Role of Financial Constraints and Risk-Taking on the Relationship between Financial Reporting Quality and Investment Efficiency: emerging and Frontier Markets' Perspective

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Title

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Abstract

Purpose: Prior evidence that financial reporting quality (FRQ) of publicly listed firms improves investment efficiency in developed markets leaves unaddressed questions of whether this relationship holds in emerging and frontier markets and what channels influence this relationship. This study tests the role of financial constraints faced by firms and managerial risk-taking on the association of FRQ and investment efficiency in 13,231 publicly listed firms in 24 emerging and frontier markets.

Design/methodology/approach: Available accounting data from 1998 to 2022 is collected for all listed firms across 41 industries in 24 countries. Causal relationships are tested using fixed-effect regression analysis, several additional tests and robustness checks are applied using alternative proxies, and concerns for endogeneity are addressed using 2SLS and system GMM analysis.

Findings: Findings show that (i) FRQ of firms in emerging and frontier markets positively affects investment efficiency, (ii) the affirmative impact of FRQ on investment efficiency is higher when firms are facing more financial constraints, (iii) and when managerial risk-taking is lower, and (iv) financial constraints and risk-taking have a more pronounced impact on the link between FRQ and investment efficiency in the underinvestment scenario.

Originality: These findings contribute to the growing body of evidence, shedding light on the meticulous interplay between FRQ and investment efficiency in frontier and emerging markets. Specifically, the increased financial constraints encountered by firms and a more conservative approach to managerial risk-taking emerge as crucial factors complementing this relationship.

Key Words

Investment efficiency, financial constraints, risk-taking, financial reporting quality, signalling theory, agency theory

1. Introduction

The literature in developed markets has brought to light the relationship between financial reporting quality (FRQ) and investment efficiency within publicly listed firms (see, e.g., Assad *et al.,* 2023; Biddle *et al.,* 2009; Gomariz and Ballesta, 2014). However, there remains a dearth of knowledge concerning the interconnection of FRQ with investment efficiency in publicly listed firms of emerging and frontier markets. Frontier markets, being relatively smaller and often less accessible, typically do not attain the status of emerging markets. Enhanced financial reports of superior quality play a role in mitigating information asymmetry by furnishing well-timed and truthful data to shareholders (Zhou *et al.,* 2017). Yet, the application of accounting information for the valuation of securities in emerging and frontier markets remains a pragmatic concern (Alfraih, 2016).

Emerging and Frontier markets have various distinguishing features from developed markets, which need further investigation before generalising the results obtained and reported in prior literature. Developed markets exhibit higher compliance with accounting standards than emerging and frontier markets (Brown *et al.,* 2014). In these nascent economies, early stages of development, limited liquidity, and weak fiscal oversight contribute to a higher prevalence of earnings manipulation (Lin and Wu, 2014). This manipulation leads to lower FRQ, particularly notable in China's developing stock market (Hussain *et al.,* 2020) and India (Chauhan *et al.*, 2021). However, due to information scarcity, FRQ holds greater significance in these markets (Lopes, 2002). Concentrated ownership in emerging markets (Vo, 2018) leads to less risky investment choices, suggesting unique FRQ impacts. Internal governance is paramount (Alam *et al.,* 2020), as weak shareholder protection and governance enforcement persist (Chen *et al.,* 2013; Chauhan *et al.,* 2021). Ownership concentration negatively affects investment efficiency (Chen *et al.,* 2017). Therefore, findings obtained in developed markets should be questioned before being extended to emerging and frontier markets. This study fills this gap and extends the FRQ and investment efficiency literature to emerging and frontier markets.

While reviewing the relevant literature, we propose exploring the two critical factors influencing the relationship between FRQ and investment efficiency. The first important factor is the level of financial constraints the firm faces. Firms facing financial constraints typically possess diminished free cash flows. Consequently, managerial tendencies toward empire-building (Jensen,1986) are less likely to manifest. These firms necessitate a more cautious approach to both project selection and investment, as highlighted by the work of Grossman and Hart (1986) as well as Hovakimian (2011). Managers operating within this context are well aware that the ongoing erosion of firm value could elevate their vulnerability in terms of employment risk. In contrast to the aforementioned perspective, the literature

also highlights a contrary relationship, where financial constraints have a detrimental effect on investment efficiency. This negative impact is exacerbated when agency issues come into play. The presence of agency problems contributes to the inefficiency of investments by distorting the very decisions that pertain to investment undertakings, as expounded by Naeem and Li (2019). Huang (2022) also underscores that financial constraints impede efforts aimed at enhancing investment efficiency.

The second important factor is the amount of managerial or corporate risk-taking tendency. It pertains to the proactive inclination to embrace risks when firms/managers strive to attain excessive profits (Boubakri *et al.,* 2013). Elevated risk-taking proves advantageous by enabling firms to capitalise on investment prospects, enhance operational performance, and sustain a lasting competitive edge (Koirala *et al.,* 2020). The existing body of literature delves into the impact of managers' propensities for risk-taking on investment efficiency and reports a positive connection (John *et al.,* 2008). However, managers' improper inclination toward risk can lead to significant investment inefficiency within a firm. Risk-averse managers may overlook valuable projects with inherent risk while embracing projects deemed safe but diminishing value (Ali *et al.,* 2022). When managers exhibit disproportionately low-risk tolerance, there is a threat of missing out on valuable investment opportunities, resulting in reduced investment efficiency compared to firms more inclined toward risk-taking.

Our study differs from the relevant existing studies on FRQ and investment efficiency, for example, Boubaker *et al.* (2018), Boubaker *et al.* (2021) and Boubaker *et al.* (2022). Acceptance of all net present value projects is called investment efficiency (Gomariz and Ballesta, 2014). Two other common forms of efficiency in corporate finance literature are productive and labour investment efficiencies. Productive efficiency reveals the usage of minimum inputs to yield output and is normally measured using total factor productivity (Palia and Lichtenberg, 1999). Whereas labour investment efficiency is a factor of production (Boubaker *et al.*, 2022). Boubaker *et al.* (2018) study the impact of audit quality on investment efficiency in 125 French-listed firms from 2008-2015 and find a positive relationship. Boubaker *et al.* (2021) investigate the effect of the largest controlling shareholders on firm productive efficiency. They find a negative association between the major blockholders and the firm productive efficiency. Boubaker *et al.* (2022) examine the link between product market competition and labour investment efficiency and find a negative relationship. We study the relationship between FRQ and investment efficiency with a focus on distinguishing features of emerging and frontier markets and identifying the two critical mechanisms, i.e., financial constraints

and risk-taking, through which the hypothesised association is moderated. To the best of our knowledge, no other research has addressed these issues in a transnational environment.

To answer the posited research problem, we examine FRQ-investment efficiency in emerging and frontier markets using Refinitiv Eikon DataStream (1998-2022) data covering 13,231 firms across 41 industries. Methods include fixed-effects OLS, alternative proxies, 2SLS, and system GMM to address endogeneity.

The study's findings show that the FRQ positively impacts investment efficiency in emerging/frontier markets. Higher financial constraints enhance the FRQ-investment efficiency link. Managerial risk-taking strengthens FRQ-investment efficiency association when low. Our study extends FRQ-investment efficiency research to emerging/frontier markets, highlighting its significance despite lower FRQ. Financial constraints and risk-taking amplify the FRQ-investment efficiency link, especially in underinvestment scenarios, which aligns with previous literature (e.g., Houcine *et al.,* 2021).

The paper is further structured: Section 2 reviews the literature and formulates hypotheses. Section 3 details the research design and methodology. Section 4 presents empirical results and discussion. Section 5 concludes with contributions and implications.

2.0 Literature Review

This study relies on agency theory (Jensen and Meckling, 1976) and signalling theory (Spence, 1973) to explain variable relationships. Agency theory highlights conflicts of interest between managers and shareholders (Alam *et al.*, 2020), while signalling theory posits that financial decisions signal information to investors, addressing information asymmetries. Voluntary disclosure aligns with these theories. Agency theory suggests a strong connection between financial disclosure and profitability (Watson *et al.*, 2002), affecting investment efficiency (Chen *et al.*, 2011; Gomariz and Ballesta, 2014). Signalling theory proposes that well-performing firms use robust financial reporting to convey quality to investors, reducing information asymmetry and enhancing investment efficiency (Watson *et al.*, 2002). Investment efficiency is crucial for firm growth and cash flow prospects, gaining increasing attention in corporate finance literature (Moradi *et al.*, 2022; Tahat *et al.*, 2022; Wu *et al.*, 2023).

IFRS and GAAP set minimum standards for accounting disclosure yet allow managerial discretion and flexibility, potentially leading to opportunistic behaviour (Zhang and Wiersema, 2009). Managers aim to distinguish themselves through superior FRQ (Zhang and Wiersema, 2009). Institutional

shareholders play a role in improving FRQ (Cui *et al.*, 2023). Low FRQ may result from earnings management (Khan *et al.*, 2021), with cases like Satyam, WorldCom, and Enron highlighting its detrimental effects (Lara *et al.*, 2020).

The relationship between FRQ and investment efficiency is well-explored in developed markets (Assad *et al.*, 2023; Biddle *et al.*, 2009; Gomariz and Ballesta, 2014). However, in emerging markets like China and India, weak shareholder protection enforcement (Chauhan *et al.*, 2021; Chen *et al.*, 2013) and governance challenges (Gao *et al.*, 2024) pose significant hurdles. Ownership concentration negatively impacts investment efficiency (Chen *et al.*, 2017), cautioning against generalising findings from developed to emerging markets. In these contexts, FRQ may carry more weight for stakeholders compared to alternative information sources (Lopes, 2002). While studies in specific countries like China and Saudi Arabia show FRQ's impact (Aldoseri, 2024; Houcine, 2017), a comprehensive transnational perspective is lacking. This study aims to bridge this gap by examining FRQ's relationship with investment efficiency across twenty-four countries.

Drawing on agency and signalling theories and considering persistent challenges like moral hazard and conflicts of interest (Alam *et al.*, 2020), higher FRQ is expected to enhance a firm's investment efficiency (Watson *et al.*, 2002; Chen *et al.*, 2011; Gomariz and Ballesta, 2014). Thus, the study predicts that superior FRQ will play a pivotal role in improving investment efficiency in emerging and frontier markets, forming the first hypothesis as follows;

H1: Financial reporting quality has a significant positive impact on investment efficiency in emerging and frontier markets.

Financial constraints shape firms' investment decisions, with previous studies emphasising their impact on corporate investment behaviour (Campello *et al.*, 2010). The availability of high-quality financial information, particularly FRQ, becomes crucial when firms face financial constraints, influencing growth and demand expectations (Yung *et al.*, 2015).

Prior literature uses the basis of agency and information asymmetry for exploring the relation between financial constraints and investment efficiency and presents mixed results (e.g., Benlemli and Bitar, 2018; Huang, 2022; Lai and Liu, 2018; Lara, Usma and Penalva, 2016; Naeem and Li, 2019; Stoffman *et al.,* 2022). Financially constrained firms have less free cash flows. Hence, the managers are less likely to engage in empire-building motives (Jensen, 1986) and must be more careful in project

selection and investment (Grossman and Hart, 1986; Hovakimian, 2011). Managers know that continuous deterioration of firm value will also increase their employment risk.

Literature documents findings where financial constraints have a negative impact on investment efficiency. This negative impact becomes more severe in the presence of agency issues. For a related example, Li *et al.* (2023) show that the impact of financial constraints on enhancing the effectiveness of utilising R&D funds is more prominent when the agency problem is severe. Agency issues lead to investment inefficiency by distorting investment decisions and lead to underinvestment or harming manager's judgement to invest in unprofitable projects, resulting in overinvestment (Naeem and Li, 2019). Huang (2022) also records that financial constraints hinder improvements in investment efficiency. Internal funds enhance corporate investment opportunities, addressing underinvestment concerns, but they also introduce overinvestment risks due to moral hazards (Chiu *et al.,* 2022).

Contrary to the above, while it is commonly believed that financial constraints can impede innovation by restricting R&D investments (e.g., Acharya and Xu, 2017), empirical observations suggest that increased financial resources do not always result in superior investment outcomes. In financially constrained firms, the need for debt financing may arise, introducing extra agency costs (Jensen and Meckling, 1976). To mitigate these costs, managers may voluntarily provide relevant information in financial reports, reducing monitoring costs (Watson *et al.,* 2002). Despite limitations imposed by financial constraints, managers may improve project selection quality by investing only in the most valuable opportunities to eliminate their reputational damage (Hovakimian, 2011; Jensen, 1986). Good managers utilise quality financial reporting to enhance investment efficiency, particularly in the context of bank financing, amplifying the positive impact of good reporting on investment decisions (Chen *et al.*, 2011).

Now, focus on how financial constraints influence the relationship between FRQ and investment efficiency. Stoffman *et al.* (2022) reveal that high financial constraints exacerbate information asymmetry, adversely impacting returns on investment and potentially leading to inefficient investments due to managerial opportunistic behaviour (Huang, 2022). FRQ is crucial for investment efficiency by reducing information asymmetry, aligning with signalling theory, especially significant when facing financial constraints. This argument aligns with the effectiveness of external corporate governance that reduces information asymmetry (Wu *et al.*, 2023). Information asymmetry between managers and investors leads to moral hazard and adverse selection, impacting firm operations. Zhao and Zhang (2023) find that financial constraints hinder innovative corporate investments, particularly

in firms characterised by credit corruption. Chiu *et al.* (2022) study shows that executive confidence influences investment efficiency with free internal funds, especially in financially constrained firms. Financial constraints positively affect the relationship between cash flow and overinvestment (Chiu *et al.,* 2022). Boubaker *et al.* (2022) Investigate the correlation between product market competition and labour investment efficiency and show a more pronounced relationship for firms experiencing elevated financial constraints. The empirical results indicate that financially constrained firms respond more to intensified competitive pressures by diminishing their labour investment. Facing financial constraints, firms tend to exaggerate their revenue figures to attract investors and improve their access to external financing resources (Sánchez-Ballesta & Yagüe, 2021).

Additionally, Financial constraints are identified as one of the mechanisms that affect the relationship between blockholders' physical monitoring and aggressive financial reporting (Cui *et al.*, 2023). A study by Xu *et al.* (2024) indicates that financial constraints arising from climate risk constrain corporate investment. Another investigation by Jose and Bhaduri (2024) uncovers a significant negative association between share pledging and investments, with the detrimental effects being more pronounced in financially constrained firms. Additionally, Yang *et al.* (2024) discovered that oil price uncertainty harms inefficient investment, particularly accentuated in firms with higher financing constraints.

The financially constrained firms, with limited access to external funds and reduced empire-building motives, may be inclined to invest more efficiently (Jensen, 1986; Hovakimian, 2011). However, contrasting views from studies like Huang (2022), Li *et al.* (2023), and Naeem and Li (2019) suggest that financial constraints could hinder a firm's investment efficiency. FRQ acts as a control mechanism in such scenarios, preventing managerial expropriation and supporting higher investment efficiency (Chen *et al.,* 2011). This study predicts that FRQ in a firm with more financial constraints would be more likely to facilitate improvement in investment efficiency in emerging and frontier markets. Hence, the second hypothesis of this study is

H2: In emerging and frontier markets, financial constraints have a significant positive moderating impact on the relationship between FRQ and investment efficiency.

Managerial or firm risk-taking, crucial for firm value and growth, receives increasing attention from academia and corporate entities (Zhang *et al.*, 2023; Marcelin *et al.*, 2022). Risk-taking, being a challenging endeavour, involves significant efforts, anxieties, and job loss fears (Ali *et al.,* 2022). Each firm adopts a unique risk strategy influenced by human nature, aiming to enhance investment

efficiency and value (Fareed *et al.,* 2022). Previous research indicates positive associations between risk-taking and investment efficiency (John *et al.*, 2008; Lai and Liu, 2018; Tang and Chang, 2024). Incentivized by compensation, CEOs are motivated to undertake additional risk, thereby increasing firm value (Arrfelt *et al.,* 2018; Gan, 2019).

Managers' inherent risk aversion, stemming from the separation of ownership and control, influences corporate investment decisions (Abascal *et al.,* 2023; Jensen, 1986; John *et al.,* 2008). This aligns with the 'lazy CEOs' hypothesis, suggesting that managers often prefer a quiet life over taking risks to enhance shareholders' value (Bertrand and Mullainathan, 2003). Without proper monitoring, risk-averse managers may lean towards underinvestment (Chiu *et al.,* 2022). Additionally, managers' risk aversion is influenced by reputational and employment risks and prevalent agency issues (Hoskisson *et al.,* 2017; Jensen and Meckling, 1976). Concerns about reputation and job loss often take precedence over maximising shareholders' wealth in risk-choice scenarios (Chiu *et al.,* 2022). Agency issues arise because investors can diversify their portfolios, while managers cannot diversify their employment and reputational risk, making managers risk-averse compared to risk-neutral investors (Hoskisson *et al.,* 2017). The 'career concern' hypothesis suggests that managers, fearing dismissal, exhibit reluctance towards embracing risk even when outcomes are influenced solely by chance, impacting their motivation for risky and innovative corporate investments (Bernstein, 2015).

On the one hand, excessive risk-taking, as empirically demonstrated by Guo (2023) and highlighted by Xiong *et al.* (2021), can lead to negative outcomes, financial strain, and deviation from societal norms, causing considerable losses for stakeholders. On the other hand, inappropriately low risk-taking by risk-averse managers, as observed in studies like Ali *et al.* (2022) and Amihud and Lev (1981), may result in investment inefficiency. Managers avoiding valuable risky projects and opting for safe yet value-reducing projects can hinder the firm's ability to capture opportunities, reduce investment efficiency, and undermine competitiveness, potentially jeopardising its survival (Ali *et al.,* 2022).

As demonstrated in related prior literature, managers' risk-taking moderates the relationship between financial reporting quality and investment efficiency (Biddle *et al.,* 2016; Gan, 2019; Lai and Liu, 2018; Lara *et al.,* 2016). For instance, IFRS adoption enhances investment efficiency by reducing information asymmetry and fostering value-enhancing risk-taking (Biddle *et al.,* 2016). Accounting conservatism, indicative of better accounting quality, is linked to increased investment efficiency, with conservative firms making strategic investments in underinvestment and overinvestment scenarios (Lara *et al.,* 2016). Another related study is by Gao *et al.* (2024), where risk-taking moderates the

relationship between board chair gender and IPO underpricing. Such studies highlight the vital role of risk-taking in corporate finance research. Improved FRQ and reduced information asymmetry encourage managers to engage in riskier investments, highlighting the complex interplay between risk-taking, FRQ, and investment efficiency (Trinugroho *et al.,* 2021). Xu *et al.* (2024) demonstrate in their research that climate risk amplifies overall investment inefficiency. Regarding overinvestment, the study suggests that climate risk prompts management to pursue empire-building behaviours, leading to investments surpassing the anticipated optimal level. Additionally, the research finds that firms with higher corporate operational risk may exhibit less efficient investment practices in the face of climate change risk. In a separate study, Bilyay-Erdogan *et al.* (2024) investigate the impact of overall ESG performance on corporate investment efficiency. Their results indicate a statistically significant relationship, revealing that firms with robust ESG performance tend to make more efficient investments. Furthermore, the research highlights that superior ESG performance contributes to reducing investment inefficiency, potentially through mitigating overall firm risk.

Based on the literature cited above, it transpires that managers with less risk-taking tendencies will make suboptimal investment decisions (Ali *et al.,* 2022; Amihud *et al.,* 1981), maximisation of shareholders' wealth goal is compromised, and investors/shareholders need another monitoring mechanism (like FRQ) to enhance investment efficiency of the firm. This study predicts that FRQ would be more likely to facilitate investment efficiency improvement in firms with less managerial risk-taking. Hence, the last hypothesis of this study is

H3: Risk-taking has a significant negative moderating role in the FRQ-investment efficiency link in emerging and frontier markets.

3.0 Research Design and Methodology

3.1 Measurement of Variables

Investment efficiency (*IE*) is the dependent variable measured using the Biddle *et al.* (2009) model. Financial reporting quality (FRQ) is the main independent variable, which is based on accrual (FRQ_A) and real (FRQ_R) earnings management and is measured using Dechow *et al.* (1995) and Roychowdhury (2006) models, respectively. The first measure of financial constraints (FC_1) is the KZ index (Kaplan and Zingales, 1997). The second measure of financial constraints (FC_2) is the WW index (Whited and Wu, 2006). For risk-taking, firstly, we calculate 5-year rolling earnings volatility (RT_1) based on return on assets (John *et al.,* 2008; Koirala *et al.,* 2020). Next, we take the difference between maximum and minimum RT_1 values in three consecutive years to calculate RT_2, which is used as the second measure of risk-taking, as done by Guo (2023). We use several control variables from prior literature, which

may affect firms' investment decisions, to diminish the association of omitted variables bias. *Appendix A* provides details of all variables.

3.2 Sample and Data

The study sample consists of publicly listed non-financial firms based on the Fama and French 48-industry classification. Financials and utilities are excluded because these firms face high regulations and are not comparable with non-financial firms. Data are extracted from Refinitiv Eikon DataStream for the years 1998 to 2022, owing to minimal data availability about frontier markets before the year 1998. We describe the sample selection procedure in *Appendix B*, with the final dataset of 99,997 firm-year observations in 24 emerging and frontier markets across 41 industries.

3.3 Econometric Model

To answer the research questions, we estimate the following baseline regression in the panel setting:

$$IE_{i,t} = \beta_0 + \beta_1 FRQ_{i,t-1} + Controls + Year\ FE + \text{Industry FE} + \text{Country FE} + \varepsilon_{i,t} \quad \textbf{(1)}$$

Where $IE_{i,t}$ is the investment efficiency, $FRQ_{i,t-1}$ is financial reporting quality. Controls represent a set of control variables. Year FE, Industry FE, and Country FE are indicator variables for controlling fixed effects of year, industry and country, respectively, and $\varepsilon_{i,t}$ is the random error term.

Next, we extend our baseline model to estimate the conditioning effect of financial constraints and risk-taking on investment efficiency as follows:

$$IE_{i,t} = \beta_0 + \beta_1 FRQ_{i,t-1} + \beta_2 FC_{i,t-1} + \beta_3 FC_{i,t-1} * FRQ_{i,t-1} + Controls + Year\ FE + \text{Industry FE} + \text{Country FE} + \varepsilon_{i,t} \quad \textbf{(2)}$$

$$IE_{i,t} = \beta_0 + \beta_1 FRQ_{i,t-1} + \beta_2 RT_{i,t-1} + \beta_3 RT_{i,t-1} * FRQ_{i,t-1} + Controls + Year\ FE + \text{Industry FE} + \text{Country FE} + \varepsilon_{i,t} \quad \textbf{(3)}$$

Where $FC_{i,t-1}$ shows two dummy variables (FC_1 and FC_2), which equal 1 if the firm is categorised as financially constrained and 0 otherwise. $RT_{i,t-1}$ shows two dummy variables (RT_1 and RT_2), which equal 1 if the firm is above the median value (higher risk-taking) and 0 otherwise.

Before the estimation of regression models, various statistical tests were performed and found no serial correlation or multi-collinearity in the data. The heteroscedasticity is addressed using the 'robust standard errors' approach, where necessary.

4.0 Results and Discussion

4.1 Descriptive Statistics

Table I shows sample distribution across countries and FF industry classification in Panels A and B, respectively. Our sample comprises 13,231 firms across twenty-four emerging and frontier markets, comprising 99,997 firm-year observations. Next, Table II reports descriptive statistics for continuous variables (Panel A) and dichotomous variables (Panel B). Investment efficiency (IE) has a mean (SD)

value of -.15 (2.12), whereas financial reporting quality (FRQ) measures, namely FRQ_A, FRQ_R have a mean (SD) of -.239(.477), -.505(3.42), respectively. These values align with previous studies (Assad *et al.*, 2023; Biddle *et al.,* 2009; Gomariz and Ballesta, 2014; Houcine, 2017). Further, financial constraints (FC) measures show that 58.3% and 54.7% of firms lie above the median as per FC_1 and FC_2. Similarly, risk-taking (RT) measures show that a much higher percentage of firms are not taking high risks, as 68.2% and 67.1% of firms within the sample fall below the median. The pair-wise correlations between variables are provided in *Appendix* C.

[Insert Table I and II about here]

4.2 Baseline Results

Table III reports the result of unconditional analysis, which estimates our baseline model using Eq. (1). First, we regress FRQ measures without using any control variables (models 1-2), and later we add twelve control variables (models 3-4) followed by another four variables (models 5-6). These results show that FRQ is positively associated with investment efficiency, as all coefficients are positive and significant at a 1% level, which is in line with our H1 and findings in developed markets by Assad *et al.* (2023), Biddle *et al.* (2009) and Gomariz and Ballesta (2014). So, in the prevalent issues of country-level governance, ownership concentration, and weak investor protection, FRQ acts as a control mechanism to discipline managers and improve investment efficiency.

[Insert Table III about here]

Then, in Table IV, we analyse the conditioning effect of FRQ in the presence of financial constraints (FC) and risk-taking (RT) on IE in Panels A and B, respectively. In Panel A, we present the results of Eq. (2) in which IE is regressed on FRQ_A/FRQ_R with two FC proxies. Results show that FRQ is still significantly associated with IE. The coefficient of FC_1/FC_2 is negative and statistically significant (p<.05 or .10). This finding is economically meaningful as managers tend to lose positive NPV projects in the presence of higher financial constraints. Next, we mainly focus on the interaction term coefficient between FRQ_A/FRQ_R and FC_1/ FC_2 and observe that it is statistically significant ($p<.05$ *or .10*) and positively associated with IE. This implies that the effect of FRQ on IE is more pronounced in the presence of financial constraints that will result in higher efficient investment. It supports our H2 and complements the prior findings (Assad *et al.*, 2023; Biddle *et al.,* 2009; Houcine, 2017).

In Panel B, the results of Eq. (3) are presented, which pertains to the regression of IE on FRQ_A and FRQ_R and utilising the two risk-taking (RT) proxies. The coefficients of RT_1 / RT_2 reveal a positive and statistically significant link between risk-taking and IE. This finding holds practical significance as it suggests that when risk-taking is higher, managers are inclined to undertake high-return projects

(Tang and Chang, 2024). The coefficients of interaction terms of $FRQ_{A/R}$ and RT_1/RT_2, which are our main interest here, reveal interesting findings as the coefficients are negative and statistically significant ($p < 0.05$). It indicates that higher risk-taking mitigates the positive impact of FRQ on IE. It implies the importance of lower risk-taking to strengthen the FRQ-IE relationship. Thus, FRQ's role is crucial to promote efficient investment in the presence of low risk-taking, which confirms our H3 and supports the arguments that low managerial risk-taking may lead towards underinvestment (Hoskisson *et al.,* 2017), so FRQ's role is more enhanced in these situations.

[Insert Table IV about here]

4.3 Additional analysis

We conduct additional analyses in this sub-section to present further insights about relationship between FRQ and IE. For this purpose, we use two approaches to extend our baseline estimation. Firstly, following prior literature (e.g., Assad *et al.*, 2023; Biddle *et al.*, 2009; Gomariz *et al.*, 2014; Houcine *et al.*, 2022; Zhang and Zhao, 2023), we combine the two proxies of financial reporting quality to calculate an aggregate measure, abbreviated as FRQ_T, and we repeat the estimation. Next, we split our sample based on firms with positive and negative investment efficiency model residuals. Following the literature (Biddle *et al.,* 2009), we declare positive and negative residual samples as Over_invest and Under_invest and re-estimate our models.

Appendix D presents the results of our first additional analysis. As stated earlier, the coefficient of aggregate measure of FRQ_T is statistically significant ($p<0.01$) and economically meaningful. Further, interaction terms of FRQ_T with $FC_{(1,2)}$ and $RT_{(1,2)}$ are also significant and align with the results already reported in Tables III and IV.

Generally, financial constraints lead to underinvestment (Naeem *et al.,* 2019), and risk-taking by managers may lead to over-investment to increase firm value (Fareed *et al.,* 2022). However, sluggish managers prefer to be under-investing due to fear of job or reputation (Hoskisson, Chirico, Zyung and Gambeta, 2017). Considering this literature, the second additional analysis is reported in Table V, Panels A and B, for under- and over-investment scenarios. In both Panels, results show that FRQ_A/FRQ_R are significantly and positively associated; thus, FRQ in emerging and frontier markets pushes investment to its optimal level by reducing information asymmetry and agency costs. In Panel A, coefficients of FC_2 are negative and significant, showing an increment in underinvestment. Further, for over-investment scenarios, the coefficients of FC_1/FC_2 and their interaction with FRQ are insignificant. This finding is intuitive because managers are less likely to over-invest when the funds are deficient.

In Panel B, the coefficients for RT_1 and RT_2 are both positive and statistically significant. It shows that managers' willingness to take risks leads to a reduction in underinvestment. Further, the interaction terms indicate that higher risk-taking mitigates the positive impact of FRQ on investment efficiency in firms inclined towards under-investment. This indicates lower risk-taking is important in strengthening the FRQ-investment efficiency relationship. Therefore, the role of FRQ is essential in promoting efficient investment in the presence of low risk-taking. Conversely, in scenarios where over-investment is a concern, the coefficients for RT_1 and RT_2 are statistically insignificant.

[Insert Table V about here]

4.4 Robustness checks

This sub-section deals with the robustness checks. Mainly, we use alternative measures of investment efficiency and FRQ to perform these checks. We extend our robustness analysis to include the conditional effect of FRQ on IE in the presence of FC and RT. These results are presented in Table VI. In this table, Panel A uses IE_C as an alternative measure of investment efficiency with the same two FRQ proxies. Meanwhile, Panel B uses FRQ_K and FRQ_{DR} as two alternative measures of financial reporting quality with the same IE proxy of the baseline model. Lastly, Panel C uses all alternative measures, namely IE_C, FRQ_K, and FRQ_{DR}. These estimations are based on Eq. (2) and (3). All of the specifications show that various measures of FRQ are still significantly and positively associated with IE and IE_C. Further, FC and RT and their interactions with FRQ are also significant. Overall, they show that higher financial constraints and lesser risk-taking lead toward a more pronounced FRQ-IE relationship, which shows the robustness of our conditional analysis.

[Insert Table VI about here]

Additionally, we split our sample into two to mitigate sample selection bias. Approximately 73% of observations are from China, India, South Korea, and Taiwan. The first sub-sample comprises firms from these countries, while the second sub-sample consists of the remaining firms. We estimate Eq. (2) and (3) separately for each sub-sample. Appendix E displays the results of this division. The interaction terms' statistically significant and economically meaningful coefficients affirm that the FRQ-investment efficiency link remains unaffected by sample selection and is not driven solely by major observations.

4.5 Endogeneity Test

This section addresses concerns about the endogenous nature of FRQ-IE relationships using 2SLS regression and system GMM. We construct an instrumental variable 'COM' by relying on previous

studies (e.g., Chin *et al*., 2009; Dayanandan *et al*., 2016) based on common law countries (1) and civil law countries (0). First-stage statistics indicate a non-weak instrumental variable (COM). Second-stage estimation using FRQH confirms our findings. Table VII presents results, showing no influence after controlling for potential endogeneity. The Sargan test validates our IV (COM) and model specification. Additionally, system GMM analysis in Appendix F confirms the positive impact of FRQ on investment efficiency. The Hansen-J over-identification test confirms model validity.

[Insert Table VII about here]

5.0 Conclusion and Recommendations

By capitalising on the limited prior research evidence in publicly listed firms of emerging and frontier markets, this paper analyses the impact of financial reporting quality (FRQ) on investment efficiency and the effect financial constraints and risk-taking have on this relationship. We use a sample of 24 emerging and frontier markets countries containing 13,231 publicly listed firms from 1998 to 2022.

Our regression results show that higher FRQ enhances investment efficiency in emerging and frontier markets as well. The higher FRQ is used as a monitoring mechanism to enhance investment efficiency by leaving fewer chances for agency issues like moral hazards and adverse selection by managers and assisting firms in selecting more rewarding projects. These findings are in line with the theoretical underpinnings of agency and signalling theories that managers produce these quality financial reports to shake up the information asymmetry and aid in optimal investment decisions. Moreover, we also find that the positive effect of FRQ on investment efficiency is higher when financial constraints in a firm are high. It is also empirically proved that low managerial risk-taking complements the positive impact of financial reporting quality on investment efficiency. Additionally, the results in the underinvestment scenario confirm the results obtained in the general model of investment efficiency but render insignificant results in the overinvestment situation. This suggests that FRQ is more relevant for reducing under-investment than over-investment and has a stronger effect when financial constraints in a firm are high and managerial risk-taking is low.

These findings enrich the landscape of investment efficiency literature and underscore that higher FRQ yields a significant positive impact on investment efficiency, extending this observation to emerging and frontier markets. Our research adds to the growing body of literature examining the correlation between FRQ and investment efficiency in publicly listed firms (Aldoseri, 2024; Houcine, 2017), particularly highlighting the factors that accentuate the strength of these outcomes in the shape of financial constraints and risk-taking. In particular, our research reveals a compelling similarity between

our results and those obtained in developed markets (e.g., Assad *et al.*, 2023; Biddle *et al.,* 2009; Houcine *et al.*, 2022) that FRQ enhances investment efficiency despite the comparatively lower FRQ in our emerging and frontier market dataset. Moreover, including both common and civil law countries within our sample adds an additional layer of complexity, yet our findings remain consistent with those from developed markets. Furthermore, our study advances the field by investigating two pivotal factors influencing the connection between FRQ and investment efficiency. We demonstrate that the relationship between FRQ and investment efficiency is positively influenced by the presence of higher financial constraints encountered by firms. Additionally, the subdued propensity for managerial risk-taking accentuates the association of FRQ with investment efficiency.

The implications of our findings extend to various parties. Investors can shape their diversification strategies by considering the factors elaborated, while managers may judiciously prioritise their reporting quality and exercise discretion. The study's findings imply that policymakers and regulators should contemplate strengthening financial reporting requirements, thereby enhancing both the legal framework and firm-specific corporate governance mechanisms. Investigating the influence of FRQ on investment efficiency and delving into the pathway of financial constraints and risk-taking, which moderate this influence, can provide management with insights into the economic mechanisms FRQ drives. This understanding could motivate firms to enhance their ethical practices and regulate their conduct, ultimately fostering the effective operation of the market.

However, our research does have certain limitations. To begin with, our selection of FRQ measures incorporates elements of both accrual and real earnings management, aiming for the best available measure. However, the possibility of measurement errors in the proxies used for FRQ and other variables cannot be ruled out. Future research could focus on some operational non-parametric measures (Boubaker *et al.*, 2021) to cater for this limitation. Due to the new, improved proxy of data envelopment analysis (DEA), results rendered may be different in developed, emerging and frontier markets. Also, our FRQ measure may not handle the complexity of the accounting transactions as challenged by the metaverse (Pandey and Gilmour, 2024) and sustainability reporting practices in emerging markets (Al-Qudah and Houcine, 2024). Secondly, the reduced sample size of 24 emerging and frontier markets due to data constraints raises concerns about the generalizability of our results to listed firms across the entire spectrum of emerging and frontier markets. To overcome this restraint, researchers may use alternative financial databases for data extraction or choose manual methods for retrieving data. Thirdly, this study focuses on channels of financial constraints and risk-taking to explore the influence on the connection between FRQ and investment efficiency. Nevertheless, it is

conceivable that the country's legal environment, CSR practices, ESG, and other factors also play a role in the stated relationship. Hence, upcoming research studies could investigate these factors and their potential influence on the relationship between FRQ and investment efficiency. It is plausible that strong CSR and ESG factors might diminish the significance of FRQ due to reduced information asymmetry.

6.0 References

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Sample & Descriptive

Table I: Sample Distribution

Panel A: Across Countries			Panel B: Across Fama & French Industries					
Country	**Firms**	**Obs.**	**Industry**	**Firms**	**Obs.**	**Industry**	**Firms**	**Obs.**
Brazil	75	644	Agric	221	1,631	Coal	60	547
Chile	19	63	Food	512	4,003	Oil	118	888
China	4,027	27,480	Beer	54	396	Util	466	3,711
Croatia	23	102	Toys	85	662	Telcm	151	1,095
Egypt	73	465	Fun	115	729	PerSv	86	393
Greece	79	705	Books	35	193	BusSv	1,093	6,650
India	2,327	13,070	Hshld	341	2,468	Comps	313	2,781
Indonesia	412	3,172	Clths	159	1,150	Chips	1,049	8,777
Jordan	24	90	Hlth	69	464	LabEq	159	1,016
S. Korea	1,735	16,526	MedEq	117	683	Paper	216	1,776
Kuwait	23	175	Drugs	558	4,135	Boxes	28	65
Malaysia	751	7,909	Chems	827	6,240	Whlsl	655	5,163
Mexico	19	45	Rubbr	195	1,329	Rtail	440	3,320
Pakistan	159	1,122	Txtls	402	2,986	Meals	208	1,548
Philippines	80	651	BldMt	641	5,497	RlEst	355	2,315
Poland	220	1,358	Cnstr	1,108	9,313	Fin	19	57
KSA	43	334	Steel	620	5,347	Other	33	149
S. Africa	75	662	FabPr	82	554			
Sri Lanka	92	689	Mach	693	4,890			
Taiwan	1,684	15,658	ElcEq	380	2,649			
Thailand	515	3,687	Autos	449	3,655			
Turkey	181	1,547	Aero	16	121			
UAE	10	97	Ships	9	17			
Vietnam	585	3,746	Mines	95	634			
Total	13,231	99,997				Total	13,231	99,997

Source: Authors' compilation.

Table II: Descriptive Statistics

VARIABLES	N	Mean	SD	Min	Max
Panel A: Continuous Variables					
IE	99,997	-.15	2.12	-743.60	0.0
FRQ_A	98,217	-.239	.477	-80.53	0.0
FRQ_R	99,997	-.505	3.42	-1120.92	0.0
SIZE	99,997	15.24	2.85	4.812	21.99
MB	99,997	1.3	2.39	.044	30.38
CFO	99,997	.152	.351	.01	3.67
SALES	99,997	.848	1.702	0.0	13.04
INVEST	99,997	.055	.361	0.0	29.40
Z-SCORE	99,997	1.09	4.593	-112.02	4.82
TANG	99,997	.324	.227	0.0	.958
LEV	99,997	.151	.212	0.0	.86
IND_LEV	99,997	.168	.066	.036	.322
CFO_SALES	99,997	-.109	2.912	-61.68	1.43
SLACK	99,997	2.16	12.137	0.0	156.09
AGE	99,997	15.63	11.131	0.0	117
OP_CYCLE	99,997	4.22	1.947	-3.30	9.11
CASH	99,997	.084	.116	0.0	.92
Panel B: Dichotomous Variables					
	0		1		
FC_1	41,648	41.6%	58,384	58.3%	
FC_2	45,319	45.3%	54,678	54.7%	
RT_1	68,200	68.2%	31,797	31.8%	
RT_2	67,062	67.1%	32,935	32.9%	
DIVIDEND	32,254	32.2%	67,743	67.8%	
LOSS	82,332	82.3%	17,665	17.7%	

Appendix A provides detailed definitions of all variables.
Source: Authors' creation.

Baseline Results

Table III: Baseline Model – Impact of Financial Reporting Quality on Investment Efficiency

Dependent variable: Investment Efficiency (IE)						
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
FRQ_A	0.0734***		0.1005***		0.0982***	
	(3.8959)		(18.0987)		(17.6431)	
FRQ_R		0.0385***		0.0399***		0.0396***
		(7.8984)		(27.0908)		(26.9234)
SIZE			-0.0369***	-0.0342***	-0.0396***	-0.0374***
			(-29.5495)	(-28.1218)	(-29.8589)	(-28.8011)
MB			-0.0075***	-0.0069***	-0.0079***	-0.0074***
			(-7.3115)	(-6.9138)	(-7.6712)	(-7.3367)
CFO			-0.0229*	-0.0188	-0.0218*	-0.0179
			(-1.9276)	(-1.6316)	(-1.8366)	(-1.5562)
SALES			-0.0190***	-0.0175***	-0.0190***	-0.0175***
			(-8.3555)	(-7.9046)	(-8.3591)	(-7.8900)
INVEST			0.0104*	0.0145***	0.0102	0.0142***
			(1.6793)	(2.8762)	(1.6435)	(2.8273)
Z-SCORE			0.0036***	0.0045***	0.0031***	0.0038***
			(5.5001)	(6.8593)	(4.5483)	(5.6996)
TANG			0.0226**	0.0255***	0.0202**	0.0232**
			(2.3635)	(2.7249)	(2.0845)	(2.4470)
LEV			0.0164	0.0149	0.0231**	0.0234**
			(1.6219)	(1.5048)	(2.2505)	(2.3257)
IND_LEV			-0.0013	-0.0013	0.2298**	0.2104**
			(-1.4921)	(-1.5718)	(2.3181)	(2.1713)
CFO_SALES			0.0000	0.0000	-0.0017**	-0.0018**
			(0.1889)	(0.0026)	(-2.0044)	(-2.1234)
SLACK			0.0006***	0.0005***	0.0002	0.0001
			(3.0862)	(2.8173)	(0.9733)	(0.8025)
AGE			0.0061***	0.0053***	0.0006***	0.0005***
			(5.5423)	(4.9265)	(2.9828)	(2.7170)
DIVIDEND					0.0188***	0.0225***
					(4.4821)	(5.4768)
OP_CYCLE					0.0058***	0.0050***
					(5.1788)	(4.6010)
LOSS					-0.0112**	-0.0111**
					(-2.2784)	(-2.3000)
CASH					-0.0589***	-0.0555***
					(-3.2792)	(-3.1355)
Constant	-0.1312***	-0.1295***	0.4403***	0.3943***	0.4442***	0.4056***
	(-17.3788)	(-20.1251)	(21.6109)	(20.0813)	(16.9261)	(15.9052)
Observations	98,217	99,997	98,217	99,997	98,217	99,997
R-squared	0.1951	0.1534	0.2016	0.2046	0.2020	0.2051
Country/Industry/Year FE	No	No	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Table IV: Conditioning Effect of Financial Constraints and Risk Taking on the Relationship between FRQ and Investment Efficiency

Dependent variable: Investment Efficiency				
Panel A: Conditioning effect of Financial Constraints (FC)				
VARIABLES	(1)	(2)	(3)	(4)
FRQ_A	0.0391***	0.0385***		
	(11.0230)	(10.5540)		
FRQ_R			0.0032***	0.1279***
			(7.2875)	(49.1416)
FC_1	-0.1218**		-0.1027**	
	(-2.2810)		(-2.0807)	
FC_2		-0.0035		-0.0596***
		(-0.2929)		(-5.5176)
$FRQ*FC_1$	0.0786*		0.0281	
	(1.9484)		(0.5989)	
$FRQ*FC_2$		0.0127*		0.1280***
		(1.8380)		(48.5862)
Observations	98,217	98,217	99,997	99,997
R-squared	0.2003	0.2012	0.2992	0.2199
Country/Industry/Year FE	Yes	Yes	No	No
CONTROLS	Yes	Yes	Yes	Yes
Panel B: Conditioning effect of Risk Taking (RT)				
VARIABLES	(1)	(2)	(3)	(4)
FRQ_A	0.0517**	0.0253*		
	(2.4344)	(1.7210)		
FRQ_R			0.0572***	0.0327
			(2.6079)	(1.1150)
RT_1	0.1234***		0.3110***	
	(17.2274)		(45.7191)	
RT_2		0.0842***		0.1678***
		(11.6209)		(25.9722)
$FRQ*RT_1$	-1.0655***		-0.6017***	
	(-57.2755)		(-112.2808)	
$FRQ*RT_2$		-1.0649***		-0.6459***
		(-59.2829)		(-115.0699)
Observations	98,217	98,217	99,997	99,997
R-squared	0.2311	0.2352	0.3018	0.3018
Country/Industry/Year FE	Yes	Yes	No	Yes
CONTROLS	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Additional Analysis

Table V: Over- and Under-Investment Analysis along with Conditioning Effect of Financial Constraints and Risk Taking

Dependent variable	Under_Inv			Over_Inv			Under_Inv			Over_Inv		
Panel A: Conditioning effect of FC												
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FRQ_A	0.4350***	0.4249***	0.4253***	0.0120**	0.0119**	0.0122**						
	(41.1398)	(7.2922)	(7.3177)	(2.4830)	(2.4832)	(2.4709)						
FRQ_R							0.030***	0.0546***	0.0675***	0.0135***	0.0135***	0.0498**
							(7.4649)	(32.5925)	(36.4491)	(3.7844)	(3.7742)	(2.1507)
FC_1		-0.0899			-0.1025			-0.0131			-0.0858	
		(-0.7110)			(-1.2628)			(-0.1674)			(-0.8020)	
FC_2			-0.0661***			-0.0265			-0.0094			-0.0114
			(-3.0335)			(-0.6723)			(-0.5223)			(-0.9530)
$FRQ*FC_1$		0.0697			0.0540			0.1807**			0.0611	
		(0.5301)			(0.8693)			(2.2148)			(1.2673)	
$FRQ*FC_2$			0.0039***			0.0005			0.0072***			0.0354
			(3.4830)			(0.7293)			(16.7879)			(1.4574)
Observations	36,149	34,951	34,951	60,714	60,714	60,714	36,785	36,785	36,785	58,253	58,253	61,775
R-squared	0.2397	0.1929	0.1932	0.2641	0.2648	0.2653	0.1608	0.2255	0.2312	0.2463	0.2475	0.2802
Panel B: Conditioning effect of RT												
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FRQ_A	-	0.0897***	0.0448***	-	0.0109**	0.0107**	-			-		
	-	(4.0108)	(2.6901)	-	(2.5356)	(2.5419)	-			-		
FRQ_R	-			-			-	0.0109***	0.0234	-	0.0118***	0.0106***
	-			-			-	(7.8712)	(0.1611)	-	(3.6860)	(4.6344)
RT_1	-	0.0297		-	0.0628		-	0.0905***		-	0.0586	
	-	(1.5090)		-	(1.4453)		-	(11.4634)		-	(0.6828)	
RT_2	-		0.1123***	-		0.0666	-		0.1917***	-		0.0565
	-		(6.0908)	-		(0.7379)	-		(24.4383)	-		(1.3427)
$FRQ*RT_1$	-	-1.0270***		-	-0.2540		-	-0.7530***		-	-0.1322	
	-	(-15.7174)		-	(-0.8609)		-	(-141.1855)		-	(-1.5009)	
$FRQ*RT_2$	-		-1.0469***	-		-0.2804	-		-0.8192***	-		-0.0994
	-		(-16.9121)	-		(-1.3058)	-		(-181.5529)	-		(-0.4398)
Observations	-	34,951	34,951	-	60,714	60,714	-	36,785	36,785	-	58,253	61,775
R-squared	-	0.2525	0.2741	-	0.2692	0.2705	-	0.5054	0.6092	-	0.2524	0.2761
Regression framework for both panel A and B												
Country/Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CONTROLS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Robustness Checks

Table VI: Robustness Check – Alternative Measure of Baseline Models with Conditioning Effect of Financial Constraints and Risk-Taking

Panel A: Alternative Measures of IE

Dependent variable: Investment Efficiency (IE_C)

	Financial Constraints (FC)				Risk Taking (RT)			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FRQ_A	0.8388**	2.0102**			1.3797**	1.8207**		
	(2.2259)	(2.2746)			(2.3530)	(2.2547)		
FRQ_R			1.1222**	1.4333*			0.8797	0.9516***
			(2.5432)	(1.6996)			(1.5013)	(2.5723)
FC_1	-15.5356**		-11.5144					
	(-1.9702)		(-0.1989)					
FC_2		-10.7424*		-9.9229*				
		(-1.7376)		(-1.9026)				
RT_1					1.2577**		3.1295*	
					(2.2240)		(1.7403)	
RT_2						1.1772**		0.1719
						(2.1321)		(1.0232)
$FRQ*FC_1$	0.8844**		5.9096					
	(2.1914)		(1.1088)					
$FRQ*FC_2$		10.3568**		0.0672**				
		(2.5043)		(2.1193)				
$FRQ*RT_1$					-7.1218*		-0.9244	
					(-1.8396)		(-0.1185)	
$FRQ*RT_2$						-11.1507**		-0.6308**
						(-2.4848)		(-2.0913)
Observations	93,725	93,725	91,276	96,214	93,725	93,725	95,628	99,997
R-squared	0.2155	0.2643	0.2121	0.2178	0.2156	0.2605	0.2132	0.2281

Panel B: Alternative Measures of FRQ

Dependent variable: Investment Efficiency (IE)

	FRQ_K				FRQ_{DR}			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FRQ	0.1769***	0.1286***	0.1550***	0.1419***	0.0117**	0.0110**	0.0751*	0.0635***
	(16.7717)	(6.3583)	(15.0414)	(13.8215)	(2.1445)	(2.0720)	(1.7339)	(2.6207)
FC_1	-0.0230**				-0.0040			
	(-2.3211)				(-0.0825)			
FC_2		-0.0139				-0.0162		
		(-1.2490)				(-1.3589)		
RT_1			0.0852***				0.0838***	
			(7.8144)				(11.8292)	
RT_2				0.0159				0.1210***
				(1.3706)				(17.0417)
$FRQ*FC_1$	0.2697***				0.0078**			
	(3.6877)				(2.0217)			
$FRQ*FC_2$		0.1025**				0.2396**		
		(2.1693)				(2.3409)		
$FRQ*RT_1$			-0.5736***				-0.9602***	
			(-7.1922)				(-14.9588)	
$FRQ*RT_2$				-0.9364***				-1.0103***
				(-12.3849)				(-16.4889)
Observations	95,509	95,509	95,509	95,509	95,942	95,942	95,456	95,456
R-squared	0.2806	0.2624	0.2910	0.2324	0.2591	0.2582	0.2661	0.2697

Panel C: Alternative Measures of both IE and FRQ

Dependent variable: Investment Efficiency Based on Chen Model (IE_C)

	FRQ_K				FRQ_{DR}			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FRQ	1.8508*	1.9900*	0.0130	0.0981**	1.3435	1.9400**	1.2549	1.1997**
	(1.9325)	(1.8306)	(1.4153)	(2.3126)	(1.3267)	(2.3133)	(1.3171)	(2.3154)
FC_1	-11.1691**				-3.2170**			
	(-2.3418)				(-2.0969)			
FC_2		-1.8946				-3.2057		
		(-1.0352)				(-0.0904)		

RT_1			0.0420**				3.3913**	
			(2.1354)				(2.1635)	
RT_2				0.0495				4.9029
				(1.2458)				(2.2348)
$FRQ*FC_1$	1.8506**				4.0986**			
	(2.2685)				(2.0327)			
$FRQ*FC_2$		2.6486				4.5100*		
		(1.4067)				(1.7461)		
$FRQ*RT_1$			-0.0976**				-3.1426**	
			(-2.4161)				(-2.1781)	
$FRQ*RT_2$				-0.1946*				-3.5935**
				(-1.8626)				(-2.2009)
Observations	98,064	98,064	95,790	95,790	99,997	99,997	99,997	99,997
R-squared	0.2178	0.2263	0.2128	0.2483	0.2854	0.2436	0.2481	0.2352
Regression framework for both panel A, B and C								
Country/Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CONTROLS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Endogeneity Concerns

Table VII: 2SLS Estimator for Addressing Endogeneity

	Stage 1	Stage 2			
VARIABLES	FRQ_T	IE	IE	IE	IE
	(1)	(2)	(3)	(4)	(5)
COM	0.2032***				
	(19.2767)				
FRQ_H		0.0251	0.0298*	0.0180	0.0123*
		(1.1365)	(1.8037)	(0.8131)	(1.9098)
FC_1		-0.0366			
		(-0.4705)			
FC_2			-0.1252***		
			(-4.6297)		
RT_1				0.0798***	
				(5.9105)	
RT_2					0.0933***
					(7.0808)
FRQ_H*FC_1		0.0326**			
		(2.4415)			
FRQ_H*FC_2			0.1561***		
			(4.6466)		
FRQ_H*RT_1				-0.3068***	
				(-17.9272)	
FRQ_H*RT_2					-0.3855***
					(-23.2567)
Observations	99,997	95,995	93,160	95,995	93,160
Shea's partial R-sq	0.1934				
Sargan Chi-sq	0.1587				
Prob > Chi-sq	0.6723				
R-Squared	0.2329	0.2594	0.2994	0.2674	0.2770
CONTROLS	Yes	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Appendix A: Variables, Symbols and Definitions

Variable	Symbol	Definition
Dependent Variable		
Investment Efficiency	IE	The measure for investment efficiency based on sales growth opportunity model (Biddle et al., 2009). $$Invest_{j,t} = \alpha + \beta_1 SG_{j,t-1} + \varepsilon_{j,t}$$ Where $Invest_{j,t}$ is total of investments in firm j in year t, which is net increase in fixed & intangible assets scaled by assets total, and $SG_{j,t-1}$ is the change in sales from year t-2 to t-1. More difference between predicted and actual investment figures means more inefficiency in investment. The deviation may be positive or negative and considered as over- and under-investment, respectively. Measure of investment efficiency is set by finding out the residual value in absolute terms from the equation above multiplied by -1, so that the higher values mean more investment efficiency.
Independent/Test Variables		
Financial Reporting Quality	FRQ_A	Proxy for measuring financial reporting quality based on modified discretionary accrual Jones model (Dechow et al., 1995). Specifically, the study will firstly estimate the below mentioned cross sectional model for each FF-48 industry categories, every year from 1998 to 2022, having at least 20 observations: $$\frac{TACC_{j,t}}{TA_{J,t-1}} = \alpha\left(\frac{1}{TA_{J,t-1}}\right) + \beta 1\left(\frac{\Delta Sales_{j,t} - \Delta REC_{j,t}}{TA_{J,t-1}}\right) + \beta 2\left(\frac{PPE_{j,t}}{TA_{J,t-1}}\right) + \varepsilon_{j,t}$$ Where: $TACC_{j,t}$= total accruals for firm j or income before extraordinary items minus cashflow from operating activities adjusted for extraordinary items and discontinued operations. $TA_{J,t-1}$= the total assets at start of the year for firm j. $\Delta Sales_{j,t}$= change in sales from previous year for firm j. $\Delta REC_{j,t}$= change in receivables from previous year for firm j. $PPE_{j,t}$= total property, plant and equipment value firm j has for FF-48 industry categories. On the basis of estimated coefficients from the equation above, the residuals from the regression model are discretionary accruals ($DA_{j,t}$). In our tests, we use the absolute values of discretionary accruals as a proxy for FRQ. We multiply the absolute values of discretionary accruals by -1x($DA_{j,t}$) to get the first measure denoted as FRQ_{AEM}. Thus, higher values of FRQ_A represent higher financial reporting quality.
	FRQ_R	Second proxy for measuring financial reporting quality based on real earnings management (REM) model of Roychowdhury (2006). Specifically, this study first estimates undermentioned cross sectional regressions for each FF-48 industries, for each year having at least 20 observations. $$\frac{CFO_{j,t}}{TA_{j,t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{TA_{j,t-1}}\right) + \alpha_2\left(\frac{Sales_{j,t}}{TA_{j,t-1}}\right) + \alpha_3\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t}$$ Where: $CFO_{j,t}$= cash flow from normal business operations. $TA_{j,t-1}$ = total assets for firm j at start of the year. $Sales_{jt}$= sales total of company j. $\Delta Sales_{jt}$= the change in sales for firm j. $$\frac{PROD_{j,t}}{TA_{j,t-1}} = \alpha_1\left(\frac{1}{TA_{j,t-1}}\right) + \alpha_2\left(\frac{Sales_{j,t}}{TA_{j,t-1}}\right) + \alpha_3\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + \alpha_4\left(\frac{\Delta Sales_{j,t-1}}{TA_{j,t-1}}\right) + \varepsilon_{j,t}$$ Where: $PROD_{j,t}$=the sum of cost of goods sold and the change in inventories $PROD_{j,t} = COGS_{j,t} + (INVT_{j,t} - INVT_{j,t-1})$ $TA_{j,t-1}$, $Sales_{jt}$, $\Delta Sales_{jt}$, and $\Delta Sales_{jt-1}$ are as defined above. $\frac{DISX_{j,t}}{TA_{j,t-1}} = \alpha_0\left(\frac{1}{TA_{j,t-1}}\right) + \alpha_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t}$ Where: $DISX_{j,t}$= the discretionary expenses in firm j for year t, which is sum of the R&D, advertising, and SG&A expenses. Unusual operating cashflows, production costs, and discretionary expenses are calculated from the residuals of above stated three equations. For capturing effects of REM, residual from all three are added to formulate an aggregate REM measure. Low operating cashflows and discretionary expenditures normally are associated with REM. For that reason, following prior literature, operating cashflows and discretionary expenses are multiplied by -1, so that relationship with REM becomes positive (Cohen & Zarowin, 2010; Zang, 2012).

		We multiply the absolute values of aggregated REM measure by -1 to get the second measure denoted as FRQ_R. Thus, higher values of FRQ_R represent higher financial reporting quality.
	FRQ_T	Finally, FRQ_{AEM} and FRQ_{REM} are added to come up aggregate measure of financial reporting quality (FRQ_T) based on overall earnings management by AEM and REM.
Conditioning Variables		
Financial Constraints	FC_1	The first measure of financial constraints is calculated from KZ index which was originally developed by Kaplan and Zingales (1997) on the basis of firm classification made by Fazzari et al. (1988). Baker et al. (2003) proposed modification in KZ index as reproduced below: $KZ\ Index_{i,t} = -1.002 \times CF_{i,t} + 3.139 \times Lev_{i,t} - 39.368 \times Div_{i,t} - 1.315 \times Cash_{i,t}$ Where, $CF_{i,t}$ is firms' EBIT divided by opening total assets, $Lev_{i,t}$ is total debt divided by total assets of last year, $Div_{i,t}$ is total dividends disbursed scaled by opening total assets, and $Cash_{i,t}$ is total cash & cash equivalents divided by opening total assets. Higher values of KZ index signify more constraints. The score of KZ index is segregated into a dummy variable (FC_1) of above median (having value '1') and below median (having value '0'), where firms above median represents financially constrained firms, and below median show firms which are less financially constrained.
	FC_2	The second measure for financial constraints is based on WW Index following Whited and Wu (2006) to identify financially constrained firms. In particular, WW index in mathematical form is as under: $WW\ Index_{i,t} = -0.091x\ CF_{i,t} - 0.062 \times Div_{i,t} + 0.021 \times Lev_{i,t} - 0.044 \times Size_{i,t} + 0.102 \times ISG_{i,t} - 0.035 \times SG_{i,t}$ Where, $CF_{i,t}$ is firms' EBIT divided by opening total assets, $Div_{i,t}$ is an indicator variable which is 1 for firm paying dividends in cash, and 0 otherwise, $Lev_{i,t}$ is total debt by assets total, $Size_{i,t}$ is the natural logarithm of assets total, $ISG_{i,t}$ is sales growth of industry, and $ISG_{i,t}$ sales growth of the firm. Higher values of WW index signify more constraints. The score of WW index is segregated into a dummy variable (FC_2) of above median (having value '1') and below median (having value '0'), where firms above median represents financially constrained firms, and below median show firms which are less financially constrained.
Risk Taking	RT_1	The first measure of risk taking (RT) is employed by following prior literature (e.g., Faccio, Marchica & Mura, 2011; John et al., 2008; Meng et al., 2023). Specifically, we utilized volatility of earnings of a firm as proxy for measuring risk taking. Return on assets is used for measuring earnings, which is considered as operational measure of RT. Variation in ROA for each sample firm is calculated by 5-years average observation during sample period. By this risk taking, denoted as RISK, is measured by taking standard deviation; $$RISK1 = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}(ROA_{i,t} - \frac{1}{T}\sum_{t=1}^{T} ROA_{i,t})^2}, \quad |T = 5.$$ Where, $ROA_{i,t} = EBIT_{i,t}/TA_{i,t}$ Higher values of these RISK1 signify that firm have more risk taking. The score of RISK1 measure is segregated into a dummy variable (RT_1) of above median (having value '1') and below median (having value '0'), where firms above median represent more risk taking firms, and below median show firms which are having less characteristics of risk taking.
	RT_2	The second proxy for measuring RT is based on Guo (2023) and Liu and Wu (2023), and used the difference between the maximum and minimum $ROA_{i,t}$ values for each firm in each observation period (every consecutive three years) to represent the risk taking (RT_2), as shown in below; $RISK2 = Max\ (ROA_{i,t}) - Min\ (ROA_{i,t})$ Higher values of these RISK2 signify that firm have more risk taking. The score of RISK2 measure is segregated into an indicator variable (RT_2) of above median (having value '1') and below median (having value '0'), where above median show more risk taking firms, and firms below median represent firms who have less risk taking tendencies.

Variables for Additional Analysis and Robustness Checks		
Investment Efficiency based on Chen Model	IE_C	The measure we use an alternative proxy for the expected level of investment using Chen et al. (2011) model. $Invest_{j,t} = \alpha + \beta_1 SG_{j,t-1} + \beta_2 NG_{j,t-1} + \beta 3 SG_{j,t-1} * NG_{j,t-1} + \varepsilon_{j,t}$ where $NG_{j,t-1}$ is an indicator variable which has the value of 1 when sales growth is negative, and 0 otherwise. Other variables are as defined earlier.
Over Investment	Over_Inv	Overinvestments is represented by positive residuals in the Biddle's investment efficiency model presented above. In overinvestment scenario, the dependent variable, the positive residuals are multiplied by -1 so that the higher values, i.e., close to zero, show higher investment efficiency.
Under Investment	Under_Inv	Underinvestment is represented by negative residuals in the Biddle's investment efficiency model presented above. For the underinvestment scenario, the negative residuals' higher values, i.e., close to zero, imply lower underinvestment and higher investment efficiency.
Financial Reporting Quality based on Kothari Model	FRQ_K	The first alternative measure for FRQ is discretionary accruals (DA) model of Kothari et al. (2005). More precisely, we estimate following equation by country and for each industry with a minimum of 10 observations: $TAc_{j,t} = \alpha_0 + \alpha_1\left(\frac{1}{TA_{j,t-1}}\right) + \alpha_2\left(\frac{\Delta Rev_{j,t}}{TA_{J,t-1}}\right) + \alpha_3\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right) + \alpha_4(ROA_{j,t}) + \varepsilon_{j,t}$ Where: $TAc_{j,t}$= total accruals for firm j in year t. $\Delta Rev_{j,t}$= change in revenues from previous year for firm j. $ROA_{j,t}$ is return on assets for firm j at year t. Other variables are as already defined. The residuals obtained from the above equation serve as an estimation of DA. To represent higher $FRQ_{Kothari}$, we apply a multiplication of -1 to the absolute values of DA.
Financial Reporting Quality based on Discretionary Revenue Model	FRQ_{DR}	Our second alternative measure for FRQ is the model of McNichols and Stubben (2008), in which discretionary revenues (DR) are used for AEM measurement. Specifically, we run the following model; $\Delta AR_{j,t} = \alpha + \beta_1 \Delta Rev_{j,t} + \varepsilon_{j,t}$ Where $\Delta AR_{j,t}$ annual change in accounts receivables, and $\Delta Rev_{j,t-1}$ is the annual change in sales revenue. DR are the residuals calculated from this model and represents that changes in accounts receivable which are not described by revenues growth. The measure for FRQ_{DR} is the absolute value of the residuals multiplied by -1*(DR). Thus, greater values specify higher FRQ_{DR}.
Instrumental Variable for 2SLS Regression	COM	Our instrumental variable (COM) is based on common and civil law classification of our 24 emerging and frontier markets, which equals '1' for common law countries and '0' for civil law countries.
Control Variables		
Size	SIZE	The logarithm of total assets
Market to Book value	MB	Market value divided by book value of total assets
Std. dev. of CFO	CFO	Std. dev. of operating cashflows scaled by average of five years (t-5 to t-1) total assets.
Std. dev. of sales revenue	SALES	Std. dev. of sales scaled by average of five years (t-5 to t-1) total assets.
Std. dev. of total investments	INVEST	Std. dev. of investment (Investments, Capital, and Non-Capital exp) from years t-5 to t-1.

Z-Score	Z-SCORE	Total of 3.3∗Income before tax/Assets, Sales/Asset, 0.25∗RE/Assets, 0.5∗W. Capital/Assets
Tangibility	TANG	Property, plant & equipment (PPE) divided by total assets
K-Structure	LEV	Long-term debt divided by sum of long-term loan to market value of equity.
Industry K-Structure	IND_LEV	Avg. K-structure of firms in the industry having same SIC3 code.
CFO sale	CFO_SALES	EBIT divided by sales
Slack	SLACK	Cash & cash short-term investments divided by PPE
Dividend	DIVIDEND	Dummy which is 1 if company paid dividend in a given year, and 0 otherwise.
Age	AGE	Difference of the current year and the first year appearance of the company in Refinitiv Eikon DataStream.
Operating Cycle	OP_CYCLE	Logarithm of accounts receivables divided by sales, plus inventory divided by CGS, whole into 360.
Loss	LOSS	A dummy variable which is denoted as 1 if net EBIT is negative, and 0 otherwise.
Cash	CASH	Cash divided by total assets.

Source: Authors' compilation.

Appendix B: Sample Selection Procedure

	Numbers
MSCI Emerging and Frontier Markets Classification Countries	52
Emerging and Frontier Markets Countries data availability in Refinitiv Eikon DataStream	47
Emerging and Frontier Markets Countries data availability for main regression analysis	24
Firm-year observations of publicly listed firms	517,567
Firms-years observations with missing data	417,570
The sample size for the main regression analysis (H1, H2 & H3)	99,997

Source: Authors' compilation.

Appendix C: Correlation Matrix

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
(1) IE	-											
(2) FRQ_T	*0.014*	(1.25)										
(3) FRQ_A	0.007	0.483	(1.26)									
(4) FRQ_R	0.013	0.991	*0.182*	(1.25)								
(5) FC_1	-0.002	*-0.009*	*-0.035*	-0.005	(1.36)							
(6) FC_2	-0.003	*-0.056*	*-0.031*	*-0.053*	*0.014*	(1.25)						
(7) RT_1	*0.053*	*0.006*	*0.059*	-0.002	*0.005*	0.046	(1.45)					
(8) RT_2	*0.057*	0.004	*0.057*	-0.004	*0.005*	0.044	*0.928*	(1.46)				
(9) SIZE	*0.043*	*0.018*	*0.112*	0.005	*-0.04*	0.058	*0.653*	*0.676*	(1.11)			
(10) MB	*-0.041*	*-0.071*	*-0.062*	*-0.066*	*0.09*	0.009	*-0.085*	*-0.085*	*-0.179*	(1.21)		
(11) CFO	*0.045*	*-0.066*	*-0.066*	-0.06	*0.108*	0.022	*0.04*	*0.04*	*-0.133*	*0.23*	(1.96)	
(12) SALES	*0.033*	*-0.029*	*-0.061*	*-0.022*	*0.067*	0.025	*0.072*	*0.071*	*-0.086*	*0.141*	*0.733*	(1.85)
(13) INVEST	*-0.226*	0.0	*-0.009*	0.0	*0.01*	0.0	*-0.012*	*-0.012*	*-0.025*	*0.009*	*0.055*	0.003
(14) Z-SCORE	*0.083*	*0.012*	*0.081*	0.004	*-0.326*	-0.019	*0.022*	*0.022*	*0.138*	*-0.306*	*-0.273*	*-0.138*
(15) TANG	*0.01*	*0.044*	*0.098*	*0.032*	-0.001	0.049	*0.034*	*0.03*	*0.071*	*-0.113*	*-0.024*	*-0.066*
(16) LEV	*0.022*	*0.016*	*0.023*	*0.013*	*0.038*	0.048	*0.119*	*0.12*	*0.18*	*-0.269*	*-0.06*	*-0.067*
(17) IND_LEV	*0.005*	*0.017*	*0.008*	*0.015*	-0.001	0.087	*0.062*	*0.062*	*0.057*	*-0.145*	*-0.01*	*-0.01*
(18) CFO_SALES	0.001	*0.01*	*0.041*	*0.005*	*-0.074*	-0.01	*0.021*	*0.018*	*0.056*	*-0.081*	*-0.05*	*-0.011*
(19) SLACK	-0.002	*-0.05*	*-0.071*	*-0.043*	*0.003*	-0.011	*-0.03*	*-0.029*	*-0.063*	*0.068*	*0.026*	*0.021*
(20) DIVIDEND	0.002	*0.029*	*0.093*	*0.017*	*-0.014*	0.07	*0.132*	*0.11*	*0.221*	*-0.013*	*-0.106*	*-0.076*
(21) AGE	0.002	*0.025*	*0.043*	0.02	*0.014*	0.064	*0.148*	*0.108*	*0.105*	*-0.106*	*0.038*	*0.059*
(22) OP_CYCLE	*0.03*	*0.024*	*0.031*	*0.02*	*-0.018*	-0.037	*-0.019*	*-0.025*	*0.027*	*-0.061*	*-0.056*	*-0.064*
(23) LOSS	*-0.006*	*-0.01*	*-0.053*	-0.003	*0.074*	0.032	*0.009*	*0.006*	*-0.094*	*0.008*	*0.032*	*-0.022*
(24) CASH	0.001	*-0.01*	*-0.011*	*-0.008*	*0.01*	-0.044	*-0.053*	*-0.049*	*-0.086*	*0.16*	*0.052*	*0.039*
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(13) INVEST	(1.02)											
(14) Z-SCORE	*-0.017*	(1.27)										
(15) TANG	*0.029*	*-0.051*	(1.23)									
(16) LEV	*0.017*	*-0.072*	*0.3*	(1.39)								
(17) IND_LEV	*0.009*	*-0.039*	*0.197*	*0.302*	(1.18)							
(18) CFO_SALES	*-0.005*	*0.253*	*0.019*	*0.002*	*0.018*	(1.09)						
(19) SLACK	-0.003	*-0.014*	*-0.224*	*-0.053*	-0.001	*-0.037*	(1.11)					
(20) DIVIDEND	*-0.003*	*0.135*	*-0.004*	*-0.103*	*-0.055*	*0.084*	*-0.059*	(1.21)				
(21) AGE	*0.016*	*-0.033*	*0.157*	*0.15*	*0.129*	*0.013*	*-0.068*	*0.295*	(1.07)			
(22) OP_CYCLE	*-0.017*	*0.025*	*-0.065*	*0.074*	0.0	*-0.015*	*-0.081*	*0.029*	*0.091*	(1.07)		
(23) LOSS	*0.006*	*-0.241*	*0.053*	*0.1*	*-0.02*	*-0.216*	*0.025*	*-0.032*	*0.13*	*-0.015*	(1.25)	
(24) CASH	*-0.013*	*-0.029*	*-0.268*	*-0.22*	*-0.171*	*-0.04*	*0.298*	*-0.007*	*-0.163*	*-0.138*	*0.006*	(1.21)

Appendix A provides detailed definitions of all variables.
The VIF values are presented diagonally in parenthesis.
The underlined figures represent significance at a minimum 10% level.
Source: Authors' creation.

Appendix D: Split Sample Analysis

Dependent variable: Investment Efficiency

	Panel A: China, India, South Korea, and Taiwan				**Panel B:** Others			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FRQ_A	0.1521***	0.1548***			0.1144***	0.1258***		
	(8.8012)	(8.7913)			(4.5347)	(4.1586)		
FRQ_R			0.2076***	0.2077***			0.0154***	0.0203***
			(110.7435)	(110.6922)			(6.6492)	(7.8817)
FC_1	-0.0419		-0.0247		-0.0501		-0.0436	
	(-0.8767)		(-0.7802)		(-0.3846)		(-0.4148)	
FC_2		-0.0294***		-0.0631***		-0.0621*		-0.0270***
		(-4.5200)		(-4.7079)		(-1.6542)		(-3.7194)
$FRQ*FC_1$	0.0123**		0.1294***		0.0930*		0.1269**	
	(1.9643)		(4.7262)		(1.7195)		(2.2283)	
$FRQ*FC_2$		0.1491***		0.1005***		0.0913*		0.0654***
		(6.7098)		(4.3859)		(1.7139)		(3.1928)
Observations	72,734	72,734	72,734	72,734	27,263	27,263	27,263	27,263
R-squared	0.2661	0.2663	0.4123	0.4122	0.2319	0.2320	0.2659	0.2663

Dependent variable: Investment Efficiency

	Panel C: China, India, South Korea, and Taiwan				**Panel D:** Others			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FRQ_A	0.0543***	0.0342***			0.0372***	0.0371***		
	(6.6241)	(7.0543)			(3.0030)	(2.9949)		
FRQ_R			0.0691***	0.0294***			0.0026	0.0012
			(41.9465)	(19.5999)			(1.1380)	(0.5081)
RT_1	0.1353***		0.2496***		-0.0306		0.0640***	
	(14.7642)		(81.4044)		(-0.9945)		(3.7817)	
RT_2		0.1002***		0.2346***		0.0657**		0.0214
		(11.7392)		(86.1573)		(2.0941)		(1.2490)
$FRQ*RT_1$	-0.9066***		-0.6473***		-1.1300***		-0.5190***	
	(-20.4354)		(-190.4949)		(-11.2273)		(-38.7822)	
$FRQ*RT_2$		-0.9539***		-0.7046***		-1.1111***		-0.5354***
		(-21.7411)		(-246.1904)		(-11.2433)		(-41.7020)
Observations	72,734	72,734	72,734	72,734	27,263	27,263	27,263	27,263
R-squared	0.3184	0.3360	0.6359	0.7120	0.2567	0.2581	0.3030	0.3094
Regression framework for both panel A, B, C and D								
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CONTROLS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Appendix E: Aggregate measure of FRQ and its Relationship with Investment Efficiency along with Conditioning Effect of Financial Constraints and Risk Taking

Dependent Variable: Investment Efficiency (IE)					
VARIABLES	(1)	(2)	(3)	(4)	(5)
FRQ_T	0.0329***	0.0037***	0.0822***	0.0572***	0.0482**
	(26.5602)	(8.5902)	(42.2975)	(2.6079)	(2.4843)
FC_1		-0.1237**		-0.1237**	
		(-2.2839)		(-2.2839)	
FC_2			-0.0546***		-0.0546***
			(-5.0255)		(-5.0255)
RT_1				0.3110***	
				(45.7191)	
RT_2					0.2781***
					(41.3020)
FRQ_T *FC_1		0.0360		0.0360	
		(1.0164)		(1.0164)	
FRQ_T *FC_2			0.0823***		0.0823***
			(41.3972)		(41.3972)
FRQ_T *RT_1				-0.6017***	
				(-112.2808)	
FRQ_T *RT_2					-0.6174***
					(-123.4808)
Observations	99,997	99,997	99,997	99,997	99,997
R-squared	0.2050	0.2994	0.3145	0.3018	0.3220
Country/Industry/Year FE	Yes	Yes	Yes	Yes	Yes
CONTROLS	Yes	Yes	Yes	Yes	Yes

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.

Appendix F: System GMM Analysis

	System GMM			
VARIABLES	IE	IE	IE	IE
	(1)	(2)	(3)	(4)
FRQ_T	0.0513***	0.0616***	0.0075**	0.0080**
	(2.6242)	(2.6931)	(2.3849)	(2.4156)
FC_1	-0.1042***			
	(-2.6724)			
FC_2		-0.0881*		
		(-1.6870)		
RT_1			0.2650***	
			(12.5408)	
RT_2				0.2361***
				(11.9283)
FRQ_H*FC_1	0.0065**			
	(2.2404)			
FRQ_H*FC_2		0.0373***		
		(3.4437)		
FRQ_H*RT_1			-0.6020***	
			(-20.6596)	
FRQ_H*RT_2				-0.6159***
				(-22.7172)
Observations	99,997	99,997	99,997	99,997
R-squared	0.1704	0.0717	0.1764	0.1980
CONTROLS	Yes	Yes	Yes	Yes
Wald Chi-sq	8,631.62	8,799.88	12,559.06	15,403.66
Prob > Chi-sq	0.0000	0.0000	0.0000	0.0000

Appendix A provides detailed definitions of all variables.
The t-statistics are clustered at the firm level.
*, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' creation.