The Impact of Business Strategies and Managerial Entrenchment on Stock Price Crash Risk in Egypt

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Abstract:

This study investigates the impact of a firm's business strategy and managerial entrenchment on stock price crash risk. A sample of 40 non-financial firms from the EGX-100 index was collected during 2017 - 2021 with 200 balanced observations. The study utilized three different measures to calculate the firm-specific crash risk. It also followed a composite strategy score using accounting indicators established by Bentley *et al*. (2013) as a proxy for business strategy. Exploratory factor analysis was applied to calculate the managerial entrenchment index for six governance mechanisms based on Lin et al. (2014). Panel regression models were then used for data analysis. The results show a significant positive association between business strategy and stock price crash risk. They indicate that firms with prospector strategies are more prone to crash risk than those with defender strategies. The findings also show that firms with a high managerial entrenchment have a lower stock price crash risk. Likewise, the results demonstrate a significant negative influence of average weekly returns on the crash risk indicators. However, the firm size and sales growth rate positively affect crash risk.

To the author's knowledge, none of the existing literature has examined managerial entrenchment's impact on crash risk. Further, no studies have been conducted to examine how various strategies affect crash risk in Egypt or Middle Eastern countries.

The study gives a fundamental perception of crash risk determinants to assist Egyptian investors in decision-making and investing in less risky companies. In addition, the current research results recommend changing the negative perception of managerial entrenchment, which is not always synonymous with inefficiency.

Keywords: Managerial Entrenchment, Business Strategies, Crash Risk, Corporate Governance, Agency Theory.

ملخص الدراسة

تهدف الدراسة الى اختبار أثر استراتيجية الشركة والتحصين الإداري على مخاطر انهيار أسعار الأسهم. تتكون عينة البحث من ٤٠ شركة غير مالية موجودة في مؤشر EGX-100 خلال الفترة ٢٠١٧-٢٠٢١، وتتكون من 200 مشاهدة متوافقة. تم استخدام ثلاثة مقاييس مختلفة لمخاطر انهيار أسعار الأسهم. استخدمت الدراسة مؤشر مركب من المؤشرات المحاسبية التي طورها(2013) Bentley *et al.* كمقياس لاستراتيجية الأعمال. تم حساب مؤشرًا للتحصين الإداري باستخدام التحليل العاملي الاستكشافي لستة آليات للحوكمة بناءً على دراسة Lin *et al.* (2014)تم استخدام نماذج انحدار البيانات المقطعية الطولية Panel regression models، وهي مزيج من البيانات المقطعية (٤٠ شركة) وبيانات السلاسل الزمنية (٥ سنوات). تظهر النتائج ارتباطًا إيجابيًا معنويًا بين استراتيجية العمل ومخاطر انهيار أسعار الأسهم، وأن الشركات التي لديها استراتيجيات التنقيب أكثر عرضة لمخاطر الانهيار من تلك التي لديها استراتيجيات مدافعة. وتظهر النتائج أيضًا أن الشركات التي لديها تحصين إداري مرتفع لديها احتمالية أقل لمخاطر انهيار أسعار الأسهم. وبالمثل، تظهر النتائج تأثيرًا سلبيًا معنويا لمتوسط العوائد الأسبوعية للسهم على مؤشرات مخاطر انهيار أسعار الأسهم. ومع ذلك، فإن حجم الشركة ومعدل نمو المبيعات يؤثران بشكل إيجابي على مخاطر انهيار أسعار الأسهم.

على حد علم الباحث، لم يتناول أي من الأدبيات الموجودة تأثير التحصين الإداري على مخاطر انهيار أسعار الأسهم. علاوة على ذلك، لم يتم إجراء دراسات عن كيفية تأثير الاستراتيجيات المختلفة على مخاطر انهيار أسعار الأسهم في مصر أو دول الشرق الأوسط.

تعطي هذه الدراسة تصورًا أساسيًا لمحددات مخاطر انهيار أسعار الأسهم لمساعدة المستثمرين المصريين في اتخاذ القرار والاستثمار في الشركات الأقل مخاطرة. بالإضافة إلى ذلك، توصي نتائج الدراسة بتغيير النظرة السلبية للتحصين الإداري، والتي لا يكون دائمًا مرادفًا لعدم الكفاءة.

الكلمات المفتاحية: التحصين الإداري، استراتيجيات الأعمال، خطر انهيار سعر الأسهم، حوكمة الشركات، نظرية الوكالة.

1. Introduction:

Business strategy plays an essential part in a company's success, and if not well implemented, it can cause financial irregularities and mispricing, affecting the company's performance and investment decisions (Navissi *et al*., 2017). Miles and Snow (2003) classified business strategies into two opposing ends of the strategy chain, prospectors and defenders. Firms that adopt innovative solutions (prospectors) to realize fast growth enhance opportunities for misinformation, resulting in poor transparency and opaque financial reporting, which may cause future stock price crash risk (hereafter crash risk) (Habib & Hassan, 2017a).

Firms engaging in prospector business strategy are likely to be involved in tax avoidance (Higgins *et al*., 2015), invest in high-growth risky enterprises, and face agency problems (Jensen, 2005). Additionally, CEOs of companies using prospector business strategies have more authority. As a result, they are subject to less monitoring, allowing them to pursue their professional goals and ignore shareholder interests (Bentley *et al*., 2013), which enhances opportunities for irregularities and misinformation that demand further auditing (Bentley *et al*., 2017). Additionally, such firms are prone to overvalue equity owing to managers' high growth prospects, which leads CEOs to misreport using opaque financial reporting (Arianwuri *et al*. 2017), a significant determinant of crash risk. Otherwise, firms that adopt defender business strategies provide managers with little power and high monitoring, encouraging them to reduce the risk associated with their occupation by investing in high-return schemes (Thomas & Ramaswamy, 1996). However, the literature shows that companies that use prospector business strategies are more interested in voluntary disclosure and analytical coverage than those that use defender business strategies. These factors reduce information asymmetry and uncertainty about a firm's value, which may mitigate crash risk (Bentley *et al*., 2017). Nevertheless, the prior research has not assessed the relationship between firms' business strategies and crash risk and how various strategies impact crash risk in the middle east, especially in Egypt. Thus, the current research discovers the influence of a company's business strategies on crash risk.

Management entrenchment may cause a manager to overestimate his knowledge and experience and gain more power, enabling them to use their positions in the company for their interests rather than shareholders (Surroca & Tribó, 2008). Managerial entrenchment occurs when managers can gain more power to access benefits for themselves by taking advantage of the company's interests. Managers adopt strategies and exploit weaknesses in the company's control environment to increase the margin of their role in managing the company, increase their opportunities and establish themselves within the organization, making it difficult to expel them quickly. This phenomenon causes distrust of stockholders and creditors towards managers, leading to suspicion of others on investment.

The inability of investors to diversify away from severe negative returns (negative skewness) justifies further investigation into the determinants of crash risk. Some determinants of crash risk include earning management (Loureiro & Silva, 2018); tax avoidance (Garg *et al*., 2020); CEO power (Zarei *et al*., 2018); and managerial ability (Liu & Lei, 2021; Habib & Hassan, 2017b) have been reached in the literature. Moreover, previous research has investigated the effect of business strategies on crash risk (Safi *et al*., 2022; Xu *et al*., 2022; Habib & Hasan, 2017a). The current study investigates the impact of corporate business strategy and managerial entrenchment on crash risk in the Egyptian context. Accordingly, this study seeks to answer the question of to what extent business strategies and managerial entrenchment affect the crash risk of listed Egyptian firms via the following sub-questions:

- What is the extent of the impact of business strategy types on the crash risk in Egyptian firms?
- What is the extent of the impact of managerial entrenchment on crash risk in Egyptian firms?

1.1. *Objectives of the Study*

According to those above, this research examines the correlation between managerial entrenchment, business strategy, and future crash risk. Additionally, it determines the impact of managerial entrenchment and

various business strategies on future crash risk and finds out the effect of some firm characteristics on future crash risk.

1.2. *Significance of the Study*

This study contributes to the existing literature in several ways. First, it examines the impact of managerial entrenchment on the crash risk, which has yet to be examined in general and Egypt. Further, this study examines the influence of business strategy on crash risk, as studies have yet to be conducted to explore the effects of a company's business strategy on crash risk and how various strategies affect crash risk in the middle east, especially in Egypt. Therefore, this study gives a fundamental perception of crash risk determinants to assist stakeholders in decision-making then investing in less risky companies in Egypt.

1.3. *Limitations of the Study*

The study uses the data of non-financial companies in the EGX100 index, only firms whose data is available for all study variables. The data cover 2017-2021, the latest information available during the study. Financial firms are excluded since they differ from non-financial firms, and some characteristics may not be comparable.

The residual of the study is presented as the next section discusses the pertinent literature to developing the research hypotheses. Section three presents the research method, which clarifies the variables' measurement, specifies the study models, and explains the statistical analysis tools. Then, section four offers the practical study and hypotheses testing, which discusses the statistical analysis results and their interpretation. Finally, conclusions and recommendations are shown in the last section.

2. Theoretical Background and Hypotheses Development

2.1. Business Strategy:

The management literature provides several patterns for a business strategy using accounting indicators to show how firms compete in their market environments. The business strategy improves firms' competitive position within a specific industry and market. Thus, to survive and maximize their placement in terms of strengths and weaknesses, firms must

establish a proper strategic method to enhance organizational performance (Di-Meo et al., 2017). March (1991) classifies business strategies into exploration and exploitation, and Treacy & Wiersema (1995) define business strategies into operational excellence, product leadership, and customer confidence. Miles and Snow 2003, define business strategies into cost leadership and product diversity. Prior studies focus on the two different strategies of Miles and Snow (2003) as they classified business strategies into two opposing sides strategies prospectors (innovation-oriented) and defenders (efficiency-focused). That is because Miles and Snow's (2003) classification can be put into practice using disclosed financial reporting data; however, the other categories require personal interviews and surveys.

Prospectors focus on innovation, produce more uncertainty in outcomes, and face more agency problems, thus requiring compensation contracts that reassure risk-taking and take a longer-term perception, permitting innovative views to realize profitable results (Singh & Agrawal, 2002; Rajagopalan, 1997). Miles and Snow (2003) defined prospectors as innovative firms looking to recognize and invent new goods and markets, so prospectors place budgets related to R&D and marketing. However, prospectors are not often achieving high efficiency in their production and distribution. In addition, they care about organizational stability, so they avoid long commitments and maintain a low level of technicality or red tape by utilizing the knowledge and skills of a firm staff.

On the other hand, Miles and Snow (2003) identified defenders as firms prioritizing efficiency in producing and distributing products and services. Because of their narrow views, defenders advance closely associated products and services instead of the pursue new products and market prospects, thus limiting efforts in developing their products. In contrast to prospectors, who "protect" the marketing and research & development roles, defenders "protect" the finance and producing functions. Unlike prospectors, defenders are growing thoughtfully and increasingly by penetrating the market and thus showing low, steady growth. Defenders maintain strict central organizational control to certify efficiency; according to Miles and Snow (2003), these firms often have a long employee tenure with an internal

promotion. Efficient production and distribution necessitate defenders to support heavily an efficient technology, which focuses on cost-efficient "single-core" technology and continuous enhancement that leads to routine and mechanization.

Prior studies examined the impact of the two opposing sides of the strategy chain, prospectors' and defenders' business strategies, on crash risk (Safi et al., 2022; Xu et al., 2022; Habib & Hasan, 2017b). However, the literature still needs to assess the relationship between a company's business strategy and crash risk and how various strategies impact crash risk in the middle east, especially in Egypt. Thus, the current study discovers the influence of a company's business strategies on crash risk in Egyptian Firms.

2.2. Managerial Entrenchment:

Entrenchment theory, developed by Shleifer & Vishny (1989), provides a framework to assess the opportunistic behavior of managers and its influence on control systems and firm performance. Managerial entrenchment is a set of actions managers take to maintain their existing positions and raise their compensation. Entrenchment theory attempts to clarify how agents can use the mechanisms that likely enhance firm performance to guarantee themselves in their careers (Dhaoui & Jouini, 2019). As a result, managers adopt a strategy that allows them to avoid all or some governance mechanisms to gain a position of superiority that cannot remove and is made difficult and costly to replace (Bilel, 2020). For example, under the entrenchment theory, once the CEO is the board chairman, he can make a series of decisions that seem to benefit the company but are harmful to shareholders, leading to an outflow of capital from the stock exchange. Finkelstein & Hambrick (1989) argue that the position and internal authority of the CEO are positively correlated, making it hard for boards to banish long-serving CEOs.

Moreover, shareholders' actions against management are expensive for certain shareholders (Fluck, 1999) and occasionally aren't legal options. Agency theory asserts that management entrenchment emphasizes the variance between shareholders and managers, and entrenched managers are considered for personal gains (Jensen & Ruback, 1983). As a result, even competent managers try to stabilize their positions by weakening corporate

governance and control procedures. Classic agency theory studies support effective company control to prevent wealth appropriation by managers (Florackis, & Ozkan, 2009), as agency literature agrees that managerial entrenchment results from weak governance. Weak governance allows managers to prioritize their personal goals over corporate ones (Bebchuk et al., 2009). Alternatively, it is associated with low-quality financial reporting procedures (Klein, 2002). Zhao & Chen (2008) argue that there is an association between managerial entrenchment and earnings management; entrenched managers avoid difficult decisions and costly efforts.

Appropriate corporate governance mechanisms assist in disciplining investments (Suman & Singh, 2020), preventing earnings management (Zehri & Zgarni, 2020; Suyono & Al Farooque, 2018), and improving the information environment (Jacoby et al., 2019). Thus, suitable corporate governance mechanisms may minimize opportunistic managerial behavior correlated with lower crash risk. So crash risk can be used as a proxy for corporate governance mechanism effectiveness. Thus, a lower rate of crash risk indicates higher corporate governance mechanism effectiveness.

Previous research demonstrates that managers have motives to opportunistically hide opposing news from stakeholders because of worries about their careers, compensation agreements, legal risks, and earnings. The bad news hoarding theory established by Jin and Myers (2006) indicates that when managers hide bad news for long periods, the negative information is locked within the firm. Then, when the accumulated bad news hits a certain threshold, all previously hidden unpleasant firm-specific shocks are made public at once, which causes a sudden drop in stock prices. Subsequent studies verified the hypothesis (Hutton et a1., 2009; Benmelech et a1., 2010). Thus, this study premises the "information hiding hypothesis" of Jin & Myers (2006), which relies on agency and information asymmetry theories. Managerial entrenchment is more likely to cause information asymmetry and provide more opportunities to hide bad news for managers, eventually leading to crash risk.

2.3. Literature Review and Hypotheses Development

Prior research mentions some factors that are likely to determine crash risk. This section reviews related literature that explores the determinants of crash risk and discusses the association of crash risk with business strategies and managerial entrenchment. The theoretical and empirical relationship between crash risk, business strategies, and managerial entrenchment is highlighted.

2.3.1. Studies related to Crash Risks

Several studies refer to the influence of corporate governance mechanisms on crash risk. The results confirm that effective corporate governance systems increase control activities, reducing the managers' intention to hide bad news from outsiders, thus, reducing crash risk. Tarkovsky's (2016) study investigates the association between corporate governance attributes and crash risk in UK firms, using data from 692 non-financial companies listed on London Stock Exchange during 1997 - 2010. Results showed a significant positive relationship between CEO Pay Slice, board busyness, and crash risk. Conversely, firms with increasing CEO Pay Slice and boards' busyness are exposed to higher levels of crash risk. The findings also directly impacted the public discussion on reducing the number of executive directorships. The study argues that the board's busyness level determines the board's efficiency.

Moreover, Sihombing & Diyanty (2019) investigates the effect of corporate governance mechanisms on one-year-ahead crash risk. The sample includes 277 non-financial firms listed on Indonesia Stock Exchange in 2016. The results showed that family ownership and accounting opacity do not affect crash risk. However, their findings also showed that the board of commissioners' effectiveness negatively impacts crash risk.

Likewise, Jeon (2019) investigates the relationship between corporate governance and crash risk. The study verifies if suitable governance structures (board of directors' characteristics) mitigate opportunistic managerial behaviors. The results show direct evidence of the association between crash risk and the board of directors' attributes by applying an OLS regression model using data from 3,635 non-financial listed Korean firms

during 2006 – 2015. Therefore, effective corporate governance may decrease crash risk.

Other research investigates the association between CEO power and crash risk. Such as, Zarei et al. (2018) examine the effect of CEO power on crash risk. The sample includes 78 with 312 balanced observations of non-financial listed Iranian firms during 2014 – 2017. In addition, it employed an index including CEO duality, ownership power, and CEO tenure as the bases of CEO power and negative conditional return skewness as a proxy to crash risk. The results show a significant negative association between CEOs' power and crash risk.

Similarly, Al Mamun et al. (2020) investigate the impact of powerful CEOs on crash risk. They used variables from the Compustat with a sample of 24,300 firm-year observations. The results indicate that powerful CEOs positively correlated with crash risk. In addition, such an association holds when controlling for earnings management, tax avoidance, CEO option incentives, and CEO overconfidence.

The study of Harper et al. (2020) responds to the call of Habib et al. (2018) by presenting further empirical indications on the consequences of crash risk. Thus, they investigate the influence of crash risk on future CEO power using a panel sample of 17,816 observations. The results found a significantly negative effect of crash risk on CEO power, signifying that CEO's power declined subsequently stock price crashes. Such derivatives are more robust for firms with female CEOs and shorter-tenure CEOs; however, such significant negative diminish for firms with strong corporate governance. Therefore, the literature provides sufficient evidence that CEOs' power negatively affects crash risk. These findings show CEOs' power weight in prompting crash risk and assure that enhancing CEOs' power alleviates crash risk.

Prior literature also assesses the impact of debt structures on crash risk. Wang et al. (2020) investigated the effect of debt financing on crash risk in non-financial Chinese A-share listed firms during 2002–2016. They excluded firms with a negative book value of equity or less than 30 weeks of stock returns data. The findings demonstrate a negative relationship between

crash risk and the debt financing level, suggesting that creditor monitoring reduces the managers' intention to hide bad news from outsiders in the weak information environment.

Similarly, Elsayed (2021) investigates the impact of debt structures on future crash risks to assist investors in understanding the determinants of crash risk and changing their investing habits. The study sample comprises 13 real estate sector firms listed on the Egyptian Stock Exchange from 2013 - 2019. The findings indicate that firms with more significant debt levels are less likely to crash risk.

Other studies examine the influence of ownership structure on crash risk. For example, Gao et al. (2017) analyze how firm ownership concentration influences crash risk for Chinese firms. The findings demonstrate that ownership concentration negatively influences firm-specific crash risk. Further evidence reveals that such a relationship is more evident in privately held firms compared to state-owned firms.

Likewise, Rahimzadeh et al. (2022) focus on the ownership structure of firms in their investigation of the variables influencing the stock price crash risk in firms listed on the Tokyo Stock Exchange. The results show a negative association of crash risk with management ownership, return on assets (ROA), the market-to-book value ratio of equity, and the ownership stake of 10 major shareholders. Because the chance of a stock price crash decreases when the firm's managers are also shareholders, there is less motivation to manipulate stock prices. Also, the crash risk is positively influenced by excessive financial leverage, institutional ownership, and firm size. Moreover, Hosseinzadeh et al. (2021) reveal a positive impact of institutional ownership on crash risk.

Furthermore, Moradi et al. (2021) explore the macroeconomic factors that influence crash risk and find an association between some firm characteristics and crash risk in the uncertain economic condition of Iran's market. The sample includes 152 with 912 balanced observations of non-financial listed Iranian firms during 2014 - 2019. The study employed a fixed effect model for panel data and the DUVOL to measure crash risk. The results showed that inflation and unemployment rates are positively associated with crash risk. However, there is a negative correlation between

crash risk and GDP and exchange rates. At the same time, they argue that increasing inflation and unemployment reduce savings, people's purchasing power, and the firms' sales due to the increase in the manufacturing price. They also indicate that increasing the exchange rate led stockholders to prefer to acquire firms' shares to sustain their purchasing power.

In addition, Fatima et al. (2020) evaluate the relationship between real earnings management and crash risk. They examine the indirect consequences of the crash due to implementing real earnings management. Their study utilized data from family firms in Pakistan during 2005–2018. The results show that real earning management significantly impacts crash risk among family firms. Results also indicate that indirect consequences are more prominent for firms facing uncertainty.

The study by Xie et al. (2020) examines how M&A goodwill affects the capital market, how to avoid crash risk, and how to support the market's orderly growth. Thus, they used 17142 observations of Chinese A-share listed companies during 2008 - 2016. The results express that firms with goodwill have a higher crash risk, and the goodwill value influences the crash risk via information asymmetry at the corporate and market levels.

2.3.2. Studies related to Business Strategy and managerial entrenchment:

Salehi & Arianpoor (2021) evaluate the effect of a firm's business strategy on managerial entrenchment in non-financial listed Iranian firms. The sample includes 128 firms during 2012–2017. They followed the composite strategy score of Bentley *et al*. (2013); they applied five factors: managerial ownership, board independence, CEO tenure, managers' compensation, and CEO duality to measure the managerial entrenchment variable. The results found a significantly negative association between the current year's aggressive (prospector) strategy (and that of the previous year) and managerial entrenchment. Such a result indicates that adopting a prospector business strategy both now and in the past can weaken managerial entrenchment. Also, the current year's defensive strategy and management entrenchment are negatively associated. On the other hand, the prior year's defensive strategy is not associated with management entrenchment.

2.3.3. Studies related to Business Strategy and Stock Price Crash Risk:

There is increasing interest in a firm's business strategy, as it influences investment decisions and performance (Navissi *et al*.، 2017). Firms that adopt innovative solutions for quick expansion may increase irregularities and misinformation, which can result in poor financial reporting transparency and is one of the leading reasons for crash risk (Habib & Hasan، 2017a). The company's main concern is the risks associated with these business strategies. Some studies refer to the influence of firm business strategies on crash risk.

Arianwuri *et al*. (2017) studied the influence of the business strategy (prospector and defender firms) and equity market competition on crash risk. The sample included 224 manufacturing firms on the Indonesia Stock Exchange during 2010-2016. The findings show that the prospector business strategy positively impacts crash risk, whereas the defender strategy has no impact. Firms that realize business prospector strategies face higher uncertainty than defender business strategies. The results also show that firms that adopt business prospector strategies lead to overvalued equities, which results in future crash risk. One way to reduce the crash risk is equity market competition. Equity market competition negatively affects crash risk; consequently, A high level of competition in the equities market can reduce information asymmetry and crash risk.

Moreover, Habib & Hassan (2017a) studied the influence of a firm business strategy on crash risk and the moderate effect of equity overvaluation on such a relationship. They followed a composite strategy score established by Bentley *et al*. (2013) and applied two variants of crash risk. The results show that companies adopting prospectors' business strategies are more likely to crash risk than defenders. They also find that prospectors are more prone to equity overvaluation, which, in turn, increases future crash risk. Additionally, prospectors are more likely to have equity overvaluation, which raises the chance of future crash risk.

Hosseinzadeh *et al*. (2021) investigate the effect of business strategy and stock price on crash risk. They followed a composite strategy score established by Bentley *et al*. (2013) as a proxy for business strategy, the

market model regression by Chen *et al*. (2001) to calculate the firm-specific crash risk, and the R2 method of Johnstone (2010) to calculate the stock price synchronicity. The study used data from 171 non-financial firms listed on the Iranian Stock Exchange during 2013 - 2018, and data were analyzed using a regression model. The findings indicate that companies that adopt a defender (prospector) business strategy are less (more) prone to crash risk. Also, results demonstrate a positive effect of stock price synchronization on crash risk. However, the interactive impact of business strategies and stock price on firm-specific crash risk is insignificant.

Using data from firms listed on the Chinese stock exchange during 2006-2019, Safi *et al*. (2022) examined the influence of a company's business strategy and market power on crash risk. They followed Miles and Snow's (2003) model to categorize companies into defenders and prospector business strategies. Industry and year-fixed effect regression models are utilized. The results show that a firm with a prospector strategy is more likely to crash risk than the defender. Additionally, the findings indicate that high market power also increases crash risk.

Based on the aforementioned preceding literature, it is concluded that:

- None of the previous studies examined the influence of managerial entrenchment on crash risk in general and in the Egyptian business environment in particular. Therefore, it is a fertile area for research.
- While the relationship between a firm's business strategies and crash risk examined in developed and developing economies, for example, Hosseinzadeh *et al*. (2021) in Iran, Safi *et al*. (2022) in China, Habib & Hassan (2017a) in the UK, and Arianwuri *et al*., (2017) in Indonesia, such research has not been conducted in Egypt. According to the contingency theory, the association between a firm's business strategy and crash risk differs according to the diverse institutional environment. Therefore, studying such a relationship in the Egyptian context is required.
- According to the entrenchment theory (Morck *et al*., 1988), corporate governance mechanisms are insufficient to ensure that

management maintains the advantages to shareholders, and the managers' power has to be restricted (Aroui & Omri, 2008).

- Business strategies are crucial to a company's success. Still, poorly executed can result in financial irregularities and mispricing, negatively impacting the company's performance and increasing the crash risk.
- Most prior research shows that firms that adopt a prospector business strategy are more likely to crash risk than defenders (e.g., Safi *et al*., 2022; Hosseinzadeh *et al*., 2021; Habib & Hassan, 2017a; Arianwuri *et al*., 2017).

Based on the previous literature mentioned above and by considering the objective and nature of the research given, the proposed hypotheses are as follows:

H1: Managerial entrenchment has a statistically significant impact on the crash risk.

H2: A firm's business strategy has a statistically significant impact on the crash risk.

H3: Firms with prospector business strategies are more likely to have crash risk than defenders.

3. Research Methodology

This section presents the research method, which determines the sample and data sources, clarifies the variables' measurement, specifies the study models, and explains the statistical analysis tools.

3.1. Sample and Data Sources

Firms listed on the EGX-100 index were selected as a proxy for the Egyptian context from 2017 to 2021. That is because the EGX-100 index contains Egypt's 100 most active firms. Moreover, the EGX-100 index consists of the EGX30 index firms and the EGX70 index firms. Therefore, it is supposed that EGX-100 index firms have good governance and reporting.

The research sample was selected from EGX-100 index firms with the following conditions:

- Banking and non-banking finance sectors were excluded because financial institutions have a particularly technical and accounting nature. They are also subject to their regulations, which differ from those of other companies.
- Continuity of the company's listing on the Egyptian Stock Exchange without delisting or stopping during 2017-2021.
- Availability of the data required for variables measurement during 2017-2021.
- The currency of a company's financial reports is the Egyptian pound.
- Availability of all the weekly Historical Data during 2017-2021.
- There should be at least three firms in the industry.

Thus, the research sample consists of 40 companies from 7 sectors during 2017 - 2021 and consists of 200 balanced observations. Data include the published financial statements, often available on the Mubasher Info Egypt website https://www.mubasher.info/countries/eg. Moreover, the information in the minutes of meetings of the shareholders' general assembly and firms' board reports are available on the Egyptian Stock Exchange website: https://www.egx.com.eg/en/homepage.aspx and a firm's website. Table (1) shows the number of observations representing the research sample distributed over the sectors.

Table (1): Sample and Composition

Sector	***Observations***	***% Observations***
Real estates	50	25
Health care and medicine	15	7.5
Building Materials	25	12.5
Food, drinks, and tobacco	30	15
Communications, media, and IT	15	7.5
Tourism and Leisure	20	10
Automotive and industrial products	15	7.5
Basic resources	30	15
Total	***200***	***100***

3.2. Variables Measurement

3.2.1. Dependent Variable

Firm-specific stock price crash risk serves as the study's dependent variable. Based on previous literature on crash risk (e.g., Safi *et al*., 2022; Elsayed, 2021; Chae *et al*., 2020; Habib & Hasan, 2017a), this study utilizes three measures as dependent variables based on the weekly stock return for a firm i in week t and t+1 and t-1 estimated as residuals from using the following market model (Kim *et al*., 2016):

$$R_{it} = \alpha i + \beta_{1i} R_{m\,(t-2)} + \beta_{2i} R_{m\,(t-1)} + \beta_{3i} R_{mt} + \beta_{4i} R_{m\,(t+1)} + \beta_{5i} R_{m\,(t+2)} + \varepsilon_{it} \quad (1)$$

Where R_{it} is a stock return of firm (i) at week (t), R_m is the return on the market index (EGX100) in a week (t), and ε_{it} is the error of firm (i) at week (t) which has a very skewed distribution. Thus, the extremely negative weekly return for a firm (i) at week (t) (W_{it}) is calculated as the natural logarithm of one plus the extreme stock return:

$$W_{it} = ln\,(1+\varepsilon_{it}) \quad (2)$$

Measures of stock price crash risk:

a. Down-to-Up Volatility (DUVOL)
b. Negative Conditional Return Skewness (NCSKEW)
c. Aggregate Crash Risk (AGG)

Measuring the three measures of crash risk as the dependent variable is as follows:

a. (DUVOL)

The first crash risk measure is the Down-to-Up Volatility (DUVOL) (Safi *et al*., 2022; Elsayed, 2021; Chae *et al*., 2020; Kim *et al*., 2011). First, firm-specific weekly returns are divided for each firm-fiscal year into "up" weeks and "down" weeks based on whether they are above or below the annual mean. Then, calculate the firm-specific weekly returns' standard deviation for these two categories. DUVOL is the logarithm of the standard deviations ratio of firm-specific returns on the "down" weeks to the standard deviations of firm-specific returns on the "up" weeks as follows:

$$DUVOL_{k,t} = log\{(n_{up} - 1) \Sigma_{down} W^2_{k,t} / (n_{down} - 1) \Sigma_{up} W^2_{k,t}\} \quad (3)$$

b. NCSKEW

The second crash risk measure is Negative Conditional Return Skewness (NCSKEW). NCSKEW is obtained by dividing the standard deviations of firm-specific weekly returns raised to the third power by the negative of the third moment of particular weekly returns for each sample year (Kim *et al*. 2011) as follows:

$$NCSKEW_{k,t} = -[n(n-1)^{3/2} \Sigma W^{3}_{k,t}] / [(n-1)(n-2)(\Sigma W^{2}_{k,t})^{3/2}] \quad (4)$$

c. *AGG:*

The third measure of crash risk is an Aggregate Crash Risk (AGG), which is measured according to the rank of the two crash risk measurements mentioned above, DUVOL & *NCSKEW*, (Elsayed, 2021; Šodan, 2015). Whereas firms are ranked based on each of the two different measures of crash risk, then their average is a firm aggregate crash risk (AGG). Therefore, the aggregate measure of crash risk for firms is calculated as follows:

$$AGG_{it} = [Rank\ (DUVOL_{it}) + Rank\ (NCSKEW_{it})]/2 \quad (5)$$

3.2.2. Independent Variable

In this study, business strategy and managerial entrenchment are the independent variables.

3.2.2.1. Business strategy (BusSt)

Consistent with the organizational theory of Miles & Snow (2003) and following Bentley *et al*. (2013); Ittner *et al*. (2003), this study uses a composite strategy score as a proxy for a firm's business strategy. Higher scores represent a firm with a prospector strategy, and lower scores represent a firm with a defender strategy. The financial statements of the study sample didn't contain any figures for costs associated with research and development (R&D), as these are included in general and administrative expenses (SG&A). Thus, the following five accounting variables are applied to determine a corporate strategy:

(1) *Production efficiency:* is related to a firm's ability to efficiently produce and distribute goods and services, calculated by dividing the number of staff by a firm's net sales.

(2) *Growth:* is calculated from the proportion changes of a firm's net sales, which are equal to [(sales $_{t}$ – sales $_{t-1)}$ / sales $_{t-1}$].
(3) *Marketing efforts;* focus on using new goods and services calculated by dividing the selling, general and administrative expenses (SG&A) by a firm's net sales.
(4) *Organizational stability:* is the standard deviation of the natural logarithm of the firm employees' number.
(5) *Capital intensity*: refer to a firm's commitment to technological efficiency and can be computed by dividing net fixed tangible assets by total assets.

The process is carried out for each of the five variables. Firstly, all variables are calculated over five years. Then, within each company year, the obtained observations are quintile. Firms in the first lowest quintile take a score of 1, and the next lowest quintile takes a score of 2. The third lowest quintile takes a score of 3. The fourth and fifth quintiles take scores of 4 & 5, respectively. However, capital density scored inversely given in the highest (lowest) quintile with a score of 1 (5).

Each of the five variables is ranked by creating quintiles within each industry year. The obtained score for firms would be between 5 and 25. The extreme possible score is 25 (Prospector type), which indicates a prospector business strategy (AGST), and the lowest possible score is 5 (Defensor type), which shows a defensive business strategy (DFST). Increasing the score means moving the firm from a defensive to a prospector strategy. The range of business strategy for the research sample scores is 23 and 5.

Then, firms are separated into two categories based on business strategy. A firm is considered a defender if the mean value of a firm's business strategy is lower than the industry's mean value. In comparison, a firm is regarded as a prospector or aggressive if the mean value of a firm's business strategy is higher than the mean value of the industry.

3.2.2.2. Managerial entrenchment (ME)

Following Lin *et al*. (2014) and Salehi *et al*. (2018), this study uses a composite variable as an index to be a single variable, titled managerial entrenchment (ME), using six variables. The six variables are board compensation, board independence, CEO duality, CEO ownership, CEO

tenure, and CEO change. The current study analyzed the main components based on the six characteristics of the CEO.

Exploratory Factor Analysis (EFA) is applied to compute managerial entrenchment. EFA is a method of variable aggregation as it combines a group of variables to create a single variable (managerial entrenchment). Based on the results of the correlation matrix, this analysis also helps weight each variable included in the managerial entrenchment. Before performing an EFA analysis to calculate managerial entrenchment to obtain an index including all six above factors, the Kaiser-Meyer-Olkin (KMO) test was performed, and the Bartlett test was utilized to determine the normality of the data.

Table (2) shows the KMO test statistic value of 0.592; if the value is less than 0.5, EFA analysis cannot be utilized. If the statistical value is between 0.5 and 0.7, the analysis could be used, and a value of more than 0.7 means such an analysis can be used powerfully. Hence, the data is suitable for EFA analysis. Using the Bartlett test, the null hypothesis is tested, and the p-value is 0.000. Therefore, the null hypothesis is rejected, and the data are appropriate for performing an EFA analysis.

Table (2): KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.592
Bartlett's Test of Sphericity	Approx. Chi-Square	140.211
	Df	15
	Sig.	0.000

As for the Measure of Sampling Adequacy (MSA), to achieve this condition, the MSA measure for each variable resulting from the Anti-image Covariance analysis must be higher than 0.05. Table (3) show that all the MSA values that appear in the diagonal cells of the shaded correlation coefficients exceed 0.05, which indicates that the correlation between each variable and the other variables in the correlation matrix is sufficient to perform the exploratory factor analysis.

Table (3): Anti-image Matrices

		Board-comp	CEO-share	Duality	CEO-tenure	CEO-change	BINDEP
Anti-image Correlation	Board-comp	0.691[a]	-0.032	0.03	-0.013	0.083	-0.137
	CEO-share	-0.032	0.712[a]	0.073	0.06	-0.063	0.013
	Duality	0.03	0.073	0.521[a]	-0.07	0.044	0.526
	CEO-tenure	-0.013	0.06	-0.07	0.525[a]	0.494	-0.047
	CEO-change	0.083	-0.063	0.044	0.494	0.526[a]	0.03
	BINDEP	-0.137	0.013	0.526	-0.047	0.03	0.516[a]
[a] Measures of Sampling Adequacy (MSA)							

For calculating the managerial entrenchment variable, information about the six factors for each company is collected in a year. Then the linear correlation coefficient matrix for the six variables mentioned above is extracted for each year. Then 6-fold variables are weighted, and the managerial entrenchment variable is attained from the total weight by multiplying the factor with the numerical value of the relevant element.

The advantage of exploratory factor analysis is that, unlike previous studies, weight is allocated to every managerial entrenchment variable according to the correlation coefficient matrix output, which aligns the impact of each of the six-factor.

3.2.3. Control Variables

The literature indicates several variables that could affect the crash risk (Safi *et al*., 2022; Salehi & Arianpoor, 2021; Hosseinzadeh *et al*., 2021; Elsayed, 2021; Navissi *et al*., 2017; Habib & Hassan, 2017a; Arianwuri *et al*., 2017), and they are defined as governing variables as follows:

TURN: is the average turnover ratio calculated by the difference between the average monthly stock turnover in the year (t) and (t-1). Monthly stock turnover is measured by dividing monthly trading volume by the total number of outstanding monthly stocks (Safi, *et al*., 2022; Hosseinzadeh *et al*., 2021).

Aver. Return: is the average weekly returns calculated by dividing the total weekly returns during the year by the number of weeks that generated returns during the year (Safi, *et al*., 2022; Hosseinzadeh *et al*., 2021).

SIZE: is the firm's size obtained from the natural logarithm of the total assets (Ji et al., 2020; Chen & Zhang, 2014).

BIG4: is a dummy variable that equals one if the auditor is one of the Big4 firms or accountability state authority and zero for otherwise.

LEV: is the company's financial leverage computed by dividing the book value of liabilities by total assets (Ji et al., 2020; Chen & Zhang, 2014).

Age: is the firm's age obtained from the natural logarithm of firm age.

SGR: is the sales growth rate measured by: ($Sales_t$ - $Sales_{t-1}$ / $Sales_{t-1}$)

PPE: is the tangible fixed assets ratio, equal (tangible fixed assets / total assets).

ROA: is the return on assets equal (net income / average total assets).

MTB: is the market-to-book ratio calculated from the market value to the book value of equity.

Codes and measurements of the used variables are shown in table (4).

Table (4): Variable Definitions and Measurement

Symbol	Description	Measurements
Dependent Variables		
DUVOL	Down-to-Up Volatility	$DUVOL_{k,t} = log\ \{(n_{up}-1)\ \Sigma\ down\ W^2_{k,t}\ /\ (n_{down}-1)\ \Sigma\ up\ W^2_{k,t}\}$
NCSKEW	Negative Conditional Return Skewness	$NCSKEW_{k,t} = -[n(n-1)^{3/2}\ \Sigma\ W^3_{k,t}]\ [(n-1)(n-2)(\Sigma\ W^2_{k,t})^{3/2}]$
AGG	Aggregate Crash Risk	AGG_{it} = [Rank ($DUVOL_{it}$)+Rank ($NCSKEW_{it}$)]/2
Independent Variables		
ME	Managerial Entrenchment	Converting six variables to one variable, using exploration factor analysis (EFA), the six variables are: -Board compensation -CEO ownership -CEO duality -CEO tenure -CEO change -Board independence.
BusSt	Business Strategies	Five accounting variables are used for determining a firm strategy as follows: -Production efficiency; (# of staff / A firm's net sales) -Growth; [(Sales t – Sales t-1) / Sales t-1]. -Marketing efforts; (SG&A exp. / A firm's net sales -Organizational stability; StdDev of the ln of the firm staff's number -Capital intensity. (Fixed tangible assets / Total assets). Following Bentley *et al.* (2013), the study uses a

		composite index as a proxy for a firm's business strategy.
AGST	Prospector business strategy	Firms whose mean value of their BusSt is higher than the mean value of BusSt for the industry
DFST	Defensive business strategy	Firms whose mean value of their BusSt is less than the mean value of BusSt for the industry.
Control variables		
TURN	Average Turnover	Average monthly stock turnover in a year (t) - (t-1)
Aver. Return	Average weekly returns	Total weekly returns during the year/number of weeks that generated returns during the year.
LEV	Financial leverage	Total Liabilities / Total Assets
ROA	Return on assets	Net Income / Average Total Assets
SIZE	Firm size	The natural logarithm of total assets
SGR	Sales growth	$(Sales_t - Sales_{-1} / Sales_{t-1})$
MTB	Market to book value	Market value of equity / Book value of equity
Age	Age of Company	The natural logarithm of firm age
BIG4	Audit quality	A dummy variable equals one if the audit firm is a big4 firm or accountability state authority and zero otherwise.

3.3. Models Specification

Three models were developed, one for each crash risk proxy. Model (1) is formed to test the effect of business strategies and managerial entrenchment on crash risk using down-to-up volatility (DUVOL) as a proxy for crash risk as follows:

Model$_1$:

$$DUVOL_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 BusSt_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Moreover, to test hypothesis H3. Sample firms are separated into two categories based on business strategy. If a firm's business strategy's mean value is higher than its industry's, that company is considered prospecting or aggressive. In contrast, a firm is viewed as a defender if its business strategy's mean value is less than its industry's. Thus, $model_1$ will be applied for prospector firms with the symbol $Model_{1AGST}$ and defensive firms with the symbol $Model_{1DFS}$ as follows:

Model$_{1AGST}$:

$$DUVOL_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 AGST_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Model$_{1DFST}$:

$$DUVOL_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 DFST_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Model (2) is formed to test the effect of business strategies and managerial entrenchment on crash risk using negative conditional return skewness (NCSKEW) as a proxy for crash risk as follows:

Model$_2$:

$$NCSKEW_{it} = \beta_0 + \beta_1 \mathrm{ME}_{it} + \beta_2 \mathrm{BusSt}_{it} + \beta_3 \mathrm{TURN}_{it} + \beta_4 \mathrm{Aver.\ Return}_{it} + \beta_5 \mathrm{MTB}_{it} + \beta_6 \mathrm{LEV}_{it} + \beta_7 \mathrm{ROA}_{it} + \beta_8 \mathrm{SIZE}_{it} + \beta_9 SGR_{it} + \beta_{10} \mathrm{Age}_{it} + \beta_{11} \mathrm{Big4}_{it} + \epsilon_{it}$$

Similar to *Model$_1$*, *Model$_2$* will be applied for prospector firms with the symbol *Model$_{2AGST}$* and defensive firms with the symbol *Model$_{2DFST}$* as follows:

Model$_{2AGST}$:

$$NCSKEW_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 AGST_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Model$_{2DFST}$:

$$NCSKEW_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 DFST_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Model (3) is formed to test the effect of business strategies and managerial entrenchment on crash risk using aggregate crash risk (AGG), which is measured according to the rank of DUVOL and $NCSKEW$ as a proxy for crash risk.

Model$_3$:

$$AGG_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 BusSt_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Model$_3$ also will be applied to the two opposing sides of the strategy chain, prospector firms with the symbol *Model$_{3AGST}$* and defensive firms with the symbol *Model$_{3DFST}$* as follows:

Model$_{3AGST}$:

$$AGG_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 AGST_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Model$_{3DFST}$:

$$AGG_{it} = \beta_0 + \beta_1 ME_{it} + \beta_2 DFST_{it} + \beta_3 TURN_{it} + \beta_4 Aver.\ Return_{it} + \beta_5 MTB_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \beta_9 SGR_{it} + \beta_{10} Age_{it} + \beta_{11} Big4_{it} + \epsilon_{it}$$

Coefficient β1 is the coefficient appraisal of the managerial entrenchment composite index, and β2 is the coefficient appraisal of the business strategies composite index. B3 to β11 are the coefficients appraisal of the control variables, and ϵit = random error represents the residual value, which expresses the difference between the actual and expected values of the crash risk for firm i in year t. Table (4) presents the definitions of model symbols and their measurements in detail.

3.4. Statistical Analysis Tools

The study data is longitudinal data collected for sample items during a specific period. This data represents a mixture of cross sections data (40 firms) and time series data (5 years). When these two types are combined, it produces Panel Data (McManus, 2015). The study relied on a panel data model to avoid defects in models based on time series only or cross-sectional data only. In addition, the panel method can be applied using random and fixed effects models because such a model reduces the multiple correlations between independent variables (McManus, 2015). Three tests were run to identify the appropriate statistical analysis tools before testing

the hypotheses. These three tests are the Hausman test, Wooldridge test, and White test, as follows:

Hausman test:

Hausman's test distinguishes between the fixed and random effects models. If the p-value of the test is more than the level of significance $\alpha = 0.05$, the random effects model is the best to represent the data. However, if the p-value is less than the value of the level of significance $\alpha = 0.05$, the fixed effects model is the best model for representing the data. Table (5) shows the results of Hausman tests which express that the p-values of all models are more than the value of the standard significance level of 0.05, suggesting that the random effects model is the best model for representing the data in all regression models. The statistical program that fits with this type of data is the STATA program, as shown in the empirical study and tests of hypotheses.

Wooldridge test:

Wooldridge test is applied for all study's models to test the first-order autocorrelation. Results of the Wooldridge test revealed in table (5) indicate that the p-values for all models are more than the value of the standard significance level of 5%, which suggests that there is no first-order autocorrelation of errors and is an indicator of acceptance of all regression models.

Table (5): Results of the Hausman test, Wooldridge test, and White test

Models	Hausman test			Wooldridge test			White test		
	Test statistic	p-value	Result	Test statistic	p-value	Result	Test statistic	p-value	Result
$Model_1$	2.478	0.529	Random	2.648	0.112	Absence of autocorrelation of error terms	21.75	0.712	Homoskedasticity of the variance error term
$Model_{1AGST}$	12.525	0.326	Random	0.062	0.805		83.89	0.277	
$Model_{1DFST}$	9.956	0.534	Random	2.882	0.110		76.85	0.4517	
$Model_2$	12.364	0.337	Random	1.668	0.204		90.39	0.1417	
$Model_{2AGST}$	6.038	0.420	Random	1.184	0.288		88.05	0.183	
$Model_{2DFST}$	8.567	0.662	Random	0.734	0.405		79.38	0.373	
$Model_3$	3.204	0.988	Random	1.558	0.219		96.55	0.056	
$Model_{3AGST}$	3.261	0.968	Random	0.128	0.723		90.59	0.121	
$Model_{3DFST}$	16.668	0.118	Random	3.472	0.336		78.40	0.403	

White test:

White's test is applied to all study models to investigate heteroskedasticity problems. It is similar to the Breusch-Pagan test, but White's test lets the independent variable has a nonlinear and interactive influence on the error variance. Table (5) shows the results of the null hypothesis of White's test, indicating that the p-value for all models is greater than the value of the standard significance level of 0.05; thus, there are no heteroskedasticity problems with the research models. The results indicate homoskedasticity of the variance error term and acceptance of all regression models.

The data obtained was employed to test the impact of business strategies and managerial entrenchment on stock price crash risk, as presented in the next section.

4. Empirical Results and Discussions

This section presents the empirical results reached by applying various statistical analyses.

4.1. Descriptive Analysis

Before determining the association between the variables, a descriptive analysis of the variables is conducted. Table (6) presents the descriptive statistics of the study variables and provides some information about the characteristics of the sample as follows:

- The mean values of the crash risk indicators DUVO, NCSKEW, and AGG are -0.082, 1.419, and 100.5, respectively, with StdDev of 0.633, 1.272, and 0.462, showing that the three indicators are distinct and consistent with prior research.
- Managerial entrenchment (ME) ranges from -0.073 to 1.367, with a mean of 0.548 and a StdDev of 0.243.
- The mean value of the business strategy (BusSt) is 15.865, with a StdDev of 3.564, suggesting all sample firms have a neutral business strategy. The business strategy minimum value is 5, and the maximum value is 23.

- Financial leverage (LEV) ranges from 0.143 to 0.898 with a mean of 0.559 with a StdDev of 0.208, which indicates that the study sample, on average, has a high indebtedness.

Table (6): Descriptive Statistics

Variable	*Obs*	*Mean*	*StdDev*	*Min*	*Max*
Duvol	200	0.082	0.633	-1.513	1.576
NCSKEW	200	1.419	1.272	-1.917	4.18
AGG	200	100.5	45.721	3	199.5
ME	200	0.548	0.243	-0.073	1.367
BusSt	200	15.865	3.564	5	23
ME* BusSt	200	8.131	3.966	-1.163	23.236
TURN	200	0.002	0.016	-0.091	0.094
Aver. Return	200	0.011	0.219	-0.248	2.891
MTB	200	1.857	4.038	-5.071	51.827
LEV	200	0.559	0.208	0.143	0.898
ROA	200	0.048	0.081	-0.174	0.296
SIZE	200	22.088	1.601	18.834	25.656
SGR	200	0.315	0.892	-6.099	5.013
Age	200	2.653	0.739	0	3.817
Dummy variable					
Big4	***Dummy***		***N***		***Ratio***
	Coded 0		79		39*%*
	Coded 1		121		61*%*

- Return on assets (ROA) ranges from -0.164 to 0.296, with an average of 0.048, an indicator of the sample accounting performance. Firm size (SIZE) ranges from 18.834 to 25.656, with an average of 22.088, indicating that the sample contains large firms.

The table also shows that, in 61% of the study sample, one of the big4 firms or accountability audits their financial reports.

4.2. Difference Test

The difference test for the prospector and defending firms is shown in Table (7). Based on their business strategies, companies are divided into two types. A firm is considered a defender if its business strategy's mean value is less than its industry's (80 observations). In contrast, a company is regarded

as a prospector if the mean value of its business strategy is greater than the industry's mean value (120 observations).

Table (7): Difference Test

	Prospector Business Strategy		***Defender Business Strategy***		**t-statistic**	**p-value**
	Obs.	***Mean***	**Obs.**	***Mean***		
Duvol	120	0.169	80	-0.052	-2.647	0.009***
NCSKEW	120	1.489	80	1.114	-2.240	0.016**
AGG	120	105.988	80	112.26	-2.566	0.011**
ME	120	0.484	80	0.644	5.193	0.000***
BusSt	120	17.342	80	13.65	-8.476	0.000***
TURN	120	0.001	80	0.003	0.718	0.474
Aver. Return	120	0.014	80	0.006	-0.402	0.688
MTB	120	2.11	80	1.178	-2.062	0.046**
LEV	120	0.568	80	0.558	-0.038	0.969
ROA	120	0.041	80	0.059	1.401	0.163
SIZE	120	21.832	80	22.472	3.309	0.001***
SGR	120	0.325	80	0.301	-0.078	0.938
Age	120	2.883	80	2.308	-5.893	0.000***
**** p<.01, ** p<.05, * p<0.1*						

Table (7) shows that companies with a prospector business strategy have a greater probability of crash risk with mean values of 0.169 (DUVOL), 1.489 (NCSKEW), and 105.988 (AGG), respectively, as compared to companies with defensive business strategies, with mean values of -0.052 (DUVOL), 1.114 (NCSKEW), and 112.26 (AGG), respectively.

Furthermore, the statistically significant difference supports hypothesis H3 in its initial form. The results for defenders and prospector businesses are consistent across the three crash risk measure indicators NCSKEW, DUVOL, and AGG. In addition, the mean value of the managerial entrenchment (ME) in defender firms is 0.644, whereas the mean value of prospector firms is 0.484. A higher value denotes greater managerial entrenchment. These results suggest that managers of prospector business strategies are more entrenched than defensive firms. The findings of the different tests also demonstrate that prospector firms have a mean market-to-book value (MTB) of 2.11 compared to defensive firms' mean value of 1.178. Table (7) also presents the different test results for other control variables.

4.3. Correlation Analysis

Before testing the research hypotheses, univariate analysis is conducted by determining the correlation between the variables. The Pearson Correlation coefficient was used to assess the correlation between the variables. Table (8) shows the correlation matrix for the study variables; coefficients are shown above, and the p-values below.

Table (8) shows a negative, statistically significant correlation between the crash risk indicators (DUVO, NCSKEW, and AGG) and the managerial entrenchment (ME). (Coef.= -0.254, -0.181, & -0.258, respectively). The crash risk indicators (DUVO, NCSKEW, and AGG) statistically showed a significant positive correlation with business strategy (BusSt) at a level of 0.05 and 0.1, which supports hypotheses H1 and H2 in their initial form.

Table (8) also shows a negative, statistically significant correlation between managerial entrenchment (ME) and business strategy (BusSt) at a level of 0.01, which is consistent with Salehi & Arianpoor (2021).

For control variables, average weekly returns (Aver. Return) is significantly negatively correlated with the crash risk indicators (DUVO, NCSKEW, and AGG) at the 1% level. Furthermore, the firm size (SIZE) and sales growth rate (SGR) are positively correlated with the crash risk indicators (DUVO, NCSKEW, and AGG); the probability value of the correlation coefficient is less than the value of the standard level of significance ($0.05 = \text{p-value} < \alpha$). Table (8) also shows the correlation between all other variables.

Table (8): Pearson correlation matrix

Variables	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
1)Duvol	1													
2)NCSKEW	.287**	1												
	0.000													
3)AGG	.795**	.789**	1											
	0.000	0.000												
4)ME	-.254**	-.181*	-.258**	1										
	0.000	0.010	0.000											
5)BusSt	.260**	.250**	.324**	-.450**	1									
	0.000	0.000	0.000	0.000										
6)TURN	-0.022	-0.074	-0.046	-0.028	-0.037	1								
	0.759	0.299	0.521	0.690	0.602									
7)Aver. Return	-.238**	-.195**	-.274**	0.009	0.032	0.029	1							
	0.001	0.006	0.000	0.900	0.657	0.687								
8)MTB	-0.037	-0.020	-0.053	0.103	-0.015	0.000	0.023	1						
	0.599	0.783	0.457	0.146	0.830	0.996	0.750							
9)LEV	0.062	.181*	.151*	.141*	-.143*	0.010	-0.082	0.069	1					
	0.381	0.010	0.033	0.047	0.044	0.886	0.248	0.329						
10) ROA	-0.065	-0.046	-0.069	.148*	0.045	-0.083	.194**	0.040	-.494**	1				
	0.361	0.516	0.331	0.036	0.525	0.242	0.006	0.572	0.000					
11) SIZE	.153*	.318**	.289**	.219**	-.172*	-0.098	-.167*	-0.108	.444**	-0.043	1			
	0.030	0.000	0.000	0.002	0.015	0.169	0.018	0.129	0.000	0.546				
12) SGR	.207**	.185**	.246**	-0.028	.198**	-0.023	-0.022	-0.028	0.077	.146*	.144*	1		
	0.003	0.009	0.000	0.690	0.005	0.752	0.761	0.690	0.276	0.040	0.042			
13) Age	.172*	0.038	0.125	-.357**	.263**	0.031	-.168*	-0.135	0.110	-.355**	-.184**	-0.038	1	
	0.015	0.596	0.078	0.000	0.000	0.660	0.018	0.056	0.121	0.000	0.009	0.595		
14) Big4	0.017	0.080	0.053	.147*	-.154*	-0.079	-0.009	-0.078	.205**	0.032	.507**	0.018	-.389**	1
	0.810	0.260	0.457	0.038	0.029	0.264	0.905	0.272	0.004	0.651	0.000	0.803	0.000	

** p<.01, * p<.05

Despite this, one is unable to draw a definitive inference that the variables listed in table (8) are the only ones that are statistically associated with the crash risk because the Pearson correlation coefficient used in the calculation ignored the differences in the characteristics of the companies under investigation and treated them as a whole. Thus, multiple regression models using the longitudinal data approach (panel models) were used to confirm this result in the next section.

4.4. Multicollinearity Diagnostics

In this study, there is no worry about linearity as the residuals are normally distributed and homoscedastic (see table 5). Information about the collinearity diagnostics is shown in Table (9). Tolerance values for each

variable are accepted, as all values are greater than 0.10, indicating there is no possibility of multicollinearity between the independent variables. Moreover, the Variance Inflation Factor (VIF) values are less than 10, meaning no multicollinearity was found between such variables.

Table (9): Collinearity Statistics

	ME	*BusSt*	*TURN*	*Aver. Return*	*MTB*	*LEV*	*ROA*	*SIZE*	*SGR*	*AGE*	*Big4*
Tolerance	0.684	0.719	0.977	0.896	0.916	0.52	0.581	0.536	0.882	0.605	0.616
VIF	1.463	1.391	1.024	1.116	1.092	1.924	1.721	1.866	1.133	1.652	1.624

4.5. Regression Analysis - Tests of Hypotheses

This section explains the empirical findings obtained from regression analysis. The models analyze the impact of business strategies and managerial entrenchment on stock price crash risk. The empirical analysis is therefore repeated in this study using three distinct panel regression models, designated Models (1–3), where each model's dependent variable is changed to one of the crash risk indicators (Duvol, NCSKEW, and AGG). The panel regression model results are presented in table (10). Wald tests on the three models are highly significant at the level of 0.01 and have high explanatory powers, which indicates acceptance of the three regression models. Moreover, the R2 of the three models are 0.208, 0.256, and 0.333, respectively; this suggests that 20.8%, 25.6%, and 33.3% of the crash risk indicators, (Duvol, NCSKEW, and AGG), in the Egyptian firms may be explained by business strategies, managerial entrenchment, and control factors.

As expected, the findings show a significant negative association between managerial entrenchment (ME) and crash risk indicators. Whereas models (1-3) suggest that managerial entrenchment influences crash risk (Duvol, NCSKEW, and AGG) with coefficient values of -0.49, -0.325, & -39.654, respectively. These findings support hypothesis H1. The significant negative association between managerial entrenchment (ME) and crash risk indicators demonstrates that managerial entrenchment is not always synonymous with inefficiency. On the contrary, managerial entrenchment

may be practical and can reduce stress and increase the convergence of managers' and shareholders' interests, consequently reducing the crash risk.

The findings also show a significant positive association between business strategy (BusSt) and crash risk measures (Duvol, NCSKEW, AGG) with coefficient values of 0.029, 0.089, & 3.04557, respectively. These results support hypothesis H2, which may be clarified by the fact that a firm that adopts a prospector business strategy experience speedy expansion, which raises the likelihood of financial misreporting through opaque financial reporting, the leading reason to crash risk. This result agrees with the study of Safi et al. (2022), Hosseinzadeh et al. (2021), Habib & Hassan (2017a), and Arianwuri et al. (2017).

Table (10): Regression Analysis Results (*Models 1-3*)

	Duvol		**NCSKEW**		**AGG**	
	Coef.	***p-value***	***Coef.***	***p-value***	***Coef.***	***p-value***
ME	-0.49	0.017**	0-.325	0.012**	-39.654	0.004***
BusSt	0.029	0.031**	0.089	0.002***	3.455	0.000***
TURN	0.205	0.936	-1.823	0.696	-9.212	0.956
Aver. Return	-0.567	0.004***	-1.026	0.006***	-46.971	0.000***
MTB	0.004	0.703	0.008	0.707	0.063	0.929
LEV	-0.025	0.926	0.575	0.339	15.733	0.395
ROA	0.037	0.956	0.253	0.855	10.362	0.816
SIZE	0.07	0.045**	0.299	0.000***	9.406	0.000***
SGR	0.102	0.038**	0.099	0.274	6.53	0.044**
AGE	0.072	0.314	-0.15	0.35	-1.347	0.78
Big4	0.035	0.735	-0.345	0.157	-6.752	0.35
Constant	-1.901	0.014**	-5.952	0.001***	-143.656	0.006***
Model summary	# of obs.: 200		# of obs.: 200		# of obs.: 200	
	Overall R^2: 0.208		Overall R^2: 0.256		Overall R^2: 0.333	
	Wald test: 49.332		Wald test: 51.759		Wald test: 90.914	
	Prob > chi2: 0.000		Prob > chi2: 0.000		Prob > chi2: 0.000	
**** p<.01, ** p<.05, * p<0.1*						

For control variables, the results show a significant negative influence of average weekly returns (Aver. Return) on the crash risk indicators (Duvol, NCSKEW, and AGG) at 1%. Such a relationship can be explained by the fact that increasing the stock returns in Egyptian firms may reduce the possibility of crash risk. Moreover, firm size (SIZE) positively affects crash risk measurers (Duvol, NCSKEW, and AGG) with coefficient values of 0.07, 0.299, & 9.406, respectively. These findings agree with the study of

Elsayed (2021); Habib & Hassan (2017a), and Gao et al. (2017) as they found a significant positive impact of firm size on the crash risk. However, these results do not agree with Safi et al. (2022). Additionally, the sales growth rate (SGR) positively impacts crash risk indicators (Duvol and AGG) at 0.05 and coefficient values of 0.102 and 6.53, respectively. However, the results indicate an insignificant impact of the control variables: stock turnover, financial leverage, return on assets, market-to-book value, company age, and audit quality on crash risk.

Given the prior findings in table (10), it is feasible to create regression models for hypotheses H1 and H2 that demonstrate the association and impact of management entrenchment and business strategy on the probability of crash risk in the presence of the control variables as follows:

Model$_1$:

$$DUVOL_{it} = -1.901 + \mathbf{-0.49ME_{it}} + \mathbf{0.029BusSt_{it}} + 0.205TURN_{it} + \mathbf{-0.567Aver.\ Return_{it}} + 0.004MTB_{it} + -0.025LEV_{it} + 0.037ROA_{it} + \mathbf{0.07SIZE_{it}} + \mathbf{0.102SGR_{it}} + 0.072Age_{it} + 0.035Big4_{it} + \epsilon_{it}$$

Model$_2$:

$$NCSKEW_{it} = -5.952 + 0\mathbf{-.325ME_{it}} + \mathbf{0.089BusSt_{it}} + \beta_3 TURN_{it} + \mathbf{-1.026Aver.\ Return_{it}} + 0.008MTB_{it} + 0.575LEV_{it} + 0.253ROA_{it} + \mathbf{0.299SIZE_{it}} + 0.099SGR_{it} + -0.15Age_{it} + -0.345Big4_{it} + \epsilon_{it}$$

Model$_3$:

$$AGG_{it} = -143.656 + \mathbf{-39.654ME_{it}} + \mathbf{3.455BusSt_{it}} + -9.212TURN_{it} + \mathbf{-46.971Aver.\ Return_{it}} + 0.063MTB_{it} + 15.733LEV_{it} + 10.362ROA_{it} + \mathbf{9.406SIZE_{it}} + \mathbf{6.53SGR_{it}} + -1.347Age_{it} + -6.752Big4_{it} + \epsilon_{it}$$

Table (11) presents the regression results separately for prospectors and defender firms. Again, the findings demonstrate a significantly positive association among prospector business strategy and crash risk indicators, DUVOL, NCSKEW, and AGG coefficient values of 0.069, 0.14, and 6.401 at the level of 1%.

Table (11): Regression Analysis Results for Prospectors and Defender firms

Panel A: Prospectors firms, Obs. 120 ($Model_{1AGST}$, $Model_{2AGST}$, and $Model_{3AGST}$)						
	Duvol		***NCSKEW***		***AGG***	
	Coef.	***p-value***	***Coef.***	***p-value***	***Coef.***	***p-value***
ME	-0.733	.013**	-0.05	0.942	-37.419	0.064*
BusSt -AGST	0.069	.001***	0.14	0.003***	6.401	0.00***
TURN	0.971	0.713	0.337	0.948	68.567	0.712
Aver. Return	-0.512	.009***	-1.013	0.011**	-43.99	.001***
MTB	0.012	0.263	0.002	0.914	0.143	0.849
LEV	0.13	0.704	0.535	0.504	21.481	0.361
ROA	0.897	0.301	-1.418	0.456	6.498	0.914
SIZE	0.073	0.083*	0.272	0.014**	8.96	0.001***
SGR	0.116	.037**	0.195	0.077*	9.702	0.013**
AGE	0.118	0.349	-0.145	0.641	-1.012	0.906
Big4	0.041	0.748	-0.425	0.197	-10.462	0.236
Constant	-2.78	0.004***	-6.518	.01***	-189.478	0.004***
Model summary	Overall R^2: 0.336		Overall R^2: 0.299		Overall R^2: 0.431	
	Wald test: 52.138		Wald test: 39.149		Wald test: 81.716	
	Prob > chi2: 0.000		Prob > chi2: 0.000		Prob > chi2: 0.000	
Panel B: Defender firms, Obs. 80 ($Model_{1DFST}$, $Model_{2DFST}$, and $Model_{3DFST}$)						
	Duvol		***NCSKEW***		***AGG***	
	Coef.	***p-value***	**Coef.**	**p-value**	***Coef.***	***p-value***
ME	-0.324	0.328	-1.681	0.005***	-51.399	0.015**
BusSt - DFST	0.003	0.919	0.311	0.02**	0.762	0.634
TURN	-5.25	0.479	-13.738	0.288	-419.707	0.374
Aver. Return	-3.033	.026**	1.823	0.442	-92.985	0.284
MTB	0.045	0.506	0.124	0.293	4.885	0.251
LEV	-0.092	0.862	0.292	0.761	10.606	0.752
ROA	-1.376	0.278	0.396	0.862	-45.334	0.574
SIZE	0.027	0.721	0.343	0.015**	8.342	0.087
SGR	0.027	0.777	-0.111	0.507	-1.337	0.827
AGE	0.038	0.73	0.026	0.899	1.231	0.862
Big4	-0.179	0.409	-0.217	0.585	-12.027	0.383
Constant	-0.288	0.873	-5.869	0.077*	-74.751	0.516
Model summary	Overall R^2: 0.156		Overall R^2: 0.313		Overall R^2: 0.245	
	Wald test: 12.532		Wald test: 27.523		Wald test: 22.116	
	Prob > chi2: 0.325		Prob > chi2: 0.004		Prob > chi2: 0.023	
**** p<.01, ** p<.05, * p<0.1*						

On the contrary, the findings for defender firms are positive but insignificant. Results suggest prospector firms are more likely to crash risk than defender firms. Because they invest heavily in innovative solutions that

offer quick development potential, increasing the likelihood of opaque financial reporting and insufficient transparency, which may cause crash risk (Kim et al., 2016). Safi et al. (2022), Hosseinzadeh et al. (2021), Habib and Hassan (2017a), and Bentley et al. (2013) support this study's results.

The findings also indicate a significant negative impact of managerial entrenchment (ME) on the crash risk indicators Duvol and AGG in firms engaging in prospector business strategies with coefficient values of -0.733 and -37.419, respectively. While in firms engaging in defender business strategies, managerial entrenchment (ME) has insignificant negative impacts on the crash risk measures NCSKEW and AGG with coefficient values of -1.681 & -51.399, respectively.

Results regression models for hypothesis H3 shown in table (11) indicate that firms that adopt a prospector strategy are more susceptible to crash risk than defenders, supporting hypothesis H3.

Regarding the control variables, for firms engaging in prospector business strategies, the results show a significant negative influence of average weekly returns (Aver. Return) on the crash risk indicators (Duvol, NCSKEW, and AGG) at the level of 1%. Moreover, firm size (SIZE) and the sales growth rate (SGR) positively affect crash risk indicators (Duvol, NCSKEW, and AGG). However, for firms engaging in defender business strategies, the results show only a significant positive influence of firm size (SIZE) on the crash risk indicator (AGG).

Given the prior findings in table (11), it is feasible to create regression models for hypothesis H3 for the three crash risk indicators (Duvol, NCSKEW, and AGG). Regression models for hypothesis H3 using down-to-up volatility (DUVOL) as a proxy for crash risk are as follows:

Model$_{1AGST}$:

$$DUVOL_{it} = -2.78 + \mathbf{-0.733}\boldsymbol{ME_{it}} + \mathbf{0.069}\,\boldsymbol{AGST_{it}} + 0.971TURN_{it} + \mathbf{-0.512}\boldsymbol{Aver.\ Return_{it}} + 0.012MTB_{it} + 0.13LEV_{it} + 0.897ROA_{it} + \mathbf{0.073}\boldsymbol{SIZE_{it}} + \mathbf{0.116}\boldsymbol{SGR_{it}} + 0.118Age_{it} + 0.041Big4_{it} + \epsilon_{it}$$

Model$_{1DFST}$:

$$DUVOL_{it} = -0.288 + -0.324ME_{it} + 0.003DFST_{it} + -5.25TURN_{it} + -3.033\textbf{Aver. Return}_{it} + 0.045MTB_{it} + -0.092LEV_{it} + -1.376ROA_{it} + 0.027SIZE_{it} + 0.027SGR_{it} + 0.038Age_{it} + -0.179Big4_{it} + \epsilon_{it}$$

Regression models for hypothesis H3 using negative conditional return skewness (NCSKEW) as a proxy for crash risk are as follows:

Model$_{2AGST}$:

$$NCSKEW_{it} = -6.518 + -0.05ME_{it} + \textbf{0.14AGST}_{it} + 0.337TURN_{it} + \textbf{-1.013Aver. Return}_{it} + 0.002MTB_{it} + 0.535LEV_{it} + -1.418ROA_{it} + \textbf{0.272SIZE}_{it} + \textbf{0.195SGR}_{it} + -0.145Age_{it} + -0.425Big4_{it} + \epsilon_{it}$$

Model$_{2DFST}$:

$$NCSKEW_{it} = -5.869 + \textbf{-1.681ME}_{it} + \textbf{0.311DFST}_{it} + -13.738TURN_{it} + 1.823Aver.\ Return_{it} + 0.124\beta_5 MTB_{it} + 0.292LEV_{it} + 0.396ROA_{it} + \textbf{0.343SIZE}_{it} + -0.111SGR_{it} + 0.026Age_{it} + -0.217Big4_{it} + \epsilon_{it}$$

Regression models for hypothesis H3 using aggregate crash risk (AGG), which is measured according to the rank of DUVOL and $NCSKEW$ as a proxy for crash risk, are as follows:

Model$_{3AGST}$:

$$AGG_{it} = -189.478 + \textbf{-37.419ME}_{it} + \textbf{6.401 AGST}_{it} + 68.567TURN_{it} + \textbf{-43.99Aver. Return}_{it} + 0.143MTB_{it} + 21.481LEV_{it} + 6.498ROA_{it} + \textbf{8.96SIZE}_{it} + \textbf{9.702SGR}_{it} + -1.012Age_{it} + -10.462Big4_{it} + \epsilon_{it}$$

Model$_{3DFST}$:

$$AGG_{it} = -74.751 + \textbf{-51.399ME}_{it} + 0.762DFST_{it} + -419.707TURN_{it} + -92.985Aver.\ Return_{it} + 4.885MTB_{it} + 10.606LEV_{it} + -45.334ROA_{it} + 8.342SIZE_{it} + -1.337SGR_{it} + 1.231Age_{it} + -12.027Big4_{it} + \epsilon_{it}$$

5. Conclusions

Before making an investment decision and managing risks, stock price crash risk is essential. Due to its significance, some determinants of crash risk have been reached in the literature, including earning management (Loureiro & Silva, 2018); tax avoidance (Garg *et al*., 2020); CEO equity incentives (Al Mamun *et al*., 2020); and managerial ability (Cui *et al*., 2019; Habib & Hassan, 2017a). Moreover, previous research has investigated the impact of business strategy on crash risk (Safi *et al*., 2022; Xu *et al*., 2022; Habib & Hasan, 2017b). Nevertheless, prior research has ignored the firm-level business strategy that affects crash risk. Moreover, studies have

ignored the impact of managerial entrenchment on crash risk. Therefore, the current study examines the influence of corporate business strategy and managerial entrenchment on crash risk in the Egyptian context.

The research results demonstrate that managerial entrenchment is negatively associated with crash risk. Such a relationship indicates that managerial entrenchment in Egyptian firms may reduce the possibility of crash risk. The findings also show that businesses adopting prospector strategies are more susceptible to crash risk than those with defender strategies. This result is consistent with Habib & Hassan (2017) and Safi et al. (2022). Regarding the control variables, the results show a significant negative influence of average weekly returns on the crash risk indicators (Duvol, NCSKEW, and AGG) at the level of 0.01. Such a finding is consistent with Gao et al. (2017) and inconsistent with Chen et al. (2001). Further, firm size (SIZE) and sales growth rate (SGR) are positively associated with crash risk. These findings agree with the study of Elsayed (2021); Habib & Hassan (2017a) and Gao et al. (2017) as they found a significant positive impact of firm size on the crash risk. However, these results do not agree with Safi et al. (2022). However, the results indicate an insignificant impact of the control variables: stock turnover, financial leverage, return on assets, market-to-book value, company age, and audit quality on crash risk.

The current research contributes to the existing literature; as noted in the literature review, none of the previous studies examined the influence of managerial entrenchment on crash risk in general and in the Egyptian business environment in particular. Therefore, it is a fertile area for research. Moreover, no previous study has examined the impact of a company's business strategy and crash risk and how various strategies impact crash risk in the middle east, especially in Egypt.

This study gives a fundamental perception of crash risk determinants to assist Egyptian stakeholders in decision-making and investing in less risky companies. Additionally, the study will be helpful to investors who need to understand the crash risk associated with the Egyptian Stock Exchange, mitigate it through management entrenchment and business strategy, and alter their investment habits.

The current study recommends changing the negative perception of managerial entrenchment. The significant negative association between managerial entrenchment (ME) and crash risk indicators demonstrates that managerial entrenchment is not always synonymous with inefficiency. On the contrary, managerial entrenchment may be practical and can reduce stress and increase the convergence of managers' and shareholders' interests, consequently reducing the crash risk. Another recommendation for investors is properly allocating resources across companies with various business strategies.

Future research can focus on the relationship between managerial entrenchment and crash risk in financial companies. Moreover, studying the moderating effect of ownership structures on the relationship between managerial entrenchment and crash risk is recommended. Correspondingly, the moderate impact of ownership structures on the relationship between business strategies and crash risk. In addition, the investigation of the effect of managerial entrenchment on stock liquidity for firms listed on the Egyptian Stock Exchange. Finally, the impact of ownership concentration on the relationship between managerial entrenchment and the liquidity of stocks in companies listed on the Egyptian Stock Exchange.

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