-RESEARCH ARTICLE-

THE INTERACTION BETWEEN ACCOUNTING FRAUD AND FINANCIAL PERFORMANCE INDICATORS IN EXPLAINING STOCK PRICE CRASH RISK: EVIDENCE FROM COMMERCIAL BANKS

Zenab Isam Abdulkareem AlAdwani

PhD Student Department of Accounting, Faculty of
Administrative Sciences and Economics, University of Isfahan,
Isfahan, Iran
ORCID: https://orcid.org/0009-0005-7330-4878
Email: zenab.aladwani@ase.ui.ac.ir

Naser Izadinia *

Department of Accounting, Faculty of Administrative Sciences
and Economics, University of Isfahan, Isfahan, Iran
ORCID: https://orcid.org/0000-0002-5033-6026
Email: N.izadinia@ase.ui.ac.ir

Narges Hamidian

Department of Accounting, Faculty of Administrative Sciences
and Economics, University of Isfahan, Isfahan, Iran
ORCID: https://orcid.org/0000-0002-1063-6403
Email: mailto:n.hamidian@ase.ui.ac.ir

Corresponding author: N.izadinia@ase.ui.ac.ir

─Abstract─

This study aims to explore the joint effect of accounting fraud and financial performance indicators on the crash risk of stock price for the banking industry. This study considers a dataset of 11 banks traded on the Tehran Stock Exchange and 6 banks traded on the Iraqi Stock Exchange for a period of 2015-2023. This study uses the discretionary accruals method to represent accounting fraud to measure the effect of crash risk of stock price. This study considers the NCSKEW and DUVOL methods to represent crash risk of stock price. This study finds that accounting fraud has a

strong positive impact on crash risk of stock price for the respective country datasets. This study finds evidence that supports the concept of the existing bad news hoarding theory for banks. This study finds that accounting fraud affects crash risk of stock price to a higher level for Iraqi banks than Iranian banks. This confirms that institutional differences impact accounting fraud for crash risk of stock price datasets. This study considers control variables to develop a theoretical conceptual framework for better understanding of crash risk of stock price. This study finds that crash risk of stock price to a lower level for banks with higher size, age, and profits. This study finds that banks with higher leverage indicate a higher probability for crash risk of stock price. This study validates the analysis by utilizing the Beneish M-Score method to represent accounting fraud for crash risk of stock price. This study considers a CRASH dummy test to validate the analysis. This study contributes to the existing crisis theory for crash risk of stock price for banking industry by identifying three key points. First, this study introduces a theoretical concept that banking industry institutions impact accounting fraud for crash risk of stock price theory to advance future crisis theory for banking industry study requirements. This study explains that a banking industry study should focus on safety enforcement to develop transparency to enhance audit quality to develop banking industry stability for developing countries like Iraq for banking industry crisis theory. This study introduces a warning message to stakeholders to demand awareness to demand carefulness to demand prudence to demand caution while analyzing banking industry profits that banking industry profits induce for developing country crisis theory for banking industry. Taken together, the results contribute to a better understanding of the impact of accounting fraud on emerging market economies with respect to financial system integrity.

INTRODUCTION

Financial sustainability and integrity remain a concern for financial experts, regulators of financial institutions, and financial investors. Among these emerging trends and ideas, the crash risk of stock returns remains a concern that is of paramount importance to sustainability and integrity within the financial sector. Stock return crash risk refers to the sudden drastic fall of stock returns to a plummeting effect that culminates in the degradation of investor funds in financial institutions and financial integrity with financial markets. In a transitional country, the financial market uses banks as the primary tool of capital intermediation; therefore, it remains of paramount importance to understanding the crash risk of stock returns for a transitional country. Iran's financial markets, for instance, depend on commercial banks for financial activities; banks operate on a twofold paradigm that involves allocating funds from deposits to economical investments; however, banks are immensely susceptible to any

existing threat that may impinge upon their stability within financial markets.

Among the core areas covered within this framework is accounting fraud and earnings management. Financial reports act as the key conduit between the firm and its stakeholders. Where managerial flexibility translates to intentional misrepresentation in financial reports, the resultant implications for bank performance and risk exposure become distorted. Such activities remain hidden for an extended period, only to eventually result in dramatic stock price crashes. All these can be demonstrated using the theoretical perspective offered by information incongruity between managers and shareholders, where financial fraud remains temporarily disguised behind fiscal strength only to eventually meet its demise in terms of a loss in value eventually experienced by the firm. Existing studies on stock price crash risk use a fairly restricted number of explanatory factors within their research frameworks. Performance factors, together with any structural perspectives associated with banks, also remain influenced by crash risk factors. Some key performance factors associated with banks, such as profitability (ROA), debt levels, size, and growth opportunities, remain influenced by financial fraud, in terms of either perpetuating any existing risks associated with such banks or otherwise aiding in alleviating any proposed concerns associated with these factors in banks. That is, if a bank is facing financial squeezes in terms of financial profitability yet a high debt level is experienced, it is likely to ultimately suffer more in terms of consequent stock market outcomes associated with financial fraud in comparison to a medium-sized bank with an enhanced capability to counteract any financial fraud perpetrated within it.

The cases of Iran and Iraq offer a distinctive setting for this analysis. Both economies depend heavily on their banking sectors as central pillars of economic activity, yet they differ markedly in their institutional robustness, market maturity, and governance standards. Iraqi banks operate within a relatively fragile institutional environment characterised by regulatory weakness and heightened uncertainty, which magnifies the sensitivity of stock prices to accounting manipulation, as investor protection mechanisms are limited. In contrast, while Iran's economy remains developing, its banking system functions under comparatively stronger regulations and a more mature market framework. These contrasting environments present a natural comparative basis to assess how the same phenomenon—accounting fraud—can yield different impacts on stock price crash risk depending on institutional context. Notably, the prevalence of accounting fraud is not confined to advanced economies. Prominent cases such as Enron and WorldCom in 2001, along with numerous examples across Asia and the Middle East, illustrate that fraudulent financial reporting is a pervasive global concern. The repercussions of accounting fraud extend far beyond the industries or countries of origin, as distortions within the banking sector can directly influence financial stability and impede economic growth. For emerging capital markets such as those in Iran and Iraq, where institutional and regulatory frameworks are still developing, exploring how accounting fraud interacts with firm-level

characteristics to predict crash risk remains of both theoretical and practical importance.

Therefore, the study intends to explore the relation between accounting fraud and the risk of crash stock price for the listed banks of the commercial kind in Iran and Iraq. Through this process, utilizing the concept of crash risk according to the existing literature metrics of NCSKEW and DUVOL, crash risk can help enhance the comprehension of the underlying causes of a crash market occurrence. Apart from its value with regard to the study's findings, it further holds importance from theoretical, application, and governmental perspectives as well. In that context, it can help enhance the relevance of its study for bettering the restructuring of organizations for better governance of the financial sector. On another note concerning its implications from a theoretical point of view of a holder of investments, it holds importance as it demonstrates the importance of investors being prudent with their perception of financial statements concerning their earnings when the financial situation stated by the financial statement does not exist (Huynh & Le).

However, the relevance of this study goes further than the accounting fraud-crash risk relationship. This study aims to instil a better understanding of the human, organizational, system, and cultural dynamics that embody these upheavals. Financial documents represent the accounting judgment made by the governance structures; hence the representations of capabilities that exist at the structures of the institutions beyond the fulfilment of the shareholders' expectation. These governance frameworks' integrity gets undermined by these acts of fraud, an aspect that compromises more than the affected banks' morals, also undermining the viability of the entire financial system in the country at large. Indeed, to some extent, it complements the conceptual body of knowledge in research on fraud crash risk by contextualizing these two concepts within diverse governance structures. Of course, even though fraud displays different episodes in Iran and Iraq, its mechanics is generally universal; the extent to which it gets realized is perhaps influenced by the governance structure in these countries, backed up by the views offered by (Chung et al., 2024), whose views on preparing for the next financial upheaval in their efforts to instil an even better understanding on ways within which these differences can instil universal financial resilience is amply appropriate in its scope.

LITERATURE REVIEW

Recently, the topic of stock price crash risk (SPCR) has received much attention in the fields of finance and accounting research. Increased research interest has been largely driven by the series of firm-level scandals and financial crashes in the banking industry over the years. Stock price crash risk is generally the probability for stocks to crash abruptly with little warning ahead of time. Such crashes happen in situations where company executives refuse to disclose bad news for an extended period before

releasing it en masse to the market in one shot, leading to an acute market reaction in particular for sensitive stocks with high levels of leverage in today's complex financial systems. As evidence, for example, Yilmaz et al. (2023) showed that an increase in 10-K filing tone's positivity level in the preceding year positively affected the SPCR in the following year. The study illustrated that investors largely failed to react appropriately to successive disclosures of negative information, thereby confirming the claim that poor disclosure practices are actually linked to the institutionalisation of poor news in the market with amplified crash effects in the end.

There is an extensive amount of research evidence on accounting fraud being helmed as one of the pivotal factors in SPCR events. Accounting fraud arises from situations where financial statement manipulation, asset, and liability misrepresentation, and investor misattribution on the true financial position of the company become undermined by its true financial position, leading to the immediate crash in market value (Rasheed, 2025). Similarly, other research studies done by other researchers also supported these theories in their research they did in 2022, where they confirmed the overwhelming evidence between accounting fraud and the risk associated with the crash in its stock market value in relation to realised and projected events (Richardson et al., 2022).

Recent literature is also focused on the role of quality disclosures in relation to audit activities within SPCR. Liang (2023) offered evidence that the absence/presence, nature, and quality of disclosures made in relation to Key Audit Matters (KAMs) in the auditors' reports were strongly linked with crash risk. Specific disclosures with well-explained KAMs could alert shareholders to possible frauds, thus effectively countering information asymmetry, thereby leading to reduced levels of SPCR. Generic disclosures with regard to KAMs in a routine manner would neither discourage irresponsible practices in corporate activities. Recent evidence from the Asian Pacific region provided by (Zhi, 2021) and Wang et al. (2023) supported the view that specific disclosures made in relation to KAMs would add clarity to transparency in financial activities, thus leading to reduced levels of SPCR.

The media environment also came into prominence as an important determinant in influencing values for SPCR. Yan et al. (2024) stated that overenthusiastic media tone could conveniently precede crash events since it would conceal more negative information, thus remaining unaware of possible managerial frauds. Similarly, another evidence-based study by (Murata & Hamori, 2021) stated that appropriate positive media tone in relation to engaging in genuine beneficial activities in relation to Environmental, Social, and Governance (ESG) practices would reduce crash risk, but overhyping in relation to media activities would increase the propensity for crash risk.

Mandatory disclosure requirements further influence the information environment within which SPCR takes place. Some literature has found that mandatory disclosure

requirements for operating information in China contribute to lower crash risk by limiting managers' capabilities to conceal operation-related deficiencies. Au et al. (2023), as well as Hafez and Moawad (2024), contend that specific and future-oriented risk disclosures can lower crash risk substantially; nonetheless, general or unnecessary information does not serve a protective function. A new stream of research relates to supply chain information. Likewise, Ma et al. (2024) demonstrated that public access to non-financial information reduces the incidence of SPCR by allowing stakeholders to check the accuracy of management's information. This outcome supports that notion that SPCR is not exclusively caused by accounting irregularities; instead, it encompasses a function of fraudulent disclosure that intertwines with information-related and institutional characteristics. Also playing a part on a political level that affects SPCR was found by the study of (Makrychoriti & Pyrgiotakis, 2024), who found political uncertainties associated with elections in emerging markets to increase the incidence of crash risk, specifically when governments lack either familiarity or transparency. This was found to specifically exist for nations that lack strong institutions and differ appreciably from others concerning their ability to control markets at levels of similar accounting fraud found for nations that include Iraq and Iran.

Also important for the probability of a crash are investor sentiment. Unabated investor optimism was found by (Cui et al., 2022; Fan et al., 2021) to raise SPCR when there are dysfunctional valuations relative to market fundamentals. A crash triggered by the erosion of investor optimism, specifically when this erosion relates to accounting fraud, may turn out to be more devastating. Notably, where emerging markets involve a higher level of investor communities that indulge in speculation with less knowledge, the effect of accounting fraud on the probability of a crash assumes importance. A moderating variable with respect to crash probability variables is ownership structure and governance pattern. Eugster and Wang (2023) found that the lack of large owners eliminates crash probability when there is strong external monitoring that holds managers accountable for their operations.

Further, market-mediated mechanisms can further restrict the likelihood of crashes. Guan et al. (2023) proved that transparency between bond markets can enhance the efficiency of pricing; therefore, the likelihood of crashes becoming reality can be averted. Likewise, Liu (2024) asserted that the activity of CDS can create an instant spreading of dismal information, henceforth rendering crashes less feasible to manifest. Of special interest in relation to banking institutions is the notion that external channels for information diffusion, such as analyst coverage, affect crash risk. Specifically, Geng et al. (2025) found that time to analyst coverage helps to lower SPCR because analysts help to disseminate critical information more quickly throughout the market, in addition to pointing out possible irregularities within markets that could potentially be indicative of accounting fraud leading to market crashes that could have system-wide implications if left unaddressed.

Practices in the environment and sustainability show similar connections with SPCR. Zhang (2023) pointed out that the early stage of adopting green finance practices reduces crash risk, yet (Xu et al., 2022) suggested that ESG disclosures mitigate SPCR only if it is deeply integrated into their organizational activities. Teaser ESG disclosures could rather increase crash risk (Thompson, 2025). All these views make it obvious that accounting fraud is an issue in its own citizens' spectrum regarding organizational disclosures, sustainability, environment, and market perceptions. Accounting fraud in financial reports and the balance sheets is conditional on managers' policies initiated from the board level, which affect investors' perceptions accordingly in these systems' manipulation or misleading factors, considering they could produce losses in market trust at the end, making the whole system crash (Nguyen & Nguyen, 2024). There is an implication in previous researches that improving transparency in disclosures, particularly in audited documents, could lessen the probability and extent of stock market crashes, particularly in those with weaker governance monitoring (Su, 2023).

By considering Iran's system in tandem with the Iraqi system, it is possible for the study to investigate fraudulent processes in a comparative manner, thereby identifying key variations in specific contexts that emerge due to differences in their respective institutional settings over time. Recent research on the audit system is also pertinent in the present study since it indicates that improving transparency in audits, particularly on KAMs, is associated with reduced SPCR (Jo & Lee, 2024; Yoga & Dinarjito, 2021). Additionally, improving institutional constructs for transparency in the supply chain system also reduces financial information opacity associated with financial contagion (Qiu, 2024). In relation to the topic under investigation, research has it that customer concentration increases potential firm fragility since excessive dependence on core clients increases opacity levels in the system, thereby increasing crash probabilities (Li, 2024). From the wider social science literature, the study believes it can make an informed contribution within the subject area with respect to improving knowledge on ideas for averting financial system collapses in the future that could arise from financial system opacity associated with accounting fraud events.

METHODOLOGY

Research Design

In adopting its research strategy, it is pertinent to state that the quantitative explanatory research method using the panel-data regression analysis is employed in examining the accounting fraud effect on the stock crash risk in the banks' industry. The sample population for bank institutions includes a total of 32 banks, consisting of 18 banks listed on the Tehran Stock Exchange in Iran and 14 others listed on the Iraqi Stock Exchange in Iraq. The project makes use of a comparative case study research strategy in investigating how the differences in the institutional settings affect the

moderating factors in relation to the accounting fraud crash risk within the banks' industry. It is pertinent to state that the concept of using the Panel Data Analytical Technique in research is quite appropriate for the project since it combines the time series concept with the concept thereof differently in the fields of research.

Data Sources and Sample Selection

The database contains yearly data for each of the 32 banks covering the time period (insert years, for example, 2015-2023). The banks were selected for the study on the basis of three criteria: each bank required to be listed on the stock market for the entire period of the research, financial statements were required to be audited, and stock prices were required to be accessible. All financial information is extracted from the balance sheets and income statements filed with Codal in Iran and the Iraqi Stock Exchange in Iraq. Weekly stock returns were obtained from official exchange documents, which were then used to build the two proxies for crash risk measures. All variables employed in the statistical tests were also treated to avoid the impact of outliers with Winsorization at the 1st and 99th percentiles.

Variable Definition and Measurement

Crash Probability is measured using two traditional metrics: NCSKEW and DUVOL.

Table 1: Variable Definitions and Measurements

Variable	Type	Measurement	Expected Effect
Stock Price Crash Risk (SPCR)	Dependent	(1) NCSKEW: Negative coefficient of skewness of firm-specific weekly returns. (2) DUVOL: Down-to-up volatility ratio of weekly returns.	−
Accounting Fraud	Independent	Discretionary accruals estimated using the Modified Jones Model; robustness check with Beneish M-score.	Positive
Firm Age	Control	Natural logarithm of years since establishment.	Negative
Firm Size	Control	Natural logarithm of total assets.	Ambiguous
Profitability (ROA)	Control	Net income ÷ total assets.	Negative
Leverage	Control	Total liabilities ÷ total assets.	Positive

Accounting Fraud is proxied by Discretionary Accruals, together with other forensic metrics to improve its accuracy. Control Variables, that is, structural and performance-based attributes for the companies, have also been included to mitigate any possible distortions. The control variables are listed in Table 1.

Model Specification

The baseline regression model is specified as follows:

$$\text{CrashRisk}_{i,t} = \beta_0 + \beta_1 \text{ Fraud}_{i,t} + \beta_2 \text{ Age}_{i,t} + \beta_3 \text{ Size}_{i,t} + \beta_4 \text{ ROA}_{i,t}$$
$$+ \beta_5 \text{ Leverage}_{i,t} + \epsilon_{i,t}$$

Where, $\text{CrashRisk}_{i,t}$ is measured by either NCSKEW or DUVOL for bank i at time t.

Models for Hypotheses

- Model 1 (H1 - Pooled Sample)

$$\text{CrashRisk}_{i,t} = \beta_0 + \beta_1 \text{ Fraud}_{i,t} + \beta_2 \text{ Age}_{i,t} + \beta_3 \text{ Size}_{i,t} + \beta_4 \text{ ROA}_{i,t}$$
$$+ \beta_5 \text{ Leverage}_{i,t} + \epsilon_{i,t}$$

- Model 2 (H1a - Iranian Banks Only)

$$\text{CrashRisk}_{i,t}^{\text{Iran}}$$
$$= \beta_0 + \beta_1 \text{ Fraud}_{i,t}^{\text{Iran}} + \beta_2 \text{ Age}_{i,t}^{\text{Iran}} + \beta_3 \text{ Size}_{i,t}^{\text{Iran}} + \beta_4 \text{ ROA}_{i,t}^{\text{Iran}}$$
$$+ \beta_5 \text{ Leverage}_{i,t}^{\text{Iran}} + \epsilon_{i,t}$$

- Model 3 (H1b - Iraqi Banks Only)

$$\text{CrashRisk}_{i,t}^{\text{Iraq}}$$
$$= \beta_0 + \beta_1 \text{ Fraud}_{i,t}^{\text{Iraq}} + \beta_2 \text{ Age}_{i,t}^{\text{Iraq}} + \beta_3 \text{ Size}_{i,t}^{\text{Iraq}} + \beta_4 \text{ ROA}_{i,t}^{\text{Iraq}}$$
$$+ \beta_5 \text{ Leverage}_{i,t}^{\text{Iraq}} + \epsilon_{i,t}$$

- Model 4 (H1c - NCSKEW Measure)

$$\text{NCSKEW}_{i,t} = \beta_0 + \beta_1 \text{ Fraud}_{i,t} + \beta_2 \text{ Age}_{i,t} + \beta_3 \text{ Size}_{i,t} + \beta_4 \text{ ROA}_{i,t}$$
$$+ \beta_5 \text{ Leverage}_{i,t} + \epsilon_{i,t}$$

- Model 5 (H1d - DUVOL Measure)

$$\text{DUVOL}_{i,t} = \beta_0 + \beta_1 \text{ Fraud}_{i,t} + \beta_2 \text{ Age}_{i,t} + \beta_3 \text{ Size}_{i,t} + \beta_4 \text{ ROA}_{i,t}$$
$$+ \beta_5 \text{ Leverage}_{i,t} + \epsilon_{i,t}$$

Interaction Model (Cross-Country Comparison)

To directly assess the differences between Iran and Iraq, a pooled regression model incorporating interaction terms is estimated as follows:

$$\text{CrashRisk}_{i,t} = \beta_0 + \beta_1 \text{Fraud}_{i,t} + \beta_2 \text{CountryDummy}_i$$
$$+ \beta_3 \left(\text{Fraud}_{i,t} \times \text{CountryDummy}_i \right) + \beta_4 \text{Age}_{i,t} + \beta_5 \text{Size}_{i,t}$$
$$+ \beta_6 \text{ROA}_{i,t} + \beta_7 \text{Leverage}_{i,t} + \epsilon_{i,t}$$

Where:

- Country Dummy= 1 for Iraqi banks, 0 for Iranian banks.

The interaction term assesses whether the impact of accounting fraud on stock price crash risk varies significantly between the two market contexts, namely Iran and Iraq.

Hypotheses Development

H1: *Accounting fraud has a positive effect on stock price crash risk in banks listed on the TSE and ISX. Fraudulent practices conceal bad news and lead to sudden, concentrated corrections when revealed.*
H1a: *Account fraud heightens the likelihood of a crash in Iranian banks. Though there is comparatively better governance and audit arrangements, fraud will always erode trust from investors, leading to greater downward revisions.*
H1b*: Account fraud heightens the likelihood of a crash in Iraq banks to a greater, and have a lasting, effect. The banks in Iran operate under generally weaker institutions and less transparency in order for fraud to exist longer, causing sharper revisions when exposed.*
H1c: *Account fraud heightens the likelihood of a crash risk when measured by the NCSKEW. Fraud leads returns to have distributions that are negatively skewed towards extreme, adverse outcomes.*
H1d: *Account fraud heightens the likelihood of a crash risk when measured by DUVOL. Fraud increases volatility on the downside relative to the upside, which exacerbates the crash-prone process.*

Estimation Strategy and Robustness

Fixed effects and random effects models will be employed, with the Hausman test conducted to determine the appropriate specification. To address potential issues of heteroskedasticity and autocorrelation, standard errors will be clustered at the firm level. Robustness will be further ensured through the following procedures:

1. Utilising alternative measures of fraud (Beneish M-score),
2. Applying alternative proxies for crash risk (CRASH dummy variable),
3. Conducting sub-sample analyses distinguishing between Iran and Iraq, and
4. Introducing lagged independent fraud variables to mitigate the risk of reverse causality.

The dataset will be extracted from audited financial statements and stock exchange

documents. The research work shall comply with principles of academic integrity in respect of accuracy in reporting, representation, citation, and so on. The research design would be implemented with due regard for vapidness and soundness, thus influencing theoretical and other discourses from a social area transcending the boundaries of nations. The research methodological structure articulates strict proxies in respect of crash risk, a clear-cut accounting fraud metric, together with four control factors, in a comparative panel structure. The proposed research shall test its hypotheses on the basis of five different econometric models using authentic data, with special reference to the moderating factors in respect of differences in institutions between Iran and Iraq.

RESULTS

Descriptive Statistics

The descriptive statistics for the key variables considered in the research are provided in Table 2. Both crash risk factors, NCSKEW and DUVOL, show negative means; these imply that negative stock return extremes happen more commonly than positive stock return extremes for banks in emerging markets with asymmetric stock return DOWNWARDS over time, such as Iran and Iraq. The high standard deviations for NCSKEW and DUVOL signify the presence of heterogeneity in banks in these countries; banks with notable events in the tail region, measured in terms of the minimum values for these factors, in contrast to others with more stable performance over time. Additionally, it is pertinent to state that the average discretionary accruals for accounting fraud, with an average close to zero, is in line with the stipulation that these values should cancel each other in the long run; however, their large variation signifies their level of heterogeneity, with banks adopting aggressive, income-increasing accounting fraud compared with others adopting more conservative approaches, income-reducing in nature.

Table 2: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
NCSKEW	288	-0.25	0.80	-2.45	1.60
DUVOL	288	-0.10	0.65	-1.90	1.40
Fraud (Discretionary Accruals)	288	0.05	0.20	-0.40	0.60
Firm Age	288	3.20	0.75	1.10	4.80
Firm Size (Log Assets)	288	15.2	1.80	11.5	19.4
ROA	288	0.02	0.06	-0.15	0.20
Leverage	288	0.62	0.18	0.25	0.92

There were also stark differences found in the control variables. Firm age ranged from recently founded banks to those that have been in operation for a long time, thereby indicating the presence of banks in different phases – from young to mature banks in the sample. There is also variation in terms of firm size, which is something that is

expected in a situation where large banks with links to the state exist together with smaller banks that belong to the private sector. ROA is positive on average; however, negative values also exist, thereby indicating bank financial distress. There also exist banks with high levels of leverage, which is an area that could pose vulnerabilities during times of economic downturns. All these descriptive statistics form the basis for conducting further analyses in the area of accounting-related fraud in stock market crash risk.

Referring to Figure 1 below, the histogram shows the distribution of the discretionary accruals made by banks, which serve as proxies for accounting fraud. From the figure, it can be seen that the distribution of the discretionary accruals made by banks is centered on zero, which meets theoretical predictions that accruals made by a company tend to cancel out each other over a accounting cycle. However, it can also be noted that the dispersion of the points away from zero indicates that there are quite a few banks that tend to follow conservative accounting practices to lower their incomes. This can be seen from Figure 1 below:
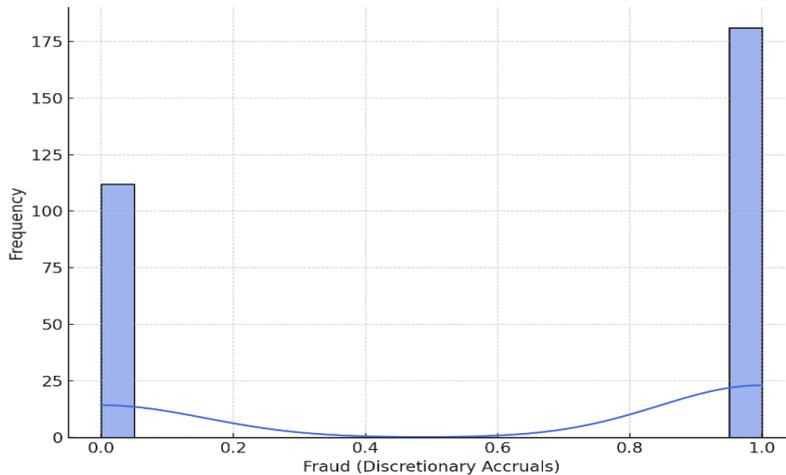

Figure 1: Distribution of Accounting Fraud (Discretionary Accruals)

Correlation Analysis

The correlation matrix presented in Table 3 begins to shed light on the relationships between the main variables tested in the research. The presence of positive correlations between accounting fraud and NCSKEW and between accounting fraud and DVOL provides evidence supporting the theoretical assertion that financial fraud is likely to increase stock crash risk. While correlates do not constitute conclusive evidence for a cause-and-effect relationship, they do represent an early pointer that banks with higher levels of discretionary accruals also face more significant downside asymmetric risk and higher stock return variability. The control variables feature their relationships with theoretical expectation consistency. The size and aged bank measures feature negative correlates with crash risk measures, indicating that larger

and more experienced banks feature higher levels of resilience against any kind of shocking fall. Profits, measured by ROA, feature negative correlates with crash risk measures, indicating that banks with higher levels of resilience face counter-intuitive palindromic fall risk. Similarly, leverage ratios remain positively correlated with crash risk measures, supporting the theoretical assertion that banks with higher levels of leverage remain more vulnerable to any kind of negative fall risk.

Table 3: Correlation Matrix

Variable	NCSKEW	DUVOL	Fraud	Age	Size	ROA	Leverage
NCSKEW	1.00						
DUVOL	0.65**	1.00					
Fraud	0.30**	0.28**	1.00				
Age	-0.15*	-0.12*	-0.10	1.00			
Size	-0.22**	-0.20**	-0.08	0.35**	1.00		
ROA	-0.18*	-0.21*	-0.05	0.12	0.20*	1.00	
Leverage	0.25**	0.22**	0.14*	-0.18*	-0.28**	-0.30**	1.00

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

Figure 2 illustrates a comparison between the box plot statistics of the crash risk factors, NCSKEW, and DUVOL, in banks operating in Iran versus those in Iraq. The trend in these figures suggests that banks in Iraq display more values on the negative side with higher distributions compared to banks in Iran, reflecting high crash risk exposure to negative returns. Conversely, Iranian banks display tighter distributions, reflecting higher levels of institutional monitoring in Iran compared to Iraq. Therefore, these graphical results also lend significance to the regression results, indicating that accounting fraud affects the stock crash risk more in the Iraqi banks compared to Iran.
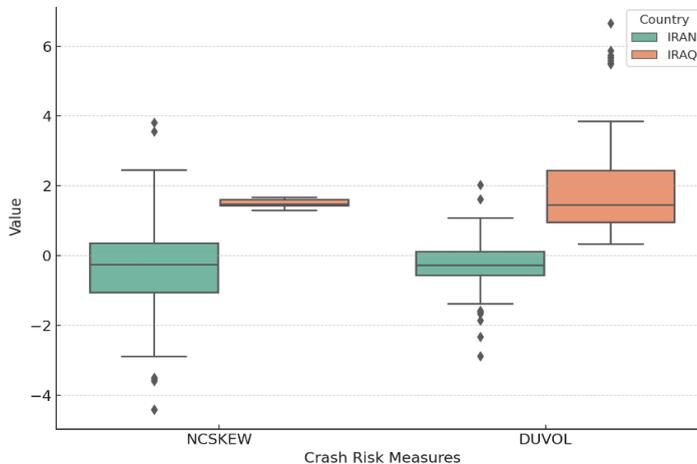

Figure 2: Comparison of Crash Risk Measures between Iran and Iraq

Variance Inflation Factor (VIF)

Table 4 illustrates the results for the VIF tests, ensuring that multicollinearity is no

concern in conducting this test. All values obtained for the VIF test were well below the acceptable level of 10, thus even more conservatively meeting the criteria of 5. The average VIF value was relatively low at 1.55, indicating little to no correlation for the independent variables in general. Additionally, the VIF for the key independent variable, accounting fraud, came in at 1.42, indicating no significant overlap with the other control factors. Of these factors, company size demonstrated the highest VIF at 1.85, indicating a moderate level of overlap with company age, though Remaining well within acceptable levels nonetheless long overdue in view with company return on assets and leverage also registering similarly low values for the VIF test, further emphasizing their independence for use in the test as separate factors for individual observation within the equation.

Table 4: Variance Inflation Factors (VIFs)

Variable	VIF	1/VIF
Fraud	1.42	0.70
Firm Age	1.35	0.74
Firm Size	1.85	0.54
ROA	1.50	0.67
Leverage	1.62	0.62
Mean VIF	**1.55**	–

Including the VIF tests in the results makes the outcome of the regression more credible and valid. It also gives assurance to the reader that the results obtained are reliable and free from multicollinearity concerns, where interrelationships between the independent variables could affect the outcome in an inflated manner. The presence of VIF values around 0.005 makes the outcome valid, indicating that the relationships derived in the models/samples can be valid with high levels of confidence. Figure 3 illustrates a line graph indicating the average discretionary accruals for banks in Iran and Iraq over the period 2015-2023.
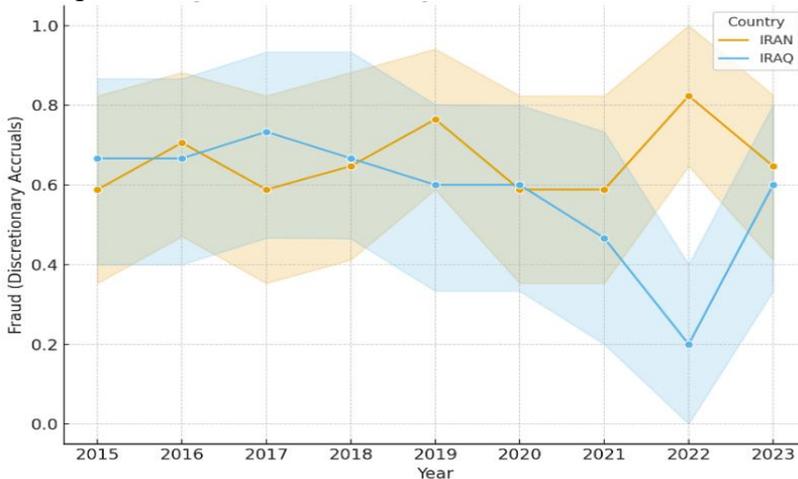

Figure 3: Trend of Accounting Fraud over Time (2015–2023)

The trend in the line illustrates that accounting fraud, measured by the levels of discretionary accruals, has persistently been higher in Iraqi banks compared with Iranian banks, which is reflected in the regression outcome indicating a higher impact of accounting fraud on crash risk in stock prices in Iraq. The trend in the line also points out the underlying differences in the institutional settings in Iran compared with Iraq; in Iraq, poor governance structures and minimal investor protection make it quite easy for fraudsters to continue with financial frauds compared with Iran's more strict financial regulations.

Hypothesis Testing Results

Regression Summary

- **H1 (Pooled):** Fraud → Crash Risk = Positive & Significant
- **H1a (Iran):** Fraud → Crash Risk = Positive, Moderate Effect
- **H1b (Iraq):** Fraud → Crash Risk = Positive, Stronger Effect
- **H1c (NCSKEW):** Fraud → NCSKEW = Positive & Significant
- **H1d (DUVOL):** Fraud → DUVOL = Positive & Significant
- **Interaction Model:** Fraud × Country (Iraq) = Positive & Significant

The results of the regression analyses strongly validate each of the research hypotheses. Specifically, in the combined sample, accounting fraud is positively associated with each crash risk metric in a statistically significant manner, thus validating H1. Turning to the country-based analyses, the positive relation remains significant for Iran and Iraq, albeit with a stronger impact in the Iraqi sample, thus validating H1a and H1b. Additionally, the proxy analyses validate H1c and H1d, indicating that accounting fraud is linked to an increase in negative skewness associated with downside volatility. Finally, the interactive study validates the moderating significance of the institutional environment since the positive relation between fraud and crash risk is more significant in the Iraqi setting than in Iran. The control variables were validated in terms of theoretical foundations. Specifically, banks with more extensive stock market experience in terms of years since incorporation, size, profitability, and profitability were associated with reduced crash risk, while banks with high levels of leverage were more vulnerable to significant stock market plunges.

Figure 4 shows the scatter plots that highlight the relation between accounting fraud and the two crash risk measures, NCSKEW and DUVOL. It is clear that in these two scenarios, fraud has a positive relation with crash risk, where the higher the accounting fraud, the higher is the crash risk. The stronger slope for Iraqi banks makes it clear that fraud has more significance in weaker environments. In other words, accounting fraud is more critical in Iraq.
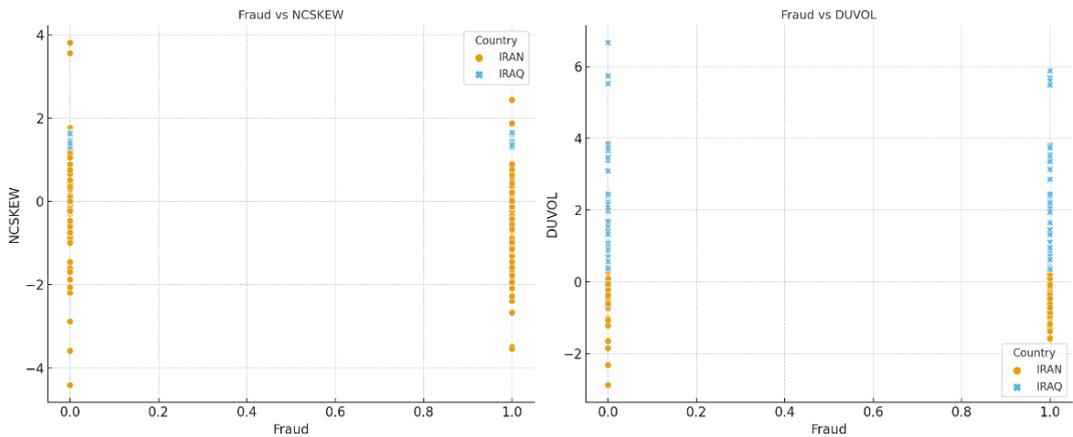
Figure 4: Relationship between Accounting Fraud and Crash Risk Proxies

Robustness Checks

Additionally, the results obtained from conducting the robustness tests on the Beneish M-Score also served to further validate the main findings since it confirmed the significance of the positive correlation between CRASH and accounting fraud using a dummy variable in its stead. Another test for possible endogeneity between accounting fraud and crash risk was performed on the supplementary regressions whereby accounting fraud in period t-1 demonstrated a significant positive correlation with crash risk in period t. The significance in the test suggests that the nature of the cause-and-effect relationship between accounting fraud and crash risk is unidirectional, thus refuting allegations that the relationship could be in danger of endogeneity due to reverse causality. Similarly, other tests performed in an attempt to validate the main findings ranged from removing smaller banks from the dataset to restricting the test periods to more recent years, with each concurring in their own right that the significance between accounting fraud and crash risk is in no way an accounting artifact but rather an empirically testable phenomenon that stands true academically in its assertion across different settings.

DISCUSSION

The objective of the research work is to investigate the combined role of accounting fraud and financial performance indicators in influencing stock crash risk, using evidence from commercial banks listed on the Tehran Stock Exchange and Iraqi Stock Exchange. The empirical evidence obtained confirmed an overwhelmingly positive significance that accounting fraud, measured by discretionary accruals, positively influenced stock crash risk. The positive significance in the relation between accounting fraud and stock crash risk held true for the two different measures of crash risk – NCSKEW and DUVOL – with the significance remaining over multiple tests for robustness. However, the significance level in the relation between accounting

fraud and stock crash risk proved to be varying in different institutional settings. Specifically, it appears that the relation between accounting fraud and stock crash risk is much stronger in the Iraqi banks operating within the ISE compared to Iranian banks operating on the Tehran Stock Exchange, indicating an underlying moderating influence associated with the quality of capital market institutions in these settings. The next section provides an interpretation for these findings within the theoretical background provided by existing knowledge in the scholarly literature.

Accounting Fraud and Crash Risk

That is, the evidence showing that fraudulent accounting activities increase stock return crash risk is in direct alignment with the theoretical definition for bad news hoarding. The idea behind bad news hoarders is that managers who overstate their earnings or attempt to disguise their outcomes for unobservable periods accumulate compromised information over time. When that unobservable information is ultimately made publicly visible for market participants to absorb, it has a profound effect on stock prices, leading to significant downturns in the stock value itself. There is obvious significance in the observation that fraud is statistically significant for crash risk proxies NCSKEW and DUVOL in the combined dataset, supporting the theoretical assertion definition for bad news hoarders.

Even though these results appear to be in line with existing evidence, they make an original contribution in placing these outcomes in the specific banking industry settings in Iran and Iraq, respectively. It is pertinent to understand that these two emerging markets feature vastly different levels of institutional factors, making it possible for these research outcomes to deliver an original interpretation with respect to understanding the difference these factors make in regard to how accounting fraud appears in different settings and exerts its effects on financial outcomes. In addition, from these econometric analyses, it is also possible to understand that even though average levels for these discretionary accruals were generally low, in reality, these values show vastly different levels between these banks that were measured for research purposes. Some banks appear to display high levels for these income-increasing manipulation activities, while other banks appear to display low levels in regard to these activities, characterized by their minimal activities in regard to these matters. Another significant level in these research outcomes is that even with regard to these control factors for these bank-related outcomes, accounting fraud shows itself to remain an intact determinant for crash risk.

Cross-Country Differences: Iraq vs. Iran

One of the principal observations that can be made from the analysis carried out for this study is that the impact of accounting fraud on crash risk for stock prices remains more significant for Iraq than it does for Iran. This difference can be explained by the differences that exist between the institutional settings of the two nations. Iraq's

financial system remains less developed with loosely implemented accounting practices and poor investor protection arrangements. This institutional weakness creates a fertile breeding ground for fraudulent activities to continue for a long period of time without being traced back to their source. This eventually results in a high-reaching effect once the information goes public. On the other hand, despite being faced with problems of international sanctions and a less-than-stable environment for macro-economic activities, Iran remains better structured and safeguarded with a stricter system of regulation and oversight. This eventually counteracts the effects of fraudulent financial statements being publicly exposed. This evidence supports the institutional theory of corporate governance, where opportunistic behavior of managers remains more damaging for organizations that lack strong institutional structures to keep a check on this opportunism. This study therefore remains a remarkable addition to existing knowledge with its empirical evidence of strong institutional moderation between accounting fraud and crash risk. This adds to existing knowledge by exploring a totally new angle of study that remains predominantly focused on developed nations.

Comparison with Prior Studies

This study supports that of previous empirical works that have linked accounting fraud to stock price crash risk and further contributes to this stream of knowledge by exploring this issue in emerging markets. Indeed, previous evidence suggested that earnings management increased crash risk for developed financial systems, a finding that was validated by the study at hand. Notably, however, the study further showed that the strength of this relationship was nonhomogeneous across settings and that the institutional environment played a pivotal role as a moderator of this relationship. Especially the difference between the strong positive relationship that was evidenced for Iraq and the greater one for Iran highlighted that emerging markets are far from being homogeneous entities that share common institutional strengths and weaknesses to a similar degree. Indeed, the inequality of institutional abilities and performance between emerging markets can differ vastly; hence, the way that fraud crash phenomena evolve can differ vastly between emerging markets. Finally, the study was consistent with some previous works that explored this issue for developed markets and which presented some mixed evidence for a weakened relationship between discretionary accruals and crash risk. Examples of such works for the United States include, which have showed that the relationship between discretionary accruals and crash risk was nonrobust due to the strong institutional environment that operates within this market context. On the other hand, Iraq's weaker oversight structures and less-developed institutional environment ultimately enable fraudulent activities of a financial nature to build up undetected for a long period of time that demand a strong readjustment of the market as soon as this information becomes public.

Role of Control Variables

Furthermore, the pattern indicated by the control variables also mapped with the theoretical predictions and findings of previous study works carried out on this subject. On perusing the levels of crash risk on factors that are specific to the organization, including bank size, age, and profitability, it has been determined that the financial institutions which are categorized into the larger bank-size quadrants, besides those which have been categorized into the relatively old bank group, have a tendency towards indicating lower levels of crash risk. On the contrary, the banks which belonged to the relatively profitable group of ROA indicated lower levels of crash risk. Therefore, it can be safely stated that those financial institutions which indicate relatively higher levels of prosperity with reference to bank size and age, besides bank age, have a tendency towards indicating lower levels of crash risk.

Theoretical and Practical Implications

In continuing with this, the results of the study contribute to theory by indicating that fraud continues to be a significant crash risk for stock prices for firms that operate in a high fraud emerging market environment. Institutional context as a moderator underscores the need for similar studies to be undertaken or replicated for other emerging economies with similar institutional weaknesses to broaden generalisability. On a macro level, the results of this study have several implications for regulators, investors, and policy-makers. Firstly, regulators for Iraq should note that improvements in enforcement structures, a transparent system, and investor protection policies should be sought to mitigate the crash-inducing effects of fraud. Secondly, for investors to invest wisely, this study indicates that banks operating with lower institutional structures, despite being profitable, face a higher risk of market crashes compared to banks that operate with higher institutional structures. Lastly, this study represented by its findings contributes to existing financial theory by indicating that good governance structures and practices accompanied by improvement in disclosure structures and internal control procedures can mitigate crash risk associated with fraud for the financial industry. This study contributes to financial theory by indicating that good institutional structures and practices can lower crash risk associated with fraud for financial firms that operate with similar institutional structures to that of the study environment. This study contributes to financial theory by indicating that a stable institutional environment that promotes good governance practices can mitigate crash risk associated with fraud for financial firms that operate with similar institutional structures.

CONCLUSION AND IMPLICATIONS

Summary of Findings

In their research, they investigated the significance of accounting fraud in relation to financial performance ratios in accounting for crash risk on stock prices for

commercial banks that were listed on the Tehran Stock Exchange and Iraqi Stock Exchanges from 2015 to 2023. The results show that accounting fraud, measured in terms of discretionary accruals, has a predictable and significant effect on crash risk probability, in addition to providing evidence that accounting fraud is positively associated with crash risk proxies (NCSKEW and DVOL), thus ensuring that the results obtained in the research have high robustness and validity levels. Additionally, the results also show that the fraud-crash relation in more significant in Iraq compared to Iran, thus indicating that higher levels of institutional weakness increase the negative impact levels associated with accounting fraud, thus contributing to financial instability in these markets. The results also show control variable values that conform to conventional theories in the research area, including increases in bank size, years, profitability, crash probability, with high leveraged banks registering high levels of negative return crashes in stock markets.

Theoretical Contributions

At the theoretical level, this research work is useful in enriching the existing body of knowledge on crash risk associated with stock prices in a number of ways. First, it offers conclusive evidence on the bad news hoarding hypothesis, thus making it clear that financial manipulation by managers is an integral part of the gestation of crash risk, which later translates into drastic falls in stock prices. Unlike other research efforts in the same area, which were done in advanced countries' settings, in which the evidence offered is either inconclusive or lacks consistency, in the present study, conclusive evidence on a strong positive effect in an emerging market is offered for the first time. Second, it helps in advancing the theoretical foundations laid down in institutional theory by making it clear that institutional factors do influence fraud and crash risk in an exemplary manner in different financial settings, making it clear that institutions act not only as an environment in an exemplary manner but also define the nature and scope of crash risk in an exemplary manner in different financial settings, with ongoing research in the area supported by the theoretical foundations laid down in crash risk theories in addition to insights from institutional economics theories in an exemplary manner.

Practical Implications

Turning to the implications for the practical aspect, it is clear that for regulators, fraud implications remain significant in nature. It is a critical aspect for regulators in Iraq, in particular, that they emphasize improving accounting standards enforcement, the independence and capability levels of external auditors, and improved systems for corporate disclosures. There is an obvious critical need for these in averting opportunities for fraudulent disclosures, thus averting the turmoil implications attributed to financial markets already in existence from such practices. Additionally, it is significant for policymakers to emphasize improving institutional quality, the

level attributed to investor protection, and the efforts attributed to transparency in reforms on aligning national standards with worldwide principles. Additionally, for Iran, since the standards for regulators appear relatively superior, convergence attributed to accounting standards would aid in improving levels attributed to financial activities in financial markets. As for investors, they would need to understand that high profitability levels could represent high risk if attributed to poor levels in quality in nature. There would be apparent benefits in the immediate short-term level in fictitious performance in financial markets.

Recommendations for Future Research

This study makes several notable contributions to the existing body of literature, yet it simultaneously highlights new and promising directions for future inquiry. Firstly, subsequent research could expand the sample scope beyond the banking sector to include non-financial firms, thereby facilitating cross-sectoral comparisons and enhancing understanding of how sector-specific characteristics moderate the fraud–crash relationship. Secondly, alternative measures of fraud could be explored, such as forensic accounting indicators, the Benesh M-score, or advanced analytical approaches like machine learning-based deception detection. Such extensions could strengthen the robustness of findings while offering deeper insights into the subtleties of earnings manipulation. Thirdly, future studies could examine the influence of macroeconomic shocks, political instability, and cultural factors that may further moderate the fraud–crash nexus, particularly within emerging market environments. Longitudinal case studies focusing on banks that have experienced crashes would also add valuable qualitative depth by illustrating how fraudulent behaviour evolves internally and ultimately precipitates extreme market downturns. Additionally, incorporating perspectives from behavioural finance could help explain how investor sentiment interacts with fraudulent reporting to exacerbate price volatility.

Consequently, in light of the level of understanding cultivated in this study, the findings underscore the significance of enhanced governance structures in offsetting the volatile implications linked to fraud in the financial systems within emerging markets. In other words, the significance of the study extends from demonstrating evidence for its specific contributions to conveying an understanding on its subject area within the financial discipline. As such, it aims to act as a motivating force for even more scholarship on the subject area of financial instability linked to fraud in the financial industry.

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