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From M-Score to F-Score: Moderating the Relationship between Earnings Management and Stock Performance

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ABSTRACT

Earnings management and value relevance are critical due to their impact on financial decisions. This study examines the relationship between earnings manipulation as measured by the Beneish M-Score and Dechow F-Score and excess stock returns in the Vietnamese market from 2004 to 2019. The analysis uses robust econometric techniques such as stochastic generalized method of moments (SGMM) to address endogeneity. The findings show a significant inverse relationship between the M-Score and excess returns, while the F- Score shows a nuanced, positive post-crisis relationship. This suggests investors in frontier markets may tolerate higher accounting discretion during economic uncertainty due to limited information sources. The results imply that it is desirable to improve financial reporting quality and transparency. In addition, the results show that investors would benefit from incorporating manipulation scores into risk assessments, avoiding firms with high M-scores, and from recognizing that firms with high F-scores may be more resilient during crises.

KEYWORDS

Earnings Management, Frontier Markets, Performance Evaluation, Vietnam, Dechow F-score, Beneish M-score

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1. Introduction

The examination of the association between earnings and stock returns, following Lintner (1962), has led to a significant body of research focusing on the concept of using market earnings to establish value relevance. Value relevance indicates a connection between financial information and share price return. Myddelton (2009) highlights the margins of error in modern accounting, suggesting that accuracy in published company accounts is unattainable. Furthermore, West (2003) notes that contemporary accounting standards permit the aggregation and deduction of abstract numbers, implying ambiguous information. The Conceptual Framework (FASB 2010, A34) states that financial information must faithfully represent the phenomena it claims to depict, ideally being complete, neutral, and free from error. This standard is rarely achieved.

Accounting information is more valuable in frontier markets than elsewhere due to higher volatility (Gökhan 1996; Amor et al. 2021). Firms in these markets have increasingly become more transparent in their financial and non-financial disclosures (Martens et al. 2021). Numerous empirical studies suggest that managed earnings often distort financial information, with notable contributions from Martens and Pham (2021), Lizińska and Czapiewski (2018), Dichev et al. (2013), Dechow et al. (2010), and Beyer et al. (2010). However, most studies focus on developed markets, with limited application to frontier markets, which tend to exhibit less political stability and more volatile macroeconomic conditions.

Our study adopts a comprehensive approach, analyzing the Vietnamese market before and after the adoption of International Financial Reporting Standards (IFRS) and during different phases of the business cycle. We conduct a quasi-natural experiment to examine the effects of Vietnam's IFRS accession on local markets. Additionally, we employ robustness tests using the Cox Proportional Hazards Model (CPHM) and interactive firm tests, exploring interactions between manipulation scores, earnings per share (EPS), and leverage.

This study makes three contributions. First, we build on the work of Dosamantes (2013) by employing two established models: the M-Score by Beneish (1999) and the F-Score by Dechow et al. (2011) to evaluate firm performance and the likelihood of financial misreporting. Our findings confirm significant relationships between these scores and excess returns, with the M-Score consistently showing an inverse relationship. Second, our comprehensive method, which includes SGMM estimation and quasi-natural experiments, reveals the impacts of earnings manipulation across different economic contexts and regulatory environments, including how the predictive power of these scores changes during financial crises and following IFRS adoption. Third, our findings - particularly the unexpected positive relationship between the F-Score and excess returns after a crisis may generalize to other markets with high information asymmetry and evolving regulatory landscapes.

The rest of the study is structured as follows: the next section presents the theoretical framework, which is followed by our methodological approach. Section 4 introduces our set of empirical observations. The penultimate section presents and discusses the results, followed by concluding remarks.

2. Theoretical and Empirical Background

2.1. Theoretical framework

Our focus is on understanding how capital cost information influences cash flow discounting. We use valuation theory and agency theory to examine these relationships.

Valuation theory shows that a firm's value is the present value of its future free cash flows, as established by Modigliani and Miller (1958). This valuation necessitates the projection of future earnings through an analysis of current and past financial data. There are many different conceptualizations of firm value, ranging from financial performance and growth potential to intellectual property rights (Gartenberg et al. 2019; Berger and Udell 2002; Burk 2004). Investigations into profit persistence and the predictive power of accounting-based factors on future returns further extend valuation theory (Lepak et al. 2007; Easton et al. 2018). Specifically, the theory addresses the implications of earnings management through over-reported, under-reported, and smoothed earnings, leading to an "uninformative equilibrium" where reported earnings do not adjust investors' prior valuations effectively (Chaney and Lewis 1995).

In this study, we use agency theory (Jensen and Meckling 2019) to analyze the impact of the divergence in interests between management (agents) and shareholders (principals) on earnings manipulation and, sub-

sequently, stock performance in Vietnam from 2004 to 2019. Agency theory is helpful for understanding the self-interested managerial motivations behind earnings management. Self-interested behaviors may alter market perceptions and influence company valuations. By incorporating the Beneish M-score and Dechow F-score, we assess the effects of agency conflicts on stock returns, shedding light on the intricate relationship between managerial actions and the quality of financial reporting (Jensen and Meckling 2019; Dechow et al. 1995; Beneish 1999).

The M-Score and F-Score detect earnings manipulation through accounting information rather than firm decisions. These scores moderate the earnings-stock returns relationship. By incorporating these scores, we empirically assess the effects of agency conflicts on stock returns. This approach aligns with Dechow et al. (2011) and Martens (2021) by focusing on predicted earnings misstatements rather than using these scores as direct predictors of performance. Figure 1 shows interdependencies involving accurate and transparent financial reporting, managerial incentives, and shareholder wealth maximization. Transparent financial reporting ensures reliable information for accurate valuations. This transparency supports robust corporate governance and reduces information asymmetries between managers and investors. The diagram shows how transparency reflects agency theory concerns by mitigating conflicts of interest. Additionally, transparency addresses the concerns of valuation theory by ensuring accurate valuations.

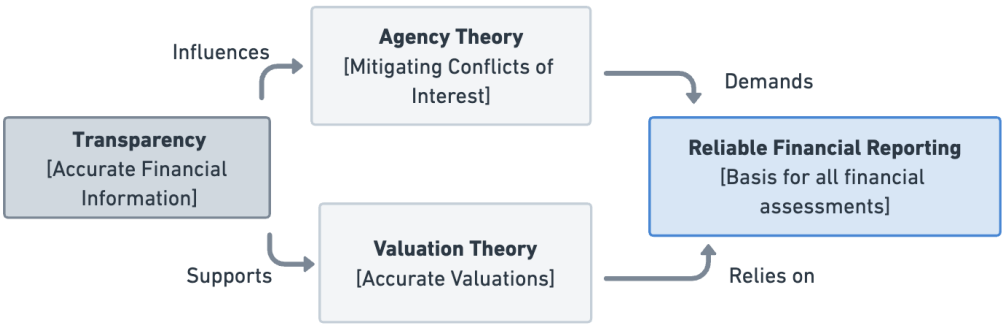

Figure 1.: Convergence of Valuation Theory and Agency Theory

2.2. Financial Manipulation Scores - M-Score and F-Score

The value relevance of fundamental accounting data, mainly focusing on Beneish's M-Score and Dechow's F-Score, has been thoroughly explored in the literature.

Beneish (1999) developed the M-Score model to detect earnings manipulation using eight financial ratios. Hołda (2020) shows that the M-Score model identified financial statement manipulators with 100% accuracy among non-financial companies listed on the Warsaw Stock Exchange. Similarly, a study by Maniatis (2021) on companies listed on the Athens Stock Exchange found that 17.5% of companies were likely to manipulate their earnings based on the M-Score.

On the other hand, the F-Score (Dechow et al. 2011) aggregates both accounting and market-based measures to predict the likelihood of financial misstatements. Studies have shown its efficacy across different contexts. For instance, Aviantara (2021b) used both the M-Score and the F-Score to identify fraudulent financial reporting by Garuda Indonesia, with findings consistent with the actual financial restatements of the company. These tools have proven valuable in both developed and emerging markets, although their effectiveness can vary across regulatory environments (Hołda 2020; Aviantara 2021b).

Financial manipulation scores are predictive of future financial performance and effective at identifying firms likely to engage in earnings manipulation. Studies of the Indonesian and Malaysian markets have shown that the F-Score model outperforms the M-Score in sensitivity and overall accuracy (Aghghaleh et al. 2016a). Financial distress and high leverage are often linked to higher manipulation scores, as firms under financial pressure tend to manipulate earnings to maintain creditworthiness and competitiveness (Handayani et al. 2023; Valaskova et al. 2021).

2.3. Impact of IFRS Adoption

The impact of IFRS adoption on financial performance and earnings manipulation is relevant in this context. While IFRS aims to enhance transparency and comparability in financial reporting, its estimated effects on earnings management and financial performance have been mixed. Basundara and Miah (2014) found that IFRS adoption did not significantly affect earnings manipulation in Indonesian firms. In contrast, Kouki (2018) notes that IFRS, in conjunction with strong investor protection mechanisms, effectively curbed misleading earnings management. Additionally, Brochet et al. (2012) shows that mandatory IFRS adoption improved financial statement comparability, reducing insiders' ability to exploit private information.

Regional and contextual factors may affect the relationship between IFRS adoption and financial performance. Turki et al. (2020) observed no direct significant effect on the financial performance of French companies post-IFRS adoption but noted an indirect positive impact through reduced cost of capital. This underscores the importance of considering the broader regulatory and market environment.

2.4. Impact of Economic Crises

Economic crises, such as the Global Financial Crisis (GFC) from 2008 to 2009, profoundly affect firm performance and financial stability. Crises exacerbate financial distress, leading to heightened scrutiny of financial practices and increased likelihood of earnings manipulation (Ho et al. 2016; Brunnermeier 2009). Firms often resorted to aggressive accounting techniques to meet earnings targets and maintain investor confidence (Kothari et al. 2016).

The M-Score and F-Score are critical tools for detecting earnings manipulation during economic downturns. Firms with higher manipulation scores are particularly vulnerable during crises, as their pre-existing financial weaknesses are magnified (Lassoued and Khanchel 2021). For instance, Hugo et al. (2019) use the Beneish M-Score model to identify companies likely to engage in fraudulent financial reporting during downturns. Similarly, Aviantara (2023) highlights the M-Score's utility in predicting fraudulent financial reporting in Indonesia during periods of instability. The predictive power of these manipulation scores varies across different phases of the business cycle (Valaskova et al. 2021). The F-Score has been shown to be effective in some contexts, such as in Malaysia, where it outperformed the M-Score in detecting financial statement fraud (Aghghaleh et al. 2016a).

2.5. The Developed-market Bias of the Empirical Literature

Empirical studies of financial manipulation, particularly those using the Beneish M-Score or Dechow F-Score, have explored their effectiveness in detecting earnings manipulation and predicting financial performance. These models have been validated across various market contexts.

Despite these achievements, significant limitations persist. Most studies have concentrated on developed markets. The applicability and effectiveness of these manipulation scores in emerging and frontier markets remain uncertain. For instance, Basundara and Miah (2014) found no significant impact of IFRS convergence on earnings manipulation in Indonesian firms. Moreover, Aghghaleh et al. (2016a) contend that while the F-Score may outperform the M-Score in some contexts, there is a need for more comparative studies across diverse markets to establish generalizability. The narrow focus of prior studies is particularly pertinent for frontier markets like Vietnam, which differ even more from developed markets than (intermediate) emerging markets. By focusing on the Vietnamese market and examining periods of economic turbulence and regulatory shifts, this study aims to explore the generalizability of developed-market results.

3. Research Design and Data Collection

This study analyzes financial reporting data using two evaluation techniques: the Beneish M-Score and the Dechow et al. F-score models. The F-score model is considered more comprehensive because it is based on a review of all Securities and Exchange Commission (SEC) Accounting and Auditing Enforcement Releases (AAERs) published between 1982 and 2005 (23 years). In contrast, the Beneish analysis is based on AAERs published between 1982 and 1992 (10 years) (Aviantara 2021a; Aghghaleh et al. 2016b).

3.1. The Beneish M-score Model

The Beneish (1999) M-score model is a statistical tool used to detect earnings manipulation. The M-score is calculated using the following eight variables: Days Sales in Receivables Index (DSRI), Gross Margin Index (GMI), Asset Quality Index (AQI), Sales Growth Index (SGI), Depreciation Index (DEPI), Sales, General, and Administrative Expenses Index (SGAI), Leverage Index (LVGI), and Total Accruals to Total Assets (TATA).

The range of the M-Score is divided into three intervals: scores below -2.22 are considered "unlikely profit manipulation," scores between -2.22 and -1.78 are considered "possible profit manipulation," and scores above -1.78 are considered "likely profit manipulation" (Bassman and Brown 2003; Liu et al. 2013). This scoring system helps categorize firms based on their likelihood of engaging in earnings manipulation.

In addition to the eight-variable model, a truncated five-variable model is also used for detecting earnings manipulation. The five-variable model focuses on a subset of the original eight variables, simplifying the analysis while maintaining robustness in identifying fraudulent activities. Studies comparing the two models have shown that the eight-variable model tends to reveal more instances of potential manipulation due to its broader scope. For example, the application of both models to Nigerian manufacturing companies revealed a higher incidence of potential misstatements using the eight-variable model (Nwoye et al. 2013). Similarly, research on companies listed on the Warsaw Stock Exchange confirmed the greater effectiveness of the eight-variable model in distinguishing manipulators from non-manipulators (Hołda 2020). Table 9 in the appendix further describes the variables in both models. The eight-variable and five-variable M-score models are calculated as follows:

$$\begin{aligned} \mathrm{M}_{8_{Score=}} &= -4.84 + 0.92 * \mathrm{DRSI} + 0.528 * \mathrm{GMl} + 0.404 * \mathrm{AQl} + 0.892 * \mathrm{SGl} \\ &\quad + 0.115 * \mathrm{DEPI} - 0.172 * \mathrm{SGAl} + 4.679 * \mathrm{TATA} - 0.327 * \mathrm{LVGl} \end{aligned} \quad (Eq.\ 1)$$

$$M_{5Score} = -6.065 + 0.823 * DRSI + 0.906 * GMl + 0.593 * AQI + 0.717 * SGI + 0.107 * DEPI \quad (Eq.\ 2)$$

3.2. Dechow F-score

Dechow et al. (2011) construct a threshold (i.e., the F-Score) by dividing the predicted probability by the unconditional probability of misstatement. The F-Score model is a development of the M-score. Skousen and Twedt (2009) argue that investors, auditors, and regulators can use the F-score model as an early detection tool when investigating foreign investment. The F-score compares a company's accruals in a given year to what would be expected if it possessed the average firm's financial characteristics. An F-score of 1.00 indicates that the firm has the same accruals as the sample mean and the same misstatement probability as the unconditional expectation; if the F-Score exceeds 1, it can signal fraud in its financial statements. While an F-score greater than one indicates earnings in excess of the expectation and may indicate misstatement, this could also result from conservative accounting practices or a stable business, as opposed to fraud. Consequently, the F-score alone should not be used to evaluate a company's financial health or the likelihood of misstatement. However, due to its consistency, Price III et al. (2011) recommend the Dechow model over the Beneish model. The F-Score is presented in Equation 3. Table 9 in the appendix provides further information on the F-score variables.

$$\begin{aligned} \mathrm{F}_{Score} &= -7.893 + 0.790 * \mathrm{ACCRUALS} + 2.518 * \Delta\mathrm{REC} + 1.191^{*}\Delta\mathrm{INV} + 1.979 * \ \mathrm{SOFTASSETS} \\ &\quad + 0.171^{*}\Delta\mathrm{CASHSALES} - 0.932 * \Delta\mathrm{ROA} + 1.029^{*}\mathrm{ISSUE} \end{aligned} \quad (Eq.\ 3)$$

3.3. Independent Variable: Excess Returns

Our methodology analyses the relationship between manipulation scores and excess returns to understand how financial manipulations influence subsequent performance. Value relevance is a crucial concept in accounting research, which assesses the ability of financial metrics to explain variations in stock returns or

share prices. We adopt two common value relevance models: the stock return model Easton and Harris (1991) and the share price model Ohlson (1999), as illustrated in Figure 2. These models measure the extent to which earnings can explain variations in returns and share price, respectively.

We use annual excess returns as a proxy for future financial performance, measured as the difference between a firm's stock return and the FTSE Vietnam All Share Price Index, following Trinh et al. (2021) and Dimitrov and Jain (2008). The analysis covers the entire dataset and specific subsets, including pre/post-IFRS adoption periods and various phases of the GFC. This comprehensive analysis helps elucidate the conditions under which manipulation scores are most predictive of excess returns, thereby offering insights into their value relevance in financial performance.

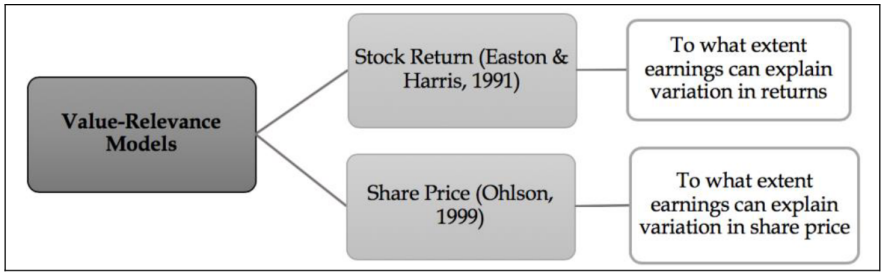

Figure 2.: Common value relevance models (Source: Azar et al. (2019)

3.4. Research Questions

We hypothesize an inverse relationship between excess returns and earnings manipulation, as measured by the M-Score, and the likelihood of accounting misrepresentations, as measured by the F-Score. This hypothesis assumes that investors incorporate information from financial statements in their investment decisions. The M-Score and F-Score serve as proxies for financial statement credibility. Thus, companies with higher manipulation scores are expected to have lower excess returns due to perceived unreliability, while companies with lower scores are expected to have higher excess returns. Our hypotheses (Hs) are as follows:

H1 There is a significant relationship between excess return and the M-Score.
H2 There is a significant relationship between excess return and the F-Score.
H3 The M-Score moderates the relationship between excess return and earnings manipulation, with higher M-Scores indicating a weaker relationship.
H4 The F-Score moderates the relationship between excess return and earnings manipulation, with higher F-Scores indicating a stronger inverse relationship.

These hypotheses address the interplay between earnings manipulation, misrepresentation, and excess returns as applied to a frontier market (Vietnam). The empirical analysis has substantial implications for investors, who can make more informed decisions, and regulators, who may need to revisit and modify regulatory frameworks to ensure greater credibility.

3.4.1. Econometric Models

The initial analysis focuses on measuring the relationship between share performance and earnings per share (Eq. 4), with the restricted scope of variables allowing for a focused examination of key financial indicators. Earnings management can undermine investor confidence, potentially impacting a firm's stock price. We hypothesize that the coefficient β_4 will be negative and statistically significant. Equations 5 and 6 incorporate the book-to-market ratio (BMR) and log of total assets (SIZE), as these variables reflect firm value and operational characteristics, respectively. Equations 7 and 8 examine the relationship between share performance, fundamental signals, and the M-score and F-score models. Equations 9 and 10 incorporate control variables, including inflation (INFL), leverage (LEV), Big Four auditors (BIG4), and capital intensity (CAP), to account for their impact on firm performance (see Table 9 for variable description).

We employ the SGMM estimator to manage endogeneity (Naseem and Tong 2021; Khan et al. 2020). SGMM controls for heteroskedasticity and autocorrelation issues, using lagged differences as instrumental

variables, which ensure robust instruments and valid model specification through Hansen p-values (Arellano and Bond 1991; Blundell and Bond 1998). The two-step SGMM estimator provides unbiased and precise results, thereby addressing potential endogeneity concerns. The estimated models are as follows:

$$R_{it} = \alpha + \beta_1(\text{EPS}_{i,t}) + \varepsilon_{i,t} \quad (Eq.\ 4)$$

$$R_{i,t} = \alpha + \beta_1(\text{EPS}_{i,t}) + \beta_2(\text{BM}_{i,t}) + \varepsilon_{i,t} \quad (Eq.\ 5)$$

$$R_{i,t} = \alpha + \beta_1(\text{EPS}_{i,t}) + \beta_2(\text{BM}_{i,t}) + \beta_3(\text{SIZE}_{i,t}) + \varepsilon_{i,t} \quad (Eq.\ 6)$$

$$R_{i,t} = \alpha + \beta_1(\text{EPS}_{i,t}) + \beta_2(\text{BM}_{i,t}) + \beta_3(\text{SIZE}_{i,t}) + \beta_4(\text{Mscore}_{i,t}) + \varepsilon_{i,t} \quad (Eq.\ 7)$$

$$R_{i,t} = \alpha + \beta_1(\text{EPS}_{i,t}) + \beta_2(\text{BM}_{i,t}) + \beta_3(\text{SIZE}_{i,t}) + \beta_4(\text{Fscore}_{i,t}) + \varepsilon_{i,t} \quad (Eq.\ 8)$$

$$R_{it} = \alpha + \beta_1(\text{EPS}_{it}) + \beta_2(\text{Mscore}_{it}) \times \sum \gamma_1(\text{Control Variables}_{it}) + \varepsilon_{it} \quad (Eq.\ 9)$$

$$R_{it} = \alpha + \beta_1(\text{EPS}_{it}) + \beta_2(\text{Fscore}_{it}) \times \sum \gamma_1(\text{Control Variables}_{it}) + \varepsilon_{it} \quad (Eq.\ 10)$$

4. Study Data

Vietnam is a frontier market as classified by MSCI, encompassing 244 firms and 1633 observations over sixteen years (2004-2019) from the Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX). Dependent and independent variables are sourced from BvD Osiris, which provides standardized financial data for public companies. Firms involved in mergers or acquisitions during the year were excluded.

Table 1 (Panel A) presents descriptive statistics of firm data by industry according to SIC code. Transportation firms are the most represented, making up 21.3% of observations. Additionally, Table 1 (Panel B) presents the mean values of the M-Score (8-var and 5-var models) and F-Score, with the M8_Score ranging from -5.18 to 0.54, the M5_Score ranging from -7.39 to 21.13, and the F-Score ranging from 0.00 to 270.30.

Table 1.: Descriptive Statistics

Panel A: Descriptive firm data by industry and market capitalization

Industry	SIC	Firms	Percentage	N	Mean	SD	p25	p50	p75
Oil & Gas	13,29	11	0.0527	86	96461230	181104846	6297050	22244708	86193840
Food	20	35	0.1702	278	96924952	354668798	7721212	19000867	56797324
Paper	24-27	7	0.0380	62	15606756	19091044	6545907	10073195	16028205
Chemicals	28	12	0.0337	55	112029702	206939953	13848832	24595094	61025108
Manufacturing	30-34	54	0.2321	379	47765943	95990691	5328063	11921589	38991408
Electronics	36	1	0.0049	8	54672085	13610691	40434216	55836030	68291148
Transport	37,39,40-45	61	0.2137	349	78101459	243965615	9414965	23166464	60595476
Pipelines	46	4	0.0129	21	40803006	31751764	13977901	31221348	56944464
Communications	48	1	0.0098	16	100170447	123078324	44939964	64923296	76569776
Utilities	49	17	0.0680	111	72537267	94478607	15778076	38674032	79203464
Durable goods	50	7	0.0220	36	8747449	8790694	2425328	5721772	10387776
Retail	53,54,56-59	14	0.0631	103	32122846	75603424	5771770	12705913	21314372
Restaurants	58	10	0.0404	66	91919627	166717175	13079373	24398879	73236504
Banks	60	8	0.0318	52	103076427	143071023	20437220	40845670	143406592
Health	80	1	0.0006	1	29356632	.	29356632	29356632	29356632
Public Admin	90	1	0.0061	10	19151080	9652849	11244700	18452843	26230964
	Total	244	1633	1.0	69779828	207128454	7552067	18697258	51339316

Panel B: Descriptive statistics of key variables

Variable	Abbrev	N	Mean	SD	p25	p50	p75
Excess Return	(R)	1618	-5.1396	20.7205	-19.0000	-8.7000	0.5700
Book to Market	(BM)	1618	1.3865	1.6178	0.7300	1.1000	1.8000
Earnings Per Share	(EPS)	1619	0.0879	0.1266	0.0230	0.0680	0.1300
M8_Score	(BMS8)	1633	-2.3286	1.3329	-3.1000	-2.4000	-1.6000
M5_Score	(BMS5)	1633	-2.3901	2.1931	-3.1000	-2.8000	-2.3000
F_Score	(DFS)	1599	6.9145	38.6618	0.2500	0.4500	0.8600

Note: Banks with total assets greater than 1 billion USD are considered big as per small otherwise.

Table 2 presents data on firms deemed as manipulators, as determined by our four different methods. There is an increasing number and percentage of firms identified as manipulators over time, with some

exceptional years. Figure 3 illustrates the mean M8 Score, M5 Score, and F-Score from 2005 to 2020. The M5 Score shows more variability, particularly around 2015, while the M8 Score and F-Score remain relatively stable. Figure 4 presents the M8 Score, M5 Score, and F-Score scores by total asset decile. It highlights that firms in the middle and upper deciles generally have lower F-Scores, indicating less likelihood of earnings management, while firms in the lower deciles have higher scores, consistent with the findings of Martens et al. (2021).

The correlation matrix in Table 3 shows that the M-Score variables fail to demonstrate a statistically significant correlation and display conflicting associations. The M8-Score correlates positively with excess return, while the M5-Score displays a negative correlation. This negative association may suggest the existence of heteroskedasticity. The F-Score has a positive correlation.

Table 2.: Mean independent variables by industry and Firms deemed as manipulators

Industry	**M8_Score**	**M5_Score**	**DFS**	**M8_Score**	**M5_Score**	**M8_Score (grey)**	**DFS**	**M8_Score %**	**M5_Score %**	**M8_Score (grey) %**	**DFS %**
Oil & Gas	-2.74	-2.74	0.38	1	1	0	1	0.5000	0.5000	0.0000	0.5000
Food	-2.33	-2.67	0.55	1	0	1	0	0.2500	0.0000	0.2500	0.0000
Paper	-2.45	-2.73	0.49	6	4	2	4	0.5455	0.3636	0.1818	0.3636
Chemicals	-2.36	-2.57	0.70	5	4	1	4	0.4545	0.3636	0.0909	0.3636
Manufacturing	-2.38	-2.53	0.41	10	9	1	8	0.8333	0.7500	0.0833	0.6667
Electronics	-2.23	-2.74	0.71	14	13	1	16	0.7778	0.7222	0.0556	0.8889
Transport	-2.06	-1.87	0.50	18	15	3	20	0.3103	0.2586	0.0517	0.3448
Pipelines	-2.38	-2.95	0.29	38	30	8	24	0.4750	0.375	0.1000	0.3000
Comms	-2.81	-2.54	1.25	51	35	16	27	0.5258	0.3608	0.1649	0.2784
Utilities	-2.73	-2.42	0.31	49	31	18	24	0.3740	0.2366	0.1374	0.1832
Durable Goods	-2.55	-0.56	0.65	75	40	35	52	0.4098	0.2186	0.1913	0.2842
Retail	-2.25	-2.41	0.51	69	45	24	51	0.3399	0.2217	0.1182	0.2512
Restaurants	-2.00	-2.74	0.59	92	61	31	33	0.4402	0.2919	0.1483	0.1579
Banks	-2.25	-2.42	0.35	88	72	16	40	0.4190	0.3429	0.0762	0.1905
Health	-4.37	-3.17	0.76	100	75	25	48	0.4739	0.3555	0.1185	0.2275
Public Admin	-2.29	-3.01	0.33	75	53	22	29	0.3886	0.2746	0.1140	0.1503
Obs.	1633	1633	1599								
Mean	-2.33	-2.39	6.90								
Min	-5.18	-7.39	0.00								
Max	0.54	21.13	270.30								
Std Dev.	1.33	2.19	38.70								

Note: BMS8: Beneish M-Score using 8 variables. BMS5: Beneish M-Score using 5 variables. DFS

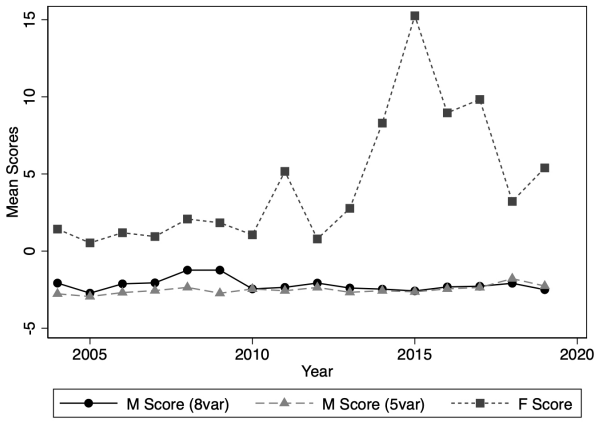

Figure 3.: Mean Scores Over Time

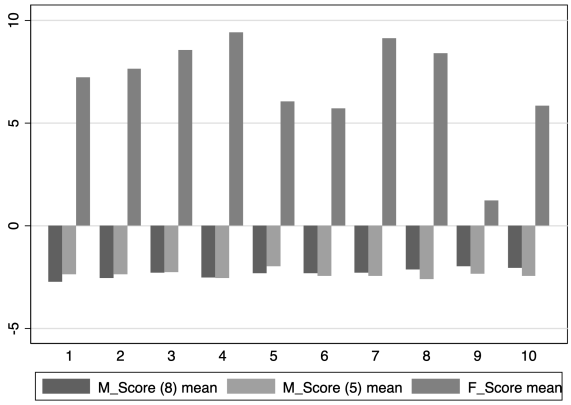

Figure 4.: Scores by Total Asset by decile

Table 3.: Correlation Matrix

Variable	Abbrev.	**R**	**BM**	**EPS**	**BMS8**	**BMS5**	**DFS**
Excess Return	(R)	1					
Book to market	(BM)	-0.06**	1				
Earnings per share	(EPS)	-0.01*	-0.13***	1			
M8_Score	(BMS8)	0.03	-0.08***	0.11***	1		
M5_Score	(BMS5)	-0.05	-0.09***	-0.05*	0.55***	1	
F_Score	(DFS)	0.05*	0.09***	-0.26***	-0.12***	-0.02	1

5. Findings and Analysis

5.1. Estimation Results: Systems GMM Analysis

Our SGMM regression analysis, presented in Table 4, reveals several key findings regarding the impact of manipulation scores on future excess returns. Firms with higher earnings per share (EPS) tend to experience higher returns, indicated by positive and significant coefficients across all specifications. Larger firms and those with higher capital intensity also tend to have higher excess returns. The presence of a Big4 auditor is positively associated with excess returns, suggesting that higher-quality audits can boost investor confidence. Unexpectedly, leverage shows a positive relationship with excess returns, contrary to the conventional wisdom that higher debt levels increase risk and reduce returns. Additionally, inflation is negatively associated with excess returns, while GDP growth is linked to lower excess returns.

The M-Score and F-Score are crucial in detecting earnings manipulation and its impact on financial performance. Our analysis reveals that both the M-Score (8-var. and 5-var. models) and the F-Score are negatively associated with excess returns, indicating that higher scores are linked to lower excess returns. Specifically, a one-unit increase in the M8 Score is associated with a 1.763 percentage point decrease in excess returns. In comparison, a one-unit increase in the F-Score corresponds to a 0.108 percentage point decrease in excess returns. These findings suggest that firms with higher M-Scores and F-Scores are more likely to manipulate earnings, leading to lower excess returns.

Diagnostic tests confirm that our models are well-specified. The AR1 test statistics indicate that our models are free from first-order serial correlation. In contrast, the Hansen test statistics are not significant, validating the over-identification restrictions and reinforcing the robustness of our findings regarding the relationship between earnings manipulation scores and excess returns. These results highlight the need for further analysis of data subsets categorized as likely, unlikely, and grey manipulators. By examining these subsets more closely, we can gain deeper insights into how different degrees of earnings manipulation impact stock performance.

5.2. Impact by Manipulation Likelihood

Table 4 shows the relationship between manipulation scores and future financial performance, specifically excess returns. For firms categorized as "unlikely manipulators" (M-Scores below -2.22), we find significant relationships (EPS = -0.121; BMR = 0.624). This indicates a positive relationship between the BMR and excess returns for these firms. Conversely, for firms classified as "likely manipulators" (M-Score>-1.78), the coefficients for EPS and BMR are -24.461 and -6.455, respectively, suggesting that higher manipulation scores are linked to lower excess returns. These relationships are further supported by the significant negative coefficients for the M5 Score at -1.696 and the M5 Score at -0.356.

The F-Score analysis reveals a similar pattern. Firms with high F-Scores (greater than 1), indicating a high probability of manipulation, exhibit a significant negative coefficient of -13.234 for excess returns. This implies that firms with higher F-scores tend to have lower excess returns. In contrast, firms with F-Scores below 1 show a smaller positive relationship with excess returns, with a coefficient of 0.051. These findings underscore the M-Score and F-Score's utility in detecting earnings manipulation and predicting its impact on stock performance. Notably, the variability in scores across firms, with the M8 Score ranging from -7.39 to 21.13 and the F-Score ranging from 0.00 to 270.30, indicates significant differences in the

likelihood of earnings manipulation.

The diagnostic tests at the bottom of the table confirm the robustness of the models. Significant AR1 test statistics indicate that the models are free from first-order serial correlation, while the non-significant Hansen test statistics validate the over-identification restrictions. We shall now turn to a quasi-natural experiment approach to investigate the EM relationship further.

Table 4.: Systems GMM

	(1) **Excess Return**	(2) **Excess Return**	(3) **Excess Return**	(4) **Excess Return**	(5) **Excess Return**	(6) **Excess Return**	(7) **Excess Return**	(8) **Excess Return**	(9) **Excess Return**
EPS	9.748***	8.874***	4.735***	4.272***	3.897***	5.213***	6.208***	5.901***	5.448***
	(0.01)	(0.01)	(0.01)	(0.12)	(0.02)	(0.07)	(0.13)	(0.25)	(0.26)
BM		0.677***	0.861***	0.325***	0.799***	-0.772***	0.712***	1.014***	-0.494***
		(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.02)	(0.01)	(0.01)
Size			1.034***	1.076***	1.000***	0.539***	0.772***	0.533***	0.319***
			(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)
Inflation							-0.746***	-0.819***	-0.670***
							(0.00)	(0.00)	(0.00)
Leverage							3.334***	2.603***	-2.520***
							(0.04)	(0.07)	(0.08)
Big4							0.853***	1.234***	-0.717***
							(0.03)	(0.05)	(0.04)
Capital Intensity							0.328***	3.000***	0.670***
							(0.09)	(0.12)	(0.12)
GDP Growth							-1.361***	-1.328***	-1.403***
							(0.00)	(0.00)	(0.00)
M8_Score				-1.763***			-1.403***		
				(0.00)			(0.01)		
M5_Score					-1.396***			-1.886***	
					(0.01)			(0.02)	
F_Score						0.108***			0.094***
						(0.00)			(0.00)
_cons	-6.180***	-7.041***	-24.403***	-28.404***	-26.960***	-14.759***	-15.600***	-13.685***	-4.87E-01
	(0.00)	(0.00)	(0.03)	(0.11)	(0.06)	(0.06)	(0.08)	(0.28)	(0.32)
AR1 (p-value)	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Hansen (p-value)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
N	1605	1605	1605	1605	1605	1571	1605	1605	1571

Note: Standard errors in parentheses. Year dummies are used as instruments. AR(1) tests for autocorrelation. Hansen test checks instrument validity.

5.3. Quasi-Natural Experiments

5.3.1. Pre & Post IFRS Adoption Period (2009-2011 | 2012-2014)

The adoption of IFRS in Vietnam offers a unique quasi-natural experiment to study the impacts of these standards on financial reporting and stock performance. We assess how these standards influenced earnings manipulation by analyzing the periods before (2009-2011) and after (2012-2014) IFRS adoption. This analysis helps us understand the effects of IFRS adoption on excess returns and financial transparency.

Our findings reveal notable changes in the relationship between manipulation scores and excess returns from the pre-IFRS to post-IFRS periods. Pre-IFRS adoption, firms with high M-Scores (indicating a high likelihood of manipulation) had significant negative relationships between EPS and excess returns, highlighting a strong adverse impact of manipulation. Post-IFRS, these negative relationships are still present but less severe. For instance, the coefficient for EPS among likely manipulators dropped to -28.229 ($p < 0.05$), indicating a reduction in the negative impact of earnings manipulation on excess returns. Similarly, the F-Score analysis showed that high F-Scores, with a high negative correlation with excess returns pre-IFRS, had a mitigated impact post-IFRS. These shifts suggest that the implementation of IFRS has improved financial transparency and reduced the extent of earnings manipulation, thus moderating its detrimental effects on stock performance. This indicates a positive impact of IFRS on the reliability and integrity of financial reporting in Vietnam.

Table 5.: Tests of Likely Manipulators: SGMM

	M-score						F-Score	
	<-2.22 Unlikely Manipulators		-2.22 < x < -1.78 "Grey"		>-2.22 Likely Manipulators		F>1 High Probability	F<1 Low Probability
Variable	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**
EPS	-0.121	-4.248***	-24.461***	-46.291***	2.315*	1.044	-2.793***	-2.368*
	-0.67	-0.25	-7.05	-7.98	-1.05	-0.99	-0.23	-1.17
BM	0.624***	0.186***	-6.455***	-5.904***	-2.113***	-3.107***	-0.295***	-2.615***
	-0.03	-0.03	-0.76	-0.42	-0.06	-0.07	-0.02	-0.17
Size	0.595***	0.234***	-3.570***	-3.867***	1.717***	2.532***	0.361***	0.419
	-0.03	-0.04	-0.44	-0.37	-0.05	-0.06	-0.03	-0.22
inflation	-0.716***	-0.785***	-0.457***	-0.814***	-0.471***	-0.564***	-0.586***	-0.651***
	0	0	-0.08	-0.09	0	-0.01	0	-0.02
Leverage	4.077***	0.322	-10.600**	-23.319***	-8.380***	-11.076***	-0.802***	-1.73
	-0.43	-0.21	-3.21	-4.03	-0.28	-0.33	-0.15	-1.09
Big4	-0.001	0.123	-3.591**	-3.295**	-1.663***	-4.783***	-2.117***	7.803***
	-0.1	-0.07	-1.31	-1.05	-0.08	-0.08	-0.03	-0.31
Capital Intensity	-0.377	0.744*	21.722***	27.370***	-1.939***	-2.802***	1.189***	-8.142***
	-0.24	-0.33	-3.44	-3.23	-0.34	-0.36	-0.21	-1.12
GDP Growth	-2.006***		-0.950***		3.503***			
	-0.01		-0.22		-0.02			
M8_Score	-1.696***		-4.678		-1.814***			
	-0.07		-6.18		-0.02			
M5_Score		-0.356***		-16.061***		-2.731***		
		-0.04		-1.35		-0.02		
F-Score							-13.234***	0.051***
							-0.03	0
_cons	64.726***	42.484***	64.726***	42.484***	-35.424***	-34.212***	-0.736	-4.808
	-10.15	-7.31	-10.15	-7.31	-0.87	-0.9	-0.57	-3.43
AR1 (p-value)	0.009	0.061	0.657	0.421	0.01	0.02	0.009	0.079
Hansen (p-value)	1.000	1.000	0.311	0.676	1.000	1.000	1.000	0.999
N	922	922	199	199	1605	683	1227	344

Note:: Standard errors in parentheses. Year dummies are used as instruments. AR(1) tests for autocorrelation. Hansen test checks instrument validity.

5.3.2. Analysis Before, During, and After the Financial Crisis (2006-2007 | 2008-2009 | 2010-2011)

Examining the crisis period is crucial as it provides insights into how economic instability influences the relationship between financial manipulation and stock performance, revealing investor sensitivities and corporate behavior under stress. Before the financial crisis, our results show that the M-Score (8 variables) had a significant coefficient of -0.368, indicating a negative relationship with excess returns. The F-Score had no significant relationship with excess returns during this period.

After the financial crisis, the relationships between these main variables and excess returns changed significantly. The M8-Score had a significant coefficient of -1.416 (p <.01), indicating a stronger negative relationship with excess returns. The F-Score had a significant coefficient of 0.052 ($p < 0.01$), indicating a positive relationship with excess returns. These changes suggest that the financial crisis profoundly impacted the relationships between these main variables and excess returns.

For the M8-Score, we observe a shift from a statistically insignificant relationship with excess returns pre-crisis (coefficient: -0.368 ($p > 0.10$)) to a significant negative relationship during and after the crisis (coefficients: -0.679 ($0.01p< 0.05$) and -1.416 ($p< 0.01$), respectively). This suggests that as the financial crisis unfolded, the market became more sensitive to potential earnings manipulation, with higher M-Scores associated with lower excess returns. The M5-Score shows a similar trend, with the relationship becoming increasingly negative and significant from the crisis period onward (during crisis: -0.753 ($p<0.01$); post-crisis: -0.770 ($p<0.01$)). Interestingly, the F-Score exhibits a different pattern. While insignificant pre-crisis and during the crisis, it shows a positive and significant relationship with excess returns in the post-crisis period (coefficient: 0.052 ($p<0.01$)). This unexpected positive relationship might suggest that in the post-crisis environment, firms with higher F-Scores (indicating a higher probability of manipulation) paradoxically experienced higher excess returns, possibly due to other factors not captured in the model or changes in market behavior following the financial crisis.

5.4. Analysis of Key Variables: Cox Proportional Hazards Model

The Cox Proportional Hazard Model (CPHM) is a survival analysis tool for assessing the impact of covariates on the timing of an event Cox (1972, 1979). This semi-parametric model evaluates the relationship between predictors and the hazard rate, representing instantaneous risk. The model's hazard function,

$\lambda(y) = \lambda_0(y)e^{x\beta}$, combines the baseline hazard $\lambda_0(y)$ with a linear combination of covariates $x\beta$. By maximizing the partial log-likelihood, the β coefficients are estimated, such as financial manipulation scores, on the hazard rate. Applying CPHM to our data (Panel A), we find that the M8-Score has a significant negative relationship with firm survival (Hazard Ratio: -0.387, p<0.001), supporting the hypothesis that earnings manipulation adversely affects long-term economic sustainability. However, the M5-Score and F-Score do not exhibit significant direct effects.

The SGMM regression results (Panels B and C) provide deeper insights through interaction effects between manipulation scores and key financial variables. For the M8 Score, there is a significant negative interaction with leverage (-0.340, $p<0.001$) and a positive interaction with EPS (5.621, $p<0.001$). This indicates that higher leverage exacerbates the negative impact of manipulation on excess returns, whereas strong earnings performance can mitigate these negative effects. Conversely, M5 Score shows a positive interaction with leverage (1.416, $p<0.001$) and a negative interaction with EPS (-3.037, $p<0.001$), implying complex interactions among manipulation, financial structure, and earnings performance. The F-Score results add further complexity: while the F-Score positively affects excess returns (0.145, $p<0.001$), its interaction with leverage is negative (-0.077, $p<0.001$), while with EPS, it is positive (0.208, p<0.001). These findings indicate that firms with higher F-Scores, which suggest greater financial distress, can achieve higher excess returns, particularly if they have strong earnings. However, this benefit is reduced by higher leverage. Thus, aggressive earnings management (higher M-Scores) tends to lower excess returns, whereas conservative earnings management (higher F-Scores) generally leads to higher excess returns.

6. Summary and Conclusion

The analysis of earnings manipulation in Vietnam from 2004 to 2019 reveals complex interactions between financial reporting quality and market performance. The M-Score consistently demonstrated an inverse relationship with excess returns, with the M8-Score showing a significant negative impact on future stock performance. Intriguingly, the F-Score exhibited a less clear-cut relationship, shifting from a negative association pre-IFRS to an unexpected positive relationship post-crisis. This paradoxical finding suggests that in the aftermath of financial turmoil, firms with higher F-Scores may have been viewed more favorably by the market, possibly due to increased transparency or improved risk management practices.

The GFC and Vietnam's adoption of IFRS were crucial inflection points in our study. Both M-Score and F-Score showed heightened predictive power during the crisis, underscoring their significance in volatile economic conditions. The implementation of IFRS further amplified the relationship between manipulation scores and excess returns, with the coefficient for likely manipulators dropping from -77.409 ($p<0.001$) pre-IFRS to -28.229 ($p<0.05$) post-IFRS. This shift highlights the positive impact of IFRS on financial reporting quality in emerging markets. The CPHM estimates corroborated these findings, revealing that the M8-Score has a significant negative relationship with firm survival, supporting the hypothesis that EM adversely affects long-term firm performance.

The varying impacts of M-Score and F-Score across different economic conditions and regulatory environments underscore the need for decomposing scores. Our analysis of firms categorized by manipulation likelihood revealed that "likely manipulators" with high M-Scores experienced significantly lower excess returns than "unlikely manipulators," for EPS impact on excess returns. These findings validate the predictive power of manipulation scores in the context of a frontier market. As emerging markets continue to evolve and integrate with global financial systems, the importance of reliable earnings manipulation detection tools will likely grow, paving the way for more sophisticated risk assessment and decision-making in increasingly complex financial landscapes.

6.1. Theoretical Implications

Our findings underscore the theoretical implications of valuation theory and agency theory in understanding the impact of financial manipulations on stock performance. Valuation theory is supported by our observation that higher manipulation scores are associated with lower future excess returns. This inverse relationship suggests that earnings management distorts the true financial health of a firm, leading to an "uninformative equilibrium" where reported earnings fail to adjust investor valuations effectively. Agency theory is in turn validated through our analysis of the M-Score and F-Score as moderators of the earnings-stock re-

turn relationship. Managerial motivations to manipulate earnings adversely affect stock performance, which aligns with agency theory. The empirical assessment shows the intricate relationship between managerial actions and financial reporting quality, emphasizing the necessity of transparent financial reporting to mitigate agency conflicts, enhance corporate governance, and ensure accurate valuations.

6.2. Practical Implications

The practical implications of our findings are actionable and specific. Investors should integrate manipulation scores (M-Score and F-Score) into their investment analysis to avoid firms with high manipulation risks, thus safeguarding their portfolios from poor financial performance. Regulators in Vietnam can adopt these scores into their risk assessment protocols to prioritize audits and investigations, ensuring better allocation of resources towards firms most likely to engage in earnings manipulation. Policymakers could mandate the disclosure of M-Score and F-Score metrics in financial statements, improving transparency and aiding investors in making informed decisions.

Credit rating agencies could incorporate these scores into their rating models to better assess firms' creditworthiness. At the same time, forensic accountants can use these scores to facilitate early detection of fraudulent activities. In addition, corporate governance reforms could align executive compensation with long-term performance metrics to discourage short-term earnings manipulation and promote sustainable growth.

6.3. Limitations and Future Research

This study has several limitations, including the restricted sample of Vietnamese public companies that may not represent broader frontier and emerging markets, potentially limiting generalizability. Furthermore, the study did not consider industry-specific impacts on firm performance. To address these limitations, future research may analyze performance by industry, distinguish between IFRS-adopting and non-adopting firms, and expand the sample to include a broader range of frontier and emerging markets, thereby enhancing our understanding of earnings manipulation and financial performance.

Table 6.: Quasi-natural experiment - Pre and Post IFRS Adoption (2009 - 2014)

Panel A: Pre-IFRS Adoption (2009 - 2011)

	M-score						F-Score	
	<-2.22 Unlikely Manipulators		-2.22 < x < -1.78 "Grey"		>-2.22 Likely Manipulators		F>1 High Probability	F<1 Low Probability
Variable	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return
EPS	1.124*	-77.647**	0.000	0.000	-3.939	-77.409***	-164.705*	-4.441
	-0.43	-24.52	(.)	(.)	-3.67	-19.92	-62.41	-13.01
BM	1.029***	-43.793***	0.000	0.000	-1.172	-31.772***	-91.244***	-2.067
	-0.18	-7.87	(.)	(.)	-0.77	-4.14	-8.15	-5.06
Size	0.090**	-3.863	3.619***	3.619***	-0.198	-4.556***	-13.816***	-0.49
	-0.03	-3.19	0.000	0.000	-0.19	-1.11	-2.9	-0.79
Inflation	-2.375***	-1.580***	0	0	-2.311***	-2.020***	-1.253*	-2.778***
	-0.01	-0.43	(.)	(.)	-0.05	-0.21	-0.55	-0.21
Leverage	0.112	-103.803***	0.000	0.000	-0.221	-6.758	-68.482***	-1.599
	-0.14	-13.58	(.)	(.)	-1.54	-7.87	-13.96	-2.58
Big4	0.091	14.903*	0.000	0.000	-0.006	7.918***	12.689	0.246
	-0.06	-6.44	(.)	(.)	-0.32	-2.15	-8.07	-0.96
Capital Intensity	0.201	-8.092	0.000	0.000	-0.184	-10.512	-10.633	0.07
	-0.16	-13.77	(.)	(.)	-1.06	-6.73	-15.3	-3.23
GDP Growth	28.600***	0.000	0.000	0.000	27.550***	0.000	0.000	0.000
	-0.04	(.)	(.)	(.)	-2.55	(.)	(.)	(.)
M8_Score	-0.08	0.000	-0.528	-0.08	(.)	(.)	(.)	(.)
	(.)	(.)	-0.71	(.)	(.)	(.)	(.)	(.)
M5_Score	(.)	-14.166**	0.000	-0.553	(.)	-4.9	(.)	(.)
	(.)	-5.64	(.)	(.)	(.)	(.)	(.)	(.)
F-Score	(.)	(.)	(.)	(.)	(.)	(.)	-0.064	0.656
	(.)	(.)	(.)	(.)	(.)	(.)	-0.06	-5.27
_cons	-95.879***	147.217*	0.000	0.000	-86.375***	130.527***	379.118***	30.205
	-0.66	-61.96	(.)	(.)	-10.04	-26.55	-45.96	-18.64
AR1 (p-value)	0.199	0.326	(.)	(.)	0.116	0.750	0.003	0.184
Hansen (p-value)	0.913	0.374	0	0	0.998	0.669	0.466	0.993
N	70	70	12	12	86	86	51	51

Panel B: Post-IFRS Adoption (2012 - 2014)

	M-score						F-Score	
	<-2.22 Unlikely Manipulators		-2.22 < x < -1.78 "Grey"		>-2.22 Likely Manipulators		F>1 High Probability	F<1 Low Probability
Variable	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return	Excess Return
EPS	-0.709	-31.317***	1.027	-55.819*	1.098	-28.229*	-70.796*	-32.587**
	-2.02	-7.5	-3.29	-21.84	-0.72	-12.04	-29.03	-11.76
BM	-0.163	-26.821***	0.008	-3.547	0.298	-16.175***	-22.248***	-31.988***
	-0.99	-2.36	-0.36	-3.24	-0.16	-1.74	-3.32	-2.23
Size	-0.017	-9.737***	-0.058	-3.674	0.107	-5.929***	-8.263***	-12.395***
	-0.37	-1.01	-0.2	-2.22	-0.07	-0.81	-2.19	-1.16
Inflation	6.329***	0.407***	6.318***	-1.414**	6.303***	0.939***	1.444***	0.963***
	-0.14	-0.11	-0.14	-0.5	-0.03	-0.12	-0.36	-0.19
Leverage	-0.213	-7.288	-0.239	-26.53	0.264	-1.796	-43.078***	2.028
	-1.2	-5.98	-1.38	-13.79	-0.38	-4.08	-9.44	-5.8
Big4	-0.165	7.254***	-0.128	8.1	0.038	6.183***	15.317***	7.717***
	-0.37	-2	-0.52	-4.44	-0.11	-1.48	-3.85	-2.3
Capital Intensity	0.055	13.441*	1.024	22.377*	0.095	4.344	28.186**	-0.213
	-0.93	-5.18	-1.42	-10.31	-0.26	-3.68	-8.36	-5.57
GDP Growth	-15.812***	(.)	-15.802***	(.)	-15.818***	(.)	(.)	(.)
	-0.35	(.)	-0.35	(.)	-0.07	(.)	(.)	(.)
M8_Score	-0.009	3.889	(.)	(.)	-0.203	-0.39	(.)	(.)
	(.)	-5.32	(.)	(.)	-0.25	(.)	(.)	(.)
M5_Score	(.)	2.331	(.)	-56.196***	(.)	-0.44	(.)	-1.46
	(.)	(.)	(.)	-11.47	(.)	-2.46	(.)	(.)
F-Score	(.)	(.)	(.)	(.)	(.)	(.)	-0.072	7.859***
	(.)	(.)	(.)	(.)	(.)	(.)	-0.07	-7.33
_cons	-33.550***	197.633***	-25.601	-67.078	-37.096***	102.656***	164.061***	226.692***
	-8.15	-20.61	-13.17	-45.86	-1.43	-15.86	-41.37	-21
AR1 (p-value)	0.163	0.061	(.)	(.)	0.029	0.2	0.346	0.026
Hansen (p-value)	0.999	0.001	0.987	0.413	0.962	0.000	0.001	0.000
N	174	174	69	69	236	229	95	308

Note: Standard errors in parentheses. Year dummies are used as instruments. AR(1) tests for autocorrelation. Hansen test checks instrument validity.

Table 7.: Quasi-natural experiment - Pre, During, and Post Financial Crisis

	M-Score (8 var)			M-Score (5 var)			F-Score		
Variable	**Pre-Crisis 2006-2007 Excess Return**	**During Crisis 2008-2009 Excess Return**	**Post-Crisis 2010-2011 Excess Return**	**Pre-Crisis 2006-2007 Excess Return**	**During Crisis 2008-2009 Excess Return**	**Post-Crisis 2010-2011 Excess Return**	**Pre-Crisis 2006-2007 Excess Return**	**During Crisis 2008-2009 Excess Return**	**Post-Crisis 2010-2011 Excess Return**
EPS	202.103	-6.314**	3.558***	54.750	-4.955***	1.290	12.204	-7.937***	2.975***
	(135.54)	(2.37)	(0.87)	(158.64)	(1.31)	(0.66)	(109.63)	(2.20)	(0.47)
BM	8.920	-2.585***	-0.756***	12.441	-2.167***	-0.538***	3.174	-2.616***	-0.467***
	(15.56)	(0.52)	(0.05)	(10.36)	(0.28)	(0.09)	(9.44)	(0.43)	(0.03)
Size	-1.343	-0.346*	-0.545***	5.177	-0.243	-0.561***	0.074	-0.358	-0.562***
	(3.29)	(0.16)	(0.08)	(4.36)	(0.14)	(0.08)	(4.51)	(0.19)	(0.05)
Inflation	2.806	-2.642***	0.727***	2.827	-2.631***	0.752***	14.701	-2.649***	0.724***
	(17.36)	(0.02)	(0.03)	(11.55)	(0.01)	(0.03)	(12.62)	(0.01)	(0.02)
Leverage	-38.968	2.947**	0.606	-53.105	1.122	-1.462***	12.412	2.953***	-0.733*
	(32.70)	(1.02)	(0.50)	(28.26)	(0.87)	(0.37)	(23.06)	(0.78)	(0.34)
Big4	-8.887	-0.426	-0.158	-20.041	-0.195	-0.161	3.212	-0.098	-0.153
	(10.09)	(0.29)	(0.17)	(10.36)	(0.24)	(0.13)	(8.48)	(0.31)	(0.10)
Capital Intensity	-35.331	-0.200	0.219	-89.517	0.487	1.200**	28.541	-0.082	-0.232
	(46.85)	(0.70)	(0.46)	(42.67)	(0.65)	(0.36)	(33.02)	(0.80)	(0.31)
GDP Growth	17.792**	1.583	-5.390***	18.572***	2.203***	-5.395***	31.148***	1.337	-5.332***
	(5.06)	(0.81)	(0.06)	(4.11)	(0.55)	(0.04)	(6.21)	(0.83)	(0.04)
M8_Score	-0.368	-0.679**	-1.416***						
	(4.74)	(0.21)	(0.15)						
M5_Score				-9.709	-0.753***	-0.770***			
				(12.27)	(0.04)	(0.09)			
F-Score							0.631	-0.008	0.052***
							(0.57)	(0.01)	(0.02)
cons	-64.296	17.634**	15.859***	-159.230	13.013**	17.491***	-274.347**	20.555***	19.541***
	(107.46)	(5.59)	(1.62)	(120.05)	(4.03)	(1.33)	(67.66)	(5.85)	(0.99)
AR(1) (p-value)	0.487	0.000	0.000	0.371	0.000	0.000	0.144	0.000	0.000
Hansen (p-value)	1.000	0.672	0.772	1.000	0.624	0.772	1.000	0.797	0.655
N	30	138	228	30	138	228	23	134	225

Note: Standard errors in parentheses. AR(1) test for autocorrelation. Hansen tests check the validity of instruments.

Table 8.: Analysis of Manipulation Scores: Cox Proportional Hazards Model, SGMM Regression on Excess Return with Interactive Effects

	Panel A: Cox Proportional Hazards Model			**Panel B:** SGMM Regression Interactive Effect: Leverage			**Panel C:** SGMM Regression Interactive Effect: EPS		
Variable	**M-Score (8 var)**	**M-Score (5 var)**	**F-Score**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**	**Excess Return**
EPS	-2.434***	-1.704**	-1.090*	6.538***	5.428***	5.543***	21.236***	-2.647***	4.468***
	(0.63)	(0.56)	(0.50)	(0.17)	(0.11)	(0.27)	(0.23)	(0.25)	(0.24)
BM	0.061*	0.118**	0.061	0.722***	1.107***	-0.487***	0.766***	1.054***	-0.516***
	(0.03)	(0.04)	(0.05)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Size	0.097	0.105*	0.077	0.790***	0.580***	0.320***	0.778***	0.606***	0.338***
	(0.05)	(0.05)	(0.05)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Inflation	-0.008	-0.007	-0.004	-0.744***	-0.820***	-0.669***	-0.749***	-0.814***	-0.665***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	3.058***	1.518***	1.030**	2.574***	6.032***	-2.176***	2.730***	2.650***	-2.631***
	(0.61)	(0.40)	(0.33)	(0.12)	(0.20)	(0.08)	(0.07)	(0.05)	(0.06)
Big4	-0.204	-0.194	-0.189	0.842***	1.161***	-0.739***	0.799***	1.241***	-0.770***
	(0.14)	(0.14)	(0.14)	(0.03)	(0.05)	(0.05)	(0.03)	(0.03)	(0.05)
Capital Intensity	0.527	0.557	0.551	0.369***	2.835***	0.602***	0.591***	2.761***	0.336**
	(0.29)	(0.29)	(0.30)	(0.10)	(0.06)	(0.14)	(0.10)	(0.10)	(0.10)
GDP Growth	-0.075	-0.078	-0.076	-1.366***	-1.331***	-1.402***	-1.360***	-1.338***	-1.406***
	(0.04)	(0.04)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
M8_Score	-0.387***			-1.273***			-1.754***		
	(0.11)			(0.02)			(0.02)		
M8_Score * Leverage	0.725***			-0.340***					
	(0.17)			(0.05)					
M8_Score * EPS							5.621***		
							(0.10)		
M5_Score		-0.032			-2.610***			-1.872***	
		(0.05)			(0.05)			(0.02)	
M5_Score * Leverage		0.173*			1.416***				
		(0.07)			(0.07)				
M5_Score * EPS								-3.037***	
								(0.06)	
F Score			0.008			0.145***			0.128***
			(0.00)			(0.00)			(0.00)
F Score * Leverage			-0.011			-0.077***			
			(0.01)			(0.01)			
F Score * EPS									0.208***
									(0.01)
_cons				-15.654***	-16.183***	-0.707	-16.629***	-14.806***	-0.599
				(0.37)	(0.24)	(0.36)	(0.29)	(0.36)	(0.38)
N	1618	1618	1584	1605	1605	1571	1605	1605	1571
χ^2	56.543 / 0.00	45.893 / 0.00	37.304 / 0.00						
AR1 (p-value)				0.000	0.000	0.000	0.000	0.000	0.000
Hansen (p-value)				1.000	1.000	1.000	1.000	1.000	1.000

Note: Standard errors in parentheses. Year dummies are used as instruments. AR(1) tests for autocorrelation. Hansen test checks instrument validity.

References

Aghghaleh, S.F., Iskandar, T.M., Mohamed, Z.M., 2016a. Detecting financial statement fraud in malaysia: Comparing the abilities of beneish and dechow models. Asian Academy of Management Journal of Accounting and Finance .

Aghghaleh, S.F., Mohamed, Z.M., Rahmat, M.M., 2016b. Detecting financial statement frauds in malaysia: Comparing the abilities of beneish and dechow models. Asian Journal of Accounting and Governance 7, 57–65.

Amor, S.B., Althof, M., Härdle, W.K., 2021. Frm financial risk meter for emerging markets. arXiv preprint arXiv:2102.05398 .

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. The Review of Economic Studies 58, 277–297.

Aviantara, R., 2021a. Scoring the financial distress and the financial statement fraud of garuda indonesia with ddcc as the financial solutions. Journal of Modelling in Management .

Aviantara, R., 2021b. Scoring the financial distress and the financial statement fraud of garuda indonesia with ddcc as the financial solutions. Journal of Modelling in Management .

Aviantara, R., 2023. Scoring the financial distress and the financial statement fraud of garuda indonesia with ddcc as the financial solutions. Journal of Modelling in Management 18, 1–16.

Azar, N., Zakaria, Z., Sulaiman, N.A., 2019. The quality of accounting information: Relevance or value-relevance? Asian Journal of Accounting Perspectives 12, 1–21.

Bassman, B., Brown, P.J., 2003. The M-Score: An empirical test of earnings management. Journal of Accounting Research 41, 255–277.

Basundara, A.T., Miah, M.S., 2014. An empirical study of ifrs convergence effect on earning manipulation in indonesian companies .

Beneish, M.D., 1999. The detection of earnings manipulation. Financial Analysts Journal 55, 24–36.

Berger, A.N., Udell, G.F., 2002. Small business credit availability and relationship lending: The importance of bank organisational structure. The economic journal 112, F32–F53.

Beyer, A., Cohen, D.A., Lys, T.Z., Walther, B.R., 2010. The financial reporting environment: Review of the recent literature. Journal of accounting and economics 50, 296–343.

Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of econometrics 87, 115–143.

Brochet, F., Jagolinzer, A.D., Riedl, E.J., 2012. Mandatory ifrs adoption and financial statement comparability. Contemporary Accounting Research 29, 135–172.

Brunnermeier, M.K., 2009. Deciphering the liquidity and credit crunch 2007–2008. Journal of Economic perspectives 23, 77–100.

Burk, D.L., 2004. Intellectual property and the firm. U. Chi. L. Rev. 71, 3.

Chaney, P.K., Lewis, C.M., 1995. Earnings management and firm valuation under asymmetric information. Journal of corporate finance 1, 319–345.

Cox, D.R., 1972. Regression models and life-tables. Journal of the Royal Statistical Society: Series B (Methodological) 34, 187–220. doi:.

Cox, D.R., 1979. A note on the graphical analysis of survival data. Biometrika 66, 188–190. doi:.

Dechow, P., Ge, W., Schrand, C., 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. Journal of accounting and economics 50, 344–401.

Dechow, P.M., Ge, W., Larson, C.R., Sloan, R.G., 2011. Predicting material accounting misstatements. Contemporary accounting research 28, 17–82.

Dechow, P.M., Sloan, R.G., Sweeney, A.P., 1995. Detecting earnings management. Accounting review , 193–225.

Dichev, I.D., Graham, J.R., Harvey, C.R., Rajgopal, S., 2013. Earnings quality: Evidence from the field. Journal of accounting and economics 56, 1–33.

Dimitrov, V., Jain, P.C., 2008. The value-relevance of changes in financial leverage beyond growth in assets and gaap earnings. Journal of Accounting, Auditing & Finance 23, 191–222.

Dosamantes, C.A.D., 2013. The relevance of using accounting fundamentals in the mexican stock market. Journal of Economics Finance and Administrative Science 18, 2–10.

Easton, P.D., Harris, T.S., 1991. Earnings as an explanatory variable for returns. Journal of accounting research 29, 19–36.

Easton, P.D., McAnally, M.L., Sommers, G.A., Zhang, X.J., 2018. Financial statement analysis & valuation. Cambridge Business Publishers Boston, MA.

FASB, 2010. Preliminary View: Conceptual Framework for Financial Reporting: Objective of Financial Reporting and Qualitative Characteristics of Decision-Useful Financial Reporting Information. Financial Accounting Series No. 1260-001. Financial Accounting Standards Board. Norwalk, CT. Available at FASB website.

Gartenberg, C., Prat, A., Serafeim, G., 2019. Corporate purpose and financial performance. Organization Science 30, 1–18.

Gökhan, U., 1996. Managing systematic risk in emerging markets .
Handayani, N.P.D.R., Narsa, I.M., et al., 2023. Fraud triangle and earnings management based on the modified m-score: A study on manufacturing company in indonesia. Heliyon .
Ho, P.H., Huang, C.W., Lin, C.Y., Yen, J.F., 2016. Ceo overconfidence and financial crisis: Evidence from bank lending and leverage. Journal of Financial Economics 120, 194–209.
Hołda, A., 2020. Using the beneish m-score model: Evidence from non-financial companies listed on the warsaw stock exchange. Investment Management Financial Innovations .
Hugo, J., et al., 2019. Efektivitas model beneish m-score dan model f-score dalam mendeteksi kecurangan laporan keuangan. Jurnal Muara Ilmu Ekonomi Dan Bisnis 3, 165–175.
Jensen, M.C., Meckling, W.H., 2019. Theory of the firm: Managerial behavior, agency costs and ownership structure , 77–132.
Khan, A., Chenggang, Y., Hussain, J., Bano, S., Nawaz, A., 2020. Natural resources, tourism development, and energy-growth-co2 emission nexus: a simultaneity modeling analysis of bri countries. Resources Policy 68, 101751.
Kothari, S.P., Mizik, N., Roychowdhury, S., 2016. Managing for the moment: The role of earnings management via real activities versus accruals in seo valuation. The accounting review 91, 559–586.
Kouki, A., 2018. Mandatory ifrs adoption, investor protection and earnings management. International Journal of Accounting .
Lassoued, N., Khanchel, I., 2021. Impact of covid-19 pandemic on earnings management: An evidence from financial reporting in european firms. Global Business Review , 09721509211053491.
Lepak, D.P., Smith, K.G., Taylor, M.S., 2007. Introduction to special topic forum: Value creation and value capture: A multilevel perspective. The Academy of Management Review , 180–194.
Lintner, J., 1962. Dividends, earnings, leverage, stock prices and the supply of capital to corporations. The review of Economics and Statistics , 243–269.
Liu, T., Li, Y., Zhang, B., 2013. An M-Score model to detect earnings management in china. Journal of Applied Business Research 29, 951–964.
Lizińska, J., Czapiewski, L., 2018. Towards economic corporate sustainability in reporting: what does earnings management around equity offerings mean for long-term performance? Sustainability 10, 4349.
Maniatis, A.S., 2021. Detecting the probability of financial fraud due to earnings manipulation in companies listed in athens stock exchange market. Journal of Financial Crime .
Martens, W., Pham, P.T., 2021. Reducing agency issues: Examining earnings management constraints in emerging markets. Academy of Accounting and Financial Studies Journal 25, 1–22.
Martens, W., Yapa, P., Safari, M., 2021. Earnings management in frontier market: do institutional settings matter? Economies 9, 17.
Martens, W.A., 2021. Three essays on earnings management in frontier countries. Unpublished PhD dissertation, RMIT University, Melbourne, Australia .
Modigliani, F., Miller, M.H., 1958. The cost of capital, corporation finance and the theory of investment. The American economic review 48, 261–297.
Myddelton, D., 2009. Margins of error in accounting. Springer.
Naseem, S., Tong, G.J., 2021. A system-gmm approach to examine the renewable energy consumption, agriculture and economic growth's impact on co2 emission in the saarc region. GeoJournal 86, 2021–2033.
Nwoye, D., Okoye, E.I., Oraka, A.O., et al., 2013. Beneish model as effective complement to the application of sas no. 99 in the conduct of audit in nigeria. Management and Administrative Sciences Review 2, 640–655.
Ohlson, J.A., 1999. On transitory earnings. Review of accounting studies 4, 145–162.
Price III, R.A., Sharp, N.Y., Wood, D.A., 2011. Detecting and predicting accounting irregularities: A comparison of commercial and academic risk measures. Accounting Horizons 25, 755–780.
Skousen, C.J., Twedt, B.J., 2009. Fraud score analysis in emerging markets. Cross Cultural Management: An International Journal .
Trinh, H.H., Nguyen, C.P., Hao, W., Wongchoti, U., 2021. Does stock liquidity affect bankruptcy risk? did analysis from vietnam. Pacific-Basin Finance Journal 69, 101634.
Turki, H., Gallali, M., Sellami, Y.M., 2020. Ifrs and financial performance: Study in the french context. International Journal of Accounting and Financial Reporting .
Valaskova, K., Durica, M., Kliestik, T., 2021. Bonds between earnings management and corporate financial stability in the context of the competitive ability of enterprises. Journal of Competitiveness .
West, B.P., 2003. Professionalism and accounting rules. Routledge.

Appendix A

Table 9.: Comprehensive List of Variables and Their Descriptions

Type	Variable	Code	Exp Sign	Description/Formula
Dependent Variable				
	Excess Return	R		Firm's annual stock return minus FTSE Vietnam All Share Price Index
Independent Variables				
	Beneish M-Score (8 var.)	M8_Score	-	Composite score of 8 variables below[a]
	Beneish M-Score (5 var.)	M5_Score	-	Variant of M8_Score using 5 variables[a]
	Dechow F-Score	F_Score	-	Composite score of variables below[b]
M-Score Components				
	Days sales receivable index	DSRI		(Net Rec$_t$ / Sales$_t$) / (Net Rec$_{t-1}$ / Sales$_{t-1}$)
	Gross margin index	GMI		[Gross Margin$_{t-1}$ / Sales$_{t-1}$] / [Gross Margin$_t$ / Sales$_t$]
	Asset Quality index	AQI		Ratio of non-current assets (excl. PPE) to total assets
	Sales growth index	SGI		Sales$_t$ / Sales$_{t-1}$
	Depreciation index	DEPI		Ratio of depreciation rates in year t and $t-1$
	SG&A expense index	SGAI		(SG&A$_t$ / Sales$_t$) / (SG&A$_{t-1}$ / Sales$_{t-1}$)
	Total accruals to Total assets	TATA		Total Accruals$_t$ / Total Assets$_t$
	Leverage index	LVGI		Debt-to-assets ratios for years t and $t-1$
F-Score Components				
	RSST Accruals	RSST		ΔWC + ΔNCO + ΔFIN / Avg. Total Assets[c]
	Change in receivables	REC		ΔAccounts Receivables / Avg. Total Assets
	Change in inventories	INV		ΔInventory / Avg. Total Assets
	Soft assets	SoftAssets		(Total assets - PPE - Cash) / Total Assets
	Change in cash sales	CashSales		% change in (Sales - ΔAccounts Receivables)
	Change in return on assets	ROA		Δ[Earnings / Avg. Total Assets]
	Securities issuance	ISSUE		Dummy: 1 if securities issued in year t
Control Variables				
	Book to Market	BMR	-	Book value / Market value
	EPS	EPS	+	Earnings Per Share (price deflated)
	Inflation	INFL	-	Annual inflation rate
	Leverage	LEV	+/-	Total Debt / Total Assets
	Firm Size	SIZE	+	Log of total assets
	Big 4 auditor	BIG4	+	Dummy: 1 if audited by Big 4, else 0
	Capital Intensity	CAP	+	PPE / Total Assets
	GDP Growth	GDP	+	Annual GDP growth rate
	Firm and Year	i, t	+/-	

[a] Calculated as per Beneish (1999)
[b] Calculated as per Dechow et al. (2011)
[c] WC = Working Capital, NCO = Non-Current Operating assets, FIN = Financial assets