environments, high leverage may reflect governance strength rather than weakness.

This tension suggests that the effect of leverage is non-linear or moderated by other institutional or firm-level characteristics. For example, the nature of debt (short- vs. long-term), creditor type (banks vs. capital markets), and quality of audit oversight may condition whether leverage acts as a fraud enabler or deterrent. Few studies, however, explicitly test for these interactions, and most treat leverage as a homogenous variable, limiting its interpretive power.



By comparing PN17 firms with top-performing counterparts, this study provides an opportunity to revisit this paradox and test whether high leverage in distressed contexts acts as a burden or as a barrier to misrepresentation.

### **Gaps and Limitations in Existing Literature**

Although extensive research has been undertaken to explore the relationship between financial indicators and fraudulent financial reporting (FFR), several substantive gaps remain—both in scope and methodological approach. Firstly, a considerable portion of prior studies rely on data from pre-pandemic periods, with limited attention paid to how financial reporting behaviours may have shifted in response to the economic dislocations caused by COVID-19. The pandemic introduced unprecedented liquidity shocks and market uncertainties, which may have altered managerial incentives and the configuration of financial red flags (Amiram et al., 2021; Chen et al., 2022). As such, findings from earlier datasets may no longer be fully generalisable in the post-2020 environment.

Secondly, much of the extant literature assumes linear and independent effects of financial ratios on fraud risk. Yet, the relationship between profitability, liquidity, and leverage is often interdependent and dynamic. For example, firms with weak profitability may simultaneously suffer from poor liquidity and rising leverage, resulting in compound pressures that exceed the explanatory scope of univariate models (Evana et al., 2019). Very few studies attempt to explore interaction effects, such as how liquidity moderates the impact of leverage on fraud, or whether high profitability buffers fraud incentives in low-cash environments. This limits the theoretical development of integrated fraud prediction models and creates a gap for more sophisticated empirical testing.

Third, prior research often under-theorises the institutional context within which fraud occurs. Studies conducted in mature economies typically assume the presence of effective enforcement mechanisms, transparent financial disclosure, and a vigilant investor base. In contrast, emerging markets such as Malaysia are characterised by weaker regulatory enforcement, concentrated ownership, and varied governance practices, which may amplify or distort the relationships between financial indicators and fraud (Zainudin & Hashim, 2020; Kamaluddin et al., 2023). However, these contextual nuances are often underrepresented in mainstream fraud literature, resulting in overgeneralisation and misapplication of findings across jurisdictions.

Fourth, there remains a methodological bias toward cross-sectional studies that rely on aggregated data. Such designs overlook the temporal dimension of fraud development, where financial pressures accumulate over time and fraud is executed progressively rather than in isolated events (García-Lara et al., 2020). Longitudinal studies capturing financial trajectories prior to and following fraud events are sparse, yet they offer greater insight into the behavioural evolution and strategic decision-making behind fraud.

Finally, while profitability, liquidity, and leverage are well-established financial predictors, non-financial indicators—such as board characteristics, CEO traits, audit quality, or whistleblower policies—are rarely integrated into the same models. This separation perpetuates a siloed approach to fraud analysis, despite growing recognition that financial manipulation is shaped by both economic conditions and organisational governance.

Addressing these gaps, the present study contributes by (i) using matched-sample data from the post-pandemic period (2020–2022), (ii) focusing on Malaysian publicly listed firms across distressed and high-performing categories, and (iii) interpreting financial indicators through the lens of multi-theoretical frameworks (Fraud Triangle, Fraud Diamond, and Signalling Theory). In doing so, it responds to the call for more context-sensitive, theoretically informed, and empirically robust models of fraudulent financial reporting.

### Contribution of the Present Study

This study contributes to the evolving literature on fraudulent financial reporting (FFR) by addressing several theoretical, empirical, and contextual limitations evident in prior research. Firstly, it revisits the explanatory value of financial indicators—profitability, liquidity, and leverage—within a post-pandemic Malaysian context, where structural shifts in firm behaviour and regulatory vigilance have altered the landscape of financial misrepresentation. Unlike many earlier studies that relied on aggregated or pre-2020 data, this study focuses on the 2020–2022 period, thereby capturing reporting behaviours during a time of heightened economic uncertainty and liquidity stress.

Secondly, the study applies a matched-sample design, comparing 30 fraudulent (PN17) firms with 30 non-fraudulent, high-performing firms across the same sectors. This methodological approach ensures greater internal validity by controlling for industry-specific effects, firm visibility, and macroeconomic exposure—factors that often confound cross-sectional fraud models. The use of a binary logistic regression model further enables a rigorous statistical evaluation of the differential effects of financial indicators on fraud likelihood.

Thirdly, the study is theoretically grounded in a multi-lens framework, integrating insights from the Fraud Triangle, Fraud Diamond, and Signalling Theory. This enables a more nuanced interpretation of financial signals—not merely as accounting metrics, but as behavioural proxies for pressure, capability, and impression management. By doing so, the study moves beyond unidimensional models and offers a more holistic understanding of how financial stress manifests in fraudulent behaviour.

Finally, the study makes a context-specific contribution to the limited body of literature on fraud detection in emerging markets. Given Malaysia's regulatory evolution post-1MDB and the socio-political complexity of its corporate governance environment, findings from this study offer insights that are both locally grounded and internationally relevant. The results have practical implications for regulators, auditors, and financial analysts seeking to refine fraud detection heuristics in similar high-risk, high-volatility environments.

In summary, this study not only extends theoretical models of FFR by contextualising financial indicators within a multidimensional framework but also provides empirical clarity on their practical significance under contemporary economic conditions. It thereby advances the discourse on fraud prediction and offers a robust foundation for further inquiry.

### Hypotheses Development

Building on multi-theoretical insights—namely the Fraud Triangle, Fraud Diamond, and Signalling Theory—this study develops three hypotheses to examine the relationship between financial indicators and the likelihood of fraudulent financial reporting (FFR). Specifically, it investigates the extent to which financial leverage, profitability, and liquidity influence the probability that a firm engages in fraudulent misrepresentation.

### **Financial Leverage and Fraudulent Financial Reporting**

Financial leverage, often measured by debt-to-asset and debt-to-equity ratios, represents a firm's dependency on borrowed capital to finance its operations. Theoretical perspectives suggest that high leverage may create financial strain, increasing pressure on management to manipulate earnings to avoid breaching loan covenants or triggering default provisions (Dechow et al., 1996; Agrawal & Chatterjee, 2015). Within the Fraud Triangle framework, such debt-induced pressure is a potent catalyst for fraud, while Signalling Theory suggests that firms may overstate performance to maintain investor and creditor confidence (Amiram et al., 2021).

Empirical studies support this association, with findings indicating that firms with higher debt burdens are more prone to engage in misreporting (Dalnial et al., 2014; Zainudin & Hashim, 2020). However, others note that debt can also invite greater scrutiny and monitoring, potentially reducing opportunities for fraud (García-Lara et al., 2020). Despite this duality, this study posits that leverage acts more as a pressure mechanism than a constraint in the Malaysian context.

*H1: There is a significant relationship between financial leverage and fraudulent financial reporting.*

### **Profitability and Fraudulent Financial Reporting**

Profitability reflects a firm's ability to generate income relative to revenue or assets. Firms experiencing declining profitability may face performance pressure, especially in capital markets, where sustained earnings are a critical signal to investors (Spathis, 2002). In such situations, managers may engage in fraudulent reporting to inflate income, hide operational inefficiencies, or preserve bonus-linked financial metrics (Prasetyo et al., 2023).

However, the literature reveals a mixed landscape. While some studies confirm profitability as a negative predictor of fraud (Zainudin & Hashim, 2016), others suggest its effect is either negligible or context-dependent (Amrizah et al., 2014; Miharsi & Sari, 2023). Highly profitable firms may also manipulate reports to sustain unrealistic growth expectations or smooth earnings. Therefore, profitability may not universally serve as a fraud trigger but could interact with other variables to shape fraudulent behaviour.

*H2: There is a significant relationship between profitability and fraudulent financial reporting.*

### **Liquidity and Fraudulent Financial Reporting**

Liquidity, often proxied by current or working capital ratios, indicates a firm's ability to meet short-term obligations. From the Fraud Triangle perspective, inadequate liquidity represents a direct form of financial pressure, particularly in distressed firms with urgent liabilities (Cressey, 1953; Handoko et al., 2020). Firms with poor liquidity may falsify financial statements to delay enforcement actions, sustain supplier relationships, or secure short-term financing (Spathis, 2002; Ahmed & Naqvi, 2021).

Empirical findings consistently suggest a negative relationship between liquidity and fraud incidence (Evana et al., 2019; Amiram et al., 2021). Liquidity manipulation, such as overstating receivables or deferring payables, is also easier to conceal and harder to audit, making it a preferred fraud pathway. Given these considerations, this study anticipates a significant inverse relationship between liquidity and fraud.

*H3: There is a significant relationship between liquidity and fraudulent financial reporting.*

### Research Methodology

This study adopts a structured quantitative research design aimed at empirically evaluating the relationships between profitability, liquidity, leverage, and fraudulent financial reporting (FFR) among publicly listed firms in Malaysia. The methodology is aligned with positivist assumptions and allows for objective, replicable assessment using financial ratio analysis and statistical testing.

The population of this study comprises all companies listed on Bursa Malaysia. A matched-sample approach was employed, involving 30 PN17 firms (classified as financially distressed) and 30 high-performing non-PN17 firms. The selection of PN17 firms was based on official classifications by Bursa Malaysia, where distressed status arises due to accumulated losses, insolvency risk, or regulatory non-compliance (Ismail et al., 2020). These firms were then matched with non-distressed counterparts from similar sectors to control for industry-specific effects and financial cycle variance.

The sampling frame spanned financial years 2020 to 2022, ensuring the inclusion of post-pandemic financial behaviour. Data were sourced from Bursa Malaysia filings, Refinitiv Eikon, and DataStream, with the final selection restricted to companies with complete and reliable financial records.

The study investigates the association between three independent variables—profitability, leverage, and liquidity—and the dependent variable, fraudulent financial reporting. Fraudulent firms are defined based on reports of financial misstatement, restatements, or governance sanctions. These firms are coded as "1", while non-fraudulent firms are coded as "0", in line with Zainudin and Hashim (2016).

Independent Variables and Ratios Used:

Type	Ratio	Formula
Profitability	Net Profit Margin (NPM)	Net Profit / Revenue
Leverage	Debt-to-Asset Ratio (DAR)	Total Debt / Total Assets
Liquidity	Working Capital Ratio (WCR)	Working Capital / Total Assets

Control variables such as firm size (measured by total assets) are included to account for heterogeneity in firm structure.

Binary logistic regression was employed to determine the significance and direction of relationships between the financial indicators and the likelihood of fraudulent reporting. This technique is appropriate given the dichotomous nature of the dependent variable. SPSS software was used to perform data screening, descriptive statistics, multicollinearity diagnostics, and the final regression modelling.

The model used for estimation is represented as:

$$FFR_i = \beta_0 + \beta_1(NPM_i) + \beta_2(DAR_i) + \beta_3(WCR_i) + \beta_4(FirmSize_i) + \epsilon_i$$

Where:

FFR = Fraudulent financial reporting (binary: 0 = non-fraudulent, 1 = fraudulent)

NPM = Net Profit Margin

DAR = Debt-to-Asset Ratio

WCR = Working Capital Ratio

FirmSize = Total assets (log-transformed if necessary)

$\varepsilon$  = Error term

## Findings

### Descriptive Statistics

Table 1 presents the descriptive statistics for the study's key variables: leverage, profitability, liquidity, and the binary fraud classification. Based on a pooled sample of 180 firm-year observations, the data reveal substantial variation across financial characteristics.

**Table 1: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Leverage	180	0.00	161.40	2.75	16.50	272.17
Profitability	180	-76.86	87.82	-0.47	9.72	94.48
Liquidity	180	-160.40	0.84	-2.14	16.45	270.70
Fraud	180	0.00	1.00	0.50	0.50	0.25

Leverage exhibits a wide range (0.00 to 161.40), with a mean of 2.75 and a standard deviation of 16.50. This indicates significant heterogeneity in capital structure and debt exposure among Malaysian public-listed companies. Profitability shows a mean value of -0.47, ranging from -76.86 to 87.82, with a high standard deviation (9.72), suggesting the presence of both loss-making and highly profitable firms. Liquidity has a mean of -2.14, with extreme values from -160.40 to 0.84, reflecting severe cash flow constraints in a subset of firms. The fraud variable is evenly distributed, with a mean of 0.50, indicating a balanced sample of fraudulent and non-fraudulent cases for comparative analysis.

**Table 2: Univariate analysis**

	Mean (Fraud=1)	Mean (Fraud=0)	T-Test
Profitability	-1.0652	0.123	0.8193
Liquidity	-4.434	0.1457	<b>1.8804**</b>
Leverage	5.002	0.5026	<b>-1.8417**</b>
Firm size	6.599	6.5278	<b>-0.3072</b>

Fraud=1 (n=90), Fraud=0 (n=90), p-value

Table 2 reports the univariate analysis comparing fraudulent (PN17) and non-fraudulent firms across four financial characteristics. The results show meaningful financial distinctions between the two groups, with statistically significant differences observed in liquidity and leverage, while profitability and firm size remain statistically indistinct.

Profitability, as measured by net profit margin, averages -1.0652 for fraudulent firms and 0.123 for non-fraudulent firms. Although this indicates that fraudulent firms tend to perform more poorly in terms of earnings, the difference is not statistically significant ( $t = 0.8193$ ). This finding reinforces earlier results in the regression analysis, suggesting that profitability on its own is not a robust differentiator of fraudulent behaviour. Theoretically, this challenges



simplistic assumptions in signalling theory, where underperformance is often presumed to lead to misrepresentation. It suggests instead that other forms of pressure—particularly liquidity constraints—may play a more immediate role in incentivising fraud.

Liquidity differences are more pronounced. Fraudulent firms show a mean liquidity of -4.434, compared to 0.1457 among non-fraudulent firms, with the difference being statistically significant ( $t = 1.8804$ ,  $p < 0.05$ ). This supports the core proposition of the Fraud Triangle and Diamond theories—that financial pressure, in the form of short-term cash flow distress, is a key motivator of fraudulent financial reporting. The significantly negative liquidity profile among fraudulent firms likely reflects deteriorating working capital positions, which may compel managers to manipulate accounts to signal ongoing viability and maintain access to credit or investor confidence.

Leverage, interestingly, shows an inverse pattern to conventional expectations. Fraudulent firms exhibit substantially higher average leverage (5.002) than non-fraudulent firms (0.5026), with this difference also statistically significant ( $t = -1.8417$ ,  $p < 0.05$ ). This finding lends empirical weight to agency theory, which posits that debt obligations create performance pressure and monitoring trade-offs, potentially increasing the likelihood of fraud. It also aligns with prior literature linking debt dependency with accounting manipulation to meet debt covenants or delay restructuring requirements. In this case, the higher leverage of fraudulent firms may indicate more aggressive risk-taking or a strategic use of debt to mask underlying financial weaknesses.

Firm size does not differ significantly between the groups (mean = 6.599 vs. 6.5278,  $t = -0.3072$ ), suggesting that firm scale alone does not explain the incidence of fraud. This finding tempers assumptions that smaller firms—due to weaker governance—are inherently more susceptible to fraud. It also implies that fraud risk can be present across various firm sizes and that governance quality and financial strain are more critical determinants.

Taken together, these results validate the financial stress hypothesis, particularly with regard to liquidity and leverage. While profitability and firm size appear less reliable as standalone indicators, the pronounced financial strain among PN17 firms in liquidity and capital structure supports the argument that targeted financial monitoring may be more effective than broad-based performance evaluations in fraud risk assessments.

### Inferential Statistics

**Table 3: Correlations**

	<b>Fraud</b>	<b>Profitability</b>	<b>Liquidity</b>	<b>Leverage</b>	<b>Firm Size</b>
Fraud		-0.4864	<b>-0.3408***</b>	<b>0.2813***</b>	<b>-0.5666***</b>
Profitability	-0.0613		<b>0.3665***</b>	<b>-0.3027***</b>	<b>0.2624***</b>
Liquidity	<b>-0.1396**</b>	0.0011		-0.6656	0.0768
Leverage	<b>0.1367***</b>	0.0008	<b>-0.9998***</b>		0.1021
Firm Size	<b>-0.3557***</b>	0.0573	<b>0.4090***</b>	<b>-0.4016***</b>	

\*, \*\* and \*\*\* indicate significant levels as 0.1, 0.05 and 0.01.

The Pearson correlation matrix reveals a significant negative association between liquidity and fraudulent financial reporting ( $\rho = -0.3408$ ,  $p < 0.01$ ), indicating that firms with weaker liquidity are more susceptible to fraud. Leverage is positively correlated with fraud ( $\rho = 0.2813$ ,  $p <$

0.01), suggesting that higher debt levels may create pressure to manipulate financial results. Profitability, however, does not show a significant correlation ( $\rho = -0.0613$ ), implying that earnings performance alone may not strongly predict fraudulent behaviour. Interestingly, liquidity and leverage are highly negatively correlated ( $\rho = -0.9998$ ), indicating that firms with higher leverage typically exhibit poorer liquidity positions.

**Table 4: Variance Inflation Factor (VIF)**

Variable	Coefficient Variance	Uncentered VIF	Centred VIF
C	0.02	17.68	NA
Profitability	0.00	1.01	1.01
Liquidity	0.01	2.73	2.68
Leverage	0.01	2.74	2.66
Firm Size	0.00	2.02	1.41

Table 4 reports Variance Inflation Factor (VIF) values to test for multicollinearity among the independent variables. All centred VIFs fall below the critical threshold of 10, suggesting no serious multicollinearity concerns. Profitability has the lowest VIF (1.01), while leverage (2.66) and liquidity (2.68) show moderate intercorrelation, consistent with their theoretical and empirical overlap. Firm size, included as a control variable, has a VIF of 1.41, further validating the reliability of the regression coefficients.

**Table 5: Regression  
Standardized Coefficients**

Model	Beta	t	Sig.
(Constant)		8.042	0.000
Leverage	<b>-6.086**</b>	-1.725	0.086
Profitability	-0.050	-0.67	0.504
Liquidity	<b>-6.224**</b>	-1.765	0.079

\*, \*\* and \*\*\* indicate significant levels as 0.1, 0.05 and 0.01.

The results of the binary logistic regression, as presented in Table 5, reveal that among the three financial indicators examined, only leverage and liquidity exhibit statistically significant relationships with fraudulent financial reporting, both at the 10% significance level. Specifically, leverage demonstrates a negative association with fraud likelihood ( $\beta = -6.086$ ,  $t = -1.725$ ,  $p = 0.086$ ), suggesting that firms with higher levels of debt may, paradoxically, be less inclined to manipulate financial statements.

This unexpected finding could imply that heavily leveraged firms are subject to greater external monitoring by creditors, thus reducing the opportunity for fraudulent behaviour. Liquidity also shows a significant negative relationship with fraud ( $\beta = -6.224$ ,  $t = -1.765$ ,  $p = 0.079$ ), reinforcing the notion that financially constrained firms—those with poor cash flow or working capital—face heightened pressure to distort reported figures to appear solvent. In contrast, profitability does not present a statistically significant effect ( $\beta = -0.050$ ,  $t = -0.670$ ,  $p = 0.504$ ), indicating that earnings performance alone may not be a decisive factor in predicting fraudulent financial activity.

The overall model suggests that while financial pressure, as represented by liquidity and leverage, contributes to fraud risk, profitability may play a more ambiguous or indirect role.

The significance of the model constant ( $t = 8.042$ ,  $p < 0.001$ ) further suggests that other unobserved variables may influence fraudulent behaviour beyond the financial indicators examined in this study.

## Discussion

The empirical findings of this study present a compelling picture of how financial characteristics—particularly liquidity and leverage—are implicated in the likelihood of fraudulent financial reporting (FFR) among Malaysian publicly listed firms. The significant negative association between liquidity and FFR affirms longstanding theoretical expectations from the Fraud Triangle and Fraud Diamond frameworks, which posit that financial pressure is a fundamental motivator for managerial fraud (Cressey, 1953; Wolfe & Hermanson, 2004). Specifically, firms operating with constrained liquidity are likely to face heightened operational and reputational risks, which may drive managers to misrepresent financial health to project solvency. This interpretation resonates with findings from Amiram et al. (2021) and Evana et al. (2019), who observe that low liquidity exacerbates short-term pressures that often precede fraudulent accounting behaviour. In the Malaysian context, this pressure may be further intensified by the stigma associated with PN17 classification, as firms strive to maintain listing status or defer regulatory sanctions.

However, the negative relationship observed between leverage and fraud risk runs counter to much of the extant literature. Traditionally, higher leverage has been interpreted as increasing fraud probability due to covenant constraints, heightened agency conflict, and pressure to meet interest obligations (Agrawal & Chatterjee, 2015; Huang & Sun, 2022). Yet, in this study, leverage appears to exert a disciplinary effect, reducing the likelihood of fraud. One plausible explanation lies in the signalling and scrutiny mechanisms that accompany high-debt capital structures. Highly leveraged firms often face close monitoring from financial institutions and credit-rating agencies, which may deter fraudulent reporting through greater transparency demands and conditional financing clauses. This interpretation aligns with signalling theory (Spence, 1973), wherein firms with substantial debt may be compelled to maintain conservative and verifiable reporting practices to reassure external stakeholders. It also reflects the institutional context of Malaysia, where governance reforms post-1MDB have heightened the oversight of firms with aggressive financing strategies.

The absence of a significant relationship between profitability and fraud risk presents an intriguing divergence from expectations. While previous studies suggest that declining profits may incentivise earnings manipulation (Ghorbani & Salehi, 2021; Zainudin & Hashim, 2016), the current findings indicate that profitability, when considered in isolation, may not reliably predict fraudulent intent. This raises questions about the multidimensional nature of fraud triggers. It is possible that firms with strong profitability may still engage in fraud to maintain performance consistency (the "earnings smoothing" hypothesis), while those with poor profitability may lack the operational bandwidth to undertake sophisticated manipulation. Additionally, this null result may reflect a methodological nuance—profitability indicators such as Net Profit Margin may be more susceptible to short-term fluctuations and accounting discretion, reducing their utility as standalone fraud predictors.

From a theoretical standpoint, the findings lend partial support to the Fraud Triangle and Fraud Diamond by affirming the role of financial pressure and capability (as inferred from leverage dynamics), but challenge the assumed universality of rationalisation as captured through profitability metrics. The insignificant result for profitability also problematises the

assumptions of signalling theory, particularly in markets where investor sophistication is increasing, and window-dressing tactics may no longer produce the intended reputational effects.

Moreover, the Malaysian regulatory and cultural environment plays a crucial role in interpreting these findings. Post-2020, the enforcement of audit oversight and governance disclosure requirements has tightened, especially for financially vulnerable firms. Consequently, firms under severe financial scrutiny may adopt more transparent reporting strategies not because of intrinsic governance strength but as a strategic response to avoid regulatory action—a form of "coerced compliance" rather than voluntary transparency. This highlights a critical gap in many fraud prediction models: the absence of governance quality as a moderating factor. Future research should incorporate variables such as board independence, audit committee effectiveness, and ownership concentration to contextualise financial ratios within broader governance ecosystems.

In summary, this study contributes to the nuanced understanding that financial indicators—while necessary—are insufficient in isolation to predict fraud. Their interpretation must be situated within broader institutional, behavioural, and regulatory frameworks. The contrasting roles of liquidity and leverage underscore the importance of understanding how and why financial pressure manifests, while the insignificance of profitability calls for a re-examination of simplistic assumptions about earnings manipulation in emerging markets.

## Conclusion

This study provides empirical evidence on the role of financial indicators—specifically leverage, liquidity, and profitability—in predicting fraudulent financial reporting (FFR) among publicly listed firms in Malaysia. By employing a matched-sample design and logistic regression analysis, the findings confirm that liquidity and leverage are significantly associated with fraud, while profitability lacks explanatory power in this context. These results underscore the enduring relevance of financial pressure as a fraud trigger, particularly under the framework of the Fraud Triangle and Fraud Diamond theories. Liquidity-strapped firms, facing cash flow challenges and short-term operational risks, may be more inclined to engage in misreporting to delay regulatory intervention or adverse investor reaction.

Contrary to conventional expectations, the observed negative association between leverage and fraud challenges dominant assumptions in agency theory and suggests a more complex relationship between debt exposure and managerial behaviour. It may reflect the increasing vigilance of creditors and regulators post-scandal, indicating that external debt acts not only as a source of pressure but also as a constraint on opportunistic behaviour. This duality of leverage—as both a risk and a check—offers a novel contribution to fraud theory, particularly in markets with maturing regulatory frameworks like Malaysia.

The absence of a significant link between profitability and FFR raises important methodological and conceptual questions. While past literature often treats declining profits as a proxy for performance pressure, the null result here implies that profitability alone is neither a necessary nor sufficient condition for fraudulent behaviour. It may be that profit figures, being easily managed through accounting adjustments, are too volatile or cosmetic to serve as a reliable fraud signal in isolation. Moreover, the increasing sophistication of investors and analysts may have diminished the efficacy of profitability-based manipulation, especially in jurisdictions undergoing governance reforms.

Beyond empirical associations, this study contributes theoretically by demonstrating the need to move beyond unidimensional fraud models. Fraudulent behaviour is not merely the result of financial strain or managerial intent, but emerges from a confluence of institutional factors, information asymmetry, and enforcement dynamics. The significance of liquidity and leverage reinforces the argument that fraud detection must be embedded within a broader understanding of a firm's financing environment, market expectations, and stakeholder scrutiny.

From a policy standpoint, the findings support the development of fraud risk models that prioritise liquidity monitoring and leverage exposure, especially for firms in high-risk sectors or those under PN17 status. Regulators should consider integrating financial ratio red flags into early warning systems and strengthening oversight over firms exhibiting these vulnerabilities. Auditors, meanwhile, should recalibrate fraud risk assessments to reflect the nuanced roles that leverage and liquidity play—not simply as financial measures, but as behavioural signals.

In conclusion, this study not only validates certain tenets of existing fraud theories but also challenges oversimplified assumptions, particularly regarding profitability. It underscores the importance of context, control mechanisms, and market evolution in shaping the dynamics of financial misreporting. Future research should extend these insights by incorporating governance, psychological, and industry-specific variables to build a more holistic model of fraud risk in emerging markets.

### **Implications and Future Research Directions**

The findings of this study yield several critical implications for regulators, corporate managers, auditors, and researchers concerned with mitigating the risks of fraudulent financial reporting (FFR), particularly in emerging markets such as Malaysia.

For policymakers and regulators, the significant association between liquidity constraints and FFR suggests the need for enhanced early warning systems and real-time financial surveillance mechanisms. Regulators should prioritise firms exhibiting deteriorating liquidity positions as part of their risk-based monitoring frameworks. The adoption of AI-driven analytics and financial pattern recognition tools may bolster regulators' ability to detect subtle anomalies in cash flow trends and working capital movements—often precursors to misreporting. Moreover, firms under PN17 classification or exhibiting red flags such as consistent liquidity deficits should be subject to enhanced disclosure requirements and targeted forensic audits.

For corporate managers, the study highlights the importance of robust internal financial controls and transparency, particularly in environments of financial stress. The findings challenge the conventional assumption that profitability is the primary motivator for fraud; instead, they point to financial pressure—especially liquidity shortfalls—as a more proximate trigger. Corporate leaders must recognise that improving short-term liquidity management, alongside cultivating an ethical reporting culture, can serve as preventive buffers against fraudulent incentives. This is especially relevant in firms facing post-pandemic recovery pressures, where temptation to manipulate earnings or hide solvency risks may be more pronounced.

For auditors, the study reinforces the necessity of expanding fraud risk assessments beyond traditional profitability metrics. Given that neither profitability nor leverage consistently predicts fraud across contexts, audit planning should incorporate stress-testing of liquidity indicators, assessment of working capital trends, and behavioural red flags. This demands greater emphasis on forensic accounting, ratio manipulation models, and the integration of



qualitative cues from board governance evaluations. External auditors must also resist overreliance on management-provided justifications, especially when liquidity indicators are persistently weak.

Theoretically, this study provides empirical support for fraud frameworks that foreground financial pressure (Fraud Triangle, Fraud Diamond) and signalling distortions (Signalling Theory), but also challenges the explanatory sufficiency of profitability-focused models. The null effect of profitability suggests that future theory-building should explore interaction effects, such as how profitability interacts with governance quality, debt maturity, or auditor strength, to shape fraud outcomes. It also calls for the inclusion of dynamic variables like earnings volatility, cash burn rate, and operational cyclicalities to develop a more predictive fraud model.

For future research, several directions emerge. First, scholars should adopt a longitudinal lens to capture the evolution of fraud risks across different economic cycles. Temporal changes in liquidity, leverage structure, and external financing conditions may reveal deeper behavioural patterns in financial manipulation. Second, expanding the sample beyond Malaysian firms to include cross-country comparisons would uncover how institutional environments and enforcement regimes mediate the financial-fraud relationship. Third, integrating non-financial variables—such as board independence, tone at the top, executive compensation structures, and whistleblower mechanisms—would significantly enrich fraud detection models.

Finally, the incorporation of machine learning algorithms and anomaly detection systems into empirical fraud research holds immense promise. These tools can process large datasets, detect hidden trends, and identify firm-specific fraud typologies often missed by conventional ratio analysis. Future studies should explore how algorithmic audit systems interact with corporate culture, managerial discretion, and regulatory thresholds in shaping real-time fraud risk.

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