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**Article**

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Cogent Economics & Finance

**Provided in Cooperation with:**

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*Suggested Citation:* Quang Luu Thu (2023) : Impact of earning management and business strategy on financial distress risk of Vietnamese companies, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 11, Iss. 1, pp. 1-21,  
<https://doi.org/10.1080/23322039.2023.2183657>

This Version is available at:

<https://hdl.handle.net/10419/303991>

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**To cite this article:** Quang Luu Thu (2023) Impact of earning management and business strategy on financial distress risk of Vietnamese companies, Cogent Economics & Finance, 11:1, 2183657, DOI: [10.1080/23322039.2023.2183657](https://doi.org/10.1080/23322039.2023.2183657)

**To link to this article:** <https://doi.org/10.1080/23322039.2023.2183657>



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Received: 08 September 2022  
Accepted: 18 February 2023

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Reviewing editor:  
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## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# Impact of earning management and business strategy on financial distress risk of Vietnamese companies

Quang Luu Thu<sup>1\*</sup>

**Abstract:** Many Vietnamese companies' net incomes have increased significantly in recent years as a result of creative competitive strategies, but many of them are being forced to delist due to persistent losses and manipulative earnings. In this paper, we are the first to investigate the simultaneous impact of business strategy and earning management on the risk of financial distress. The sample for the study includes information from 601 companies that are listed on the Ho Chi Minh City Stock Exchange between 2010 and 2021. The finding indicates that there is a high risk of financial distress for companies that manipulate earnings by increasing discretionary accruals value. However, if firms manipulate earnings through real operations, the risk of financial distress is reduced. Firms will see a significant improvement in their financial performance if they adopt a key differentiation or low-cost leadership strategy that gives them a competitive advantage in the same industry. The firm size, leverage, firm loss, and liquidity ratio are also the main factors that influence financial distress risk. These results are robust by using alternative proxies of financial distress risk (O and ZM score) to control for potential endogeneity.

**Subjects:** Corporate Finance; Accounting; Corporate Governance

**Keywords:** earning management; business strategy; financial distress; Asset Turnover of Operation; profit margin; cost of goods sold

## 1. Introduction

Accounting creates a bridge for managers to exchange benefits with stakeholders. Specifically, enterprises need to comply with accounting standards and information disclosure regulations on the stock exchange. The financial statements are used as a tool to help convey information to investors and other parties. However, in reality, numerous managers have manipulated financial reports or attempted to adjust earnings in order to affect the company's share price, successful listing, new stock issuance, or simply to take advantage of corporate income tax incentives. According to Ghosh (2011), "earning management is widely used in domestic and foreign enterprises". When earning management appears, it will reduce the quality and reliability of financial reports in the long-run. Due to the excessive earning adjustment, accounting information will be inaccurate, giving users false information. Additionally, earning management is solely focused on achieving the highest possible profits in the short term. It is unrelated to any upgradation of product quality or the improvement of the company structure that might raise the possibility of future financial difficulties.

Contrary to the earning management behavior that negatively affects the transparency of financial statements; the business strategy makes the business more productive and profitable, minimizing the risk of bankruptcy in the future (Bryan et al., 2013). In a competitive market, a company can use one of three basic competitive strategies: the low-cost strategy or business differentiation strategy, or a combination of the two. If the low-cost strategy is achieved through production efficiency (optimizing inputs to create an excellent product) and asset reduction (maximizing the capacity of fixed assets to create an excellent product) then the differentiation strategy can be achieved through product features and customer loyalty (David et al., 2002; Porter, 1997). Research by Chen et al. (2017) examines whether a company's business strategy affects the quality of audit reports. The results show that among a sample of companies facing financial difficulties, an effective Business Strategy improves the quality of the financial statement and reduces the financial distress risk. Then, this study also analyzed a sample of companies that had filed for bankruptcy and showed that business strategy is closely related to the bankruptcy risk of the firm. In Vietnam, Vietnam Dairy Products JSC (Vinamilk) has reduced costs by eliminating unnecessary expenses, restructuring brands, and managing retail locations so that sales are not dependent on wholesale. As a result, the company has saved a significant amount on promotional expenses. This strategy increases Vinamilk's market share from 17% to 50% across the country. For many years, Vinamilk has maintained its position as the leader in the industry of manufacturing and processing dairy products. It adapts cost leadership strategy frequently to the market environment and ranks among the top 10 brands in Vietnam. Business differentiation strategies are often implemented through efforts to create unique products and build customer brand loyalty (Bryan et al., 2013). Phu Nhuan Jewelry JSC (PNJ) is a market leader in positioning products toward young consumers between the ages of 25 and 45 with modern style. PNJ owns a complete value chain from manufacturing to distribution. This advantage helps the market share of Phu Nhuan jewelry to expand continuously from 12% in 2012 to 30% in 2018 in the branded jewelry segment.

The main topics of many previous studies usually focus on the relationship between performance, capital structure, and financial distress risk of the firms (Chhillar et al., 2022). Other investigates the predictive and explanatory ability of Industry relative, market-based variables, and macro-level indicators on financial distress (Lizares & Bautista, 2020). There are also numerous studies examining the impact of earnings management or the quality of the audit report on the financial distress risk of companies (Muñoz et al., 2020). But most of these studies were conducted in developed or emerging nations, rarely in frontier markets. This is a big omission because earnings management activities and non-transparency are more severe in frontier markets than in developed and emerging markets. Therefore, it is necessary to study this issue in a frontier market like Vietnam. Additionally, the author is also aware of a very small number of studies that explore the link between financial distress risk and corporate strategy. Or, if they have, these studies only examine separately the relationship between the risk of financial distress and business strategy or earnings management. Only two papers of Agustia et al. (2020) and Tamanna and Mahdi (2021) simultaneously address the impact of both business strategy and earning management on the risk of bankruptcy. However, these two studies have the limitation that they only focus on Z-score and may be biased if different proxy variables are used. By including more variables to represent the risks of financial distress, such as the O-score and ZM-score, our study will attempt to overcome the shortcomings of those two studies. Our further contribution is using two more variables (cost of goods sold and changes in inventory) that have never been included in earning management when assessing financial risk.

Financial distress risk of firms is an important topic in accounting and business management due to its impact on the market and the decisions of stakeholders. The measurement, prediction, and assessment of financial distress risk of enterprises are receiving the attention of many investors (to make investment decisions), managers (to make management

decisions), and state agencies (to supervise the companies and the market). Because of the importance of Financial distress risk. Our study aims to determine the influence of earnings management and business strategy on the financial distress risk of companies listed on Vietnam's stock market, allowing us to make recommendations for CEOs and suggest practical steps they can take to reduce their risk of bankruptcy.

Our results show that earnings management is closely related to the risk of financial distress, and that the business strategy has a positive impact on the risk of financial distress. This study offers crucial supporting data to interested parties. The findings of this study specifically inform managers about the impact of earnings management behavior and how it affects financial performance, as well as significant business strategies that can boost financial performance and aid managers in reducing the risk of future bankruptcies. Second, the study offers crucial data that creditors and shareholders can use to make informed decisions about lending to or investing in businesses that follow accounting standards for managing earnings and employ different business strategies that give them a competitive advantage. The biggest difference in our study from previous studies is that we find evidence that when the company simultaneously pursues differentiation and lower-cost strategies, combined with minimizing the intensity of earning manipulation will make the financial risk of the company much lower than that of the company's mere pursuit of a business strategy. And the financial risk of the company is less serious when it manipulates earnings in conjunction with a different business strategy than when it only manipulates earnings without pursuing any business strategy.

This paper is structured into 5 sections. The next section will list the previous research related to earning management and focus more on the theories of business strategy and financial distress risk. In Section 3, we describe the data, research methods and robustness check. Empirical results are discussed in Section 4. Final Section 5 includes the conclusion, limitation and policy implications.

## 2. Literature review

The previous literature shows three types of earnings management. These are accumulated earnings management (AEM), real earnings management (REM), and classification shifting. Managers make trade-offs between these methods depending on the costs, constraints and timelines of each strategy. Real earnings management (REM) involves altering transactions to meet financial reporting targets. Companies may cut costs such as research and development (R&D) or advertising, reduce prices to increase sales, or reduce cost of goods sold by overproducing inventory. Accumulated earnings management (AEM) illustrates CEOs' decisions to gain profit targets using commonly accepted accounting techniques and budgetary accruals figures (Duong & Evans, 2016).

Healy and Wahlen (1999) believes that earnings management is the action of managers to impact on the transactions or financial statements to change information reported in the financial statements to mislead the shareholders about the actual performance of the company. Earnings management is the process of using accounting principles to manipulate financial statements that accurately depict an organization's financial and operational status. This is done because accurate financial statements can give a general picture of stability and consistency within an organization. According to Tian & Peterson, (2016), managers frequently use earnings management behavior in a variety of contexts. These contexts include (1) promoting stock market investing, (2) concealing insider information, (3) using inside information for political gain, (4) demonstrating the CEO's management effectiveness, and (5) personal motivation.

The incentive for managers to manipulate earnings before listing companies has been supported by a large body of prior research. Anh and Chi (2022) indicate that "Vietnamese firms aggressively manipulate their earnings upward in the year before listing in an attempt

to meet listing requirements when adopting current accruals models. And earnings management (measured by discretionary current accruals) in the pre-listing year are negatively related to poor accounting performance for two years after listing but not in the listing year". On the other hand, Chhillar et al. (2022) examines how capital structure and income management can be used to predict the beginnings of financial distress. He contends that companies in the final stage have accruals that are significantly negative and higher than those of mature companies. Both avoiding debt covenant violations and obtaining better terms in debt contract renegotiations are the two goals of managing the earnings in declining stage firms. Chhillar et al. (2022) also emphasizes that "In order to negotiate better debt covenants in the debt renegotiation after the debt covenant violations, the firms in the declining stage manipulate the numbers downwards by engaging in income decreasing activities". Meanwhile, Salehi and Arianpoor (2022) indicate a significant and direct relationship between managerial ability and internal control quality as well as real earnings management and internal control quality. In detail, there is an inverse and significant relationship managerial ability and audit fees, and there is a stronger relationship between managerial ability and internal control quality in companies with lower audit fees. The most recent research of Grabiński and Wójtowicz (2022) is concerned with the religious aspect, they find that Catholicism positively influences the level of accrual earning management, and earning management strategy of a firm depends heavily on the values shared by the national community.

### **2.1. Earning management and financial distress risk**

There is a close connection between financial distress risk and earning management. Ting et al. (2009) argue that earnings management behavior will increase the risk, thereby increasing the risk of financial distress. Panigrahi (2019) also argues that the company using earnings management tools can increase the risk of financial distress.

A different group of researchers examines the characteristics of firms that engage in earnings manipulation. They are aware that firms that manipulate profits are frequently described as: close to being forced to delist; hiding their actual financial situation; or in financial trouble. For instances, Chen et al. (2010) sheds light on how Chinese businesses use earnings management as a tool to conceal their true financial situation to get around creditor lending restrictions or lessen the chance of being delisted from stock exchanges after many years of operations with no actual profit. He also shows that when a company uses earnings management to conceal its actual financial position (especially in a loss position), which can increase the risk of bankruptcy. Debdas et al. (2021) find that before bankruptcy, firms used more earnings management practices. Lara et al. (2009) describes that financially distressed firms often change their accounting accruals and attempt to manipulate financial statements during the four years before the company's bankruptcy. Hsiao et al. (2010) studied 186 companies in sound financial standing and 93 companies in financial difficulty between 1997 and 2007. The result shows that the companies in financial difficulty used more earnings management practices than the companies in sound financial standing. The outcomes are consistent to Habib et al. (2013).

In addition, some other studies focus on external factors such as financial crisis, and capital mobilization affecting earning manipulation decisions, thereby increasing the company's financial risk. Bisogno and DeLuca (2015) study 40 family firms and SMEs that were not listed on the Italian stock exchange and discovered that earning management behavior to keep obtaining bank capital. However, over time, when a company consistently manipulates earnings to raise capital, the ineffective use of capital exposes the company to financial risks. By analyzing 256 Indonesian companies over 15 years, Muljono and Suk (2018) report that the global financial crisis has had a positive impact on the aggravation of earnings management. The management board will manage earnings through real earnings if the company's financial health is stronger. However, if the company's health is poor, and CEOs cannot conduct earning management

activities based on actual operations, they will switch to the earning management based on accrual accounting.

Furthermore, Chhillar et al. (2022) analyzes the influence of capital structure on earnings management behavior. Research suggests that firms with high debt financing require higher earnings quality resulting in lower levels of earnings management. However, during periods of financial stress, the level of earnings management increases as the debt-to-equity ratio in the capital structure decreases. Saona et al. (2020) studies the ownership structure and characteristics of the board of directors to identify financial manipulation through accounting earnings management. The finding also shows that the default risk also seems to be a negative relationship with earnings management

It can be concluded that prior research has demonstrated a positive relationship between earning management behavior and a firm's risk of bankruptcy.

## **2.2. Business strategy and financial distress risk**

According to Porter (1997), a company's business strategy is a set of policies adopted to respond to a competitive business environment. A company's business strategy also includes a set of values that create the quality of products to compete with rivals in the market. A company can choose to use one of three business strategies: low-cost, differentiated, or focus approach. Chen and Keung (2019) contends that business strategies can be identified by how firms pursue, acquire, and sustain a competitive edge in their industry.

Salehi and Arianpoor (2022) investigates the relationship between business strategy and management entrenchment. The obtained results show a negative and significant relationship between the aggressive strategy of the current year and management entrenchment such that adopting an aggressive business strategy in the current and previous years can debilitate the management entrenchment. Up to now, only two papers look at the relationship between business strategy and the risk of bankruptcy. First, Chen and Keung (2019) examines whether a company's business strategy affects the quality of the audit report. This study shows that out of a sample of companies experiencing financial difficulties, a good business strategy will improve the quality of financial statements and reduce the risk of financial distress. Then, the study analyzed a sample of companies that had filed for bankruptcy and showed that business strategy is closely related to the company's financial distress risk. The second one is from Agustia et al. (2020). He proves that businesses compete in a highly competitive environment by employing various strategies to gain an advantage over rivals. Therefore, it will bring better revenue and profit, reducing the financial distress risk. In Porter's study of competitive strategy, two basic business strategies are proposed: low cost and differentiation. Low cost mainly focuses on improving productivity by using cost efficiency (reducing costs to generate more profit) and asset optimization (optimizing the use of fixed assets to produce a higher level of output). On the other hand, the company needs to differentiate itself by creating product uniqueness, customer loyalty, and distribution channels to achieve high-profit margins.

Only two studies on this subject have been conducted to date, as was already mentioned. Since more research is needed to supplement the theoretical background, we decided to conduct a study simultaneously on the impact of both competitive strategy and earnings management on corporate financial distress risk. This is also the main contribution of this paper. Our proposed hypothesis:

**H1.** *The risk of financial distress for the company increases as earnings management activities increase.*



**H2.** A company with a lower-cost strategy has a lower risk of financial distress

**H3.** The higher the degree of differentiation in a company's operations, the lower the financial distress risk.

### 3. Data and methodology

Datastream and Finnpro are used to retrieve financial information. These two data sources are reliable because they are widely used in many previous papers and published in prestigious journals. Because the risks of the banking/finance industry are different from other industries, we only focus on non-financial companies listed on the Vietnam Stock Exchange. There are 1543 listed non-financial companies. After excluding companies with missing data, the remaining sample is 601 companies. To eliminate outliers' effect, the entire data sample must be winsorized at 1% and 99% significance levels. Besides, all variables are also standardized (mean value of zero and unit variance value) before analysis.

#### 3.1. Financial distress risk measurement

Two methods for estimating financial distress risk are presented in the literature. The first method relies on accounting based data (Altman et al., 2017; Duong & Evans, 2016; Tykvová & Mariela, 2012), while the next method considers market data (Bharath & Shumway, 2008; Shumway, 2001). A substantial body of literature uses accounting and market-based measures to estimate the risk of financial distress (see, for example, Campbell et al., 2008; Richardson et al., 2015; Tykvová & Mariela, 2012). Using a global dataset, Agarwal and Taffler (2008) demonstrate that the Zscore model performs better at predicting bankruptcy and hazard than market-based models. Altman et al. (2017), who conducted a more recent longitudinal study, also believes that the Z-value score is a suitable estimator of financial distress risk. We, therefore, favor the measurement of financial distress using accounting-based models.

We calculate financial distress risk using the three primary accounting-based measures, namely the Zscore by Equation 1 (Altman, 1968), Oscore by Equation 2 (Griffin & Lemmon, 2002; Ohlson, 1980), and ZMscore Equation 3 (Zmijewski, 1984). While a high Oscore (ZMscore) is linked to a high financial distress risk, a high Zscore is linked to a low financial distress risk.

$$Z = 0.012 \frac{\text{Working Capital}}{\text{Total Assets}} + 0.014 \frac{\text{Retained earning}}{\text{Total Assets}} + 0.033 \frac{\text{EBIT}}{\text{Total Assets}} + 0.006 \frac{\text{Market value}}{\text{Total Assets}} + 0.999 \frac{\text{Sales}}{\text{Total Assets}} \quad (1)$$

$$O = -1.32 - 0.407 \log(\text{Total Assets}) + 6.03 \frac{\text{Total liabilities}}{\text{Total Assets}} - 1.43 \frac{\text{Working Capital}}{\text{Total Assets}} + 0.076 \frac{\text{Current liabilities}}{\text{Current assets}} - 1.72 \text{TL\_dummy} - 2.37 \frac{\text{Net income}}{\text{Total Assets}} - 1.83 \frac{\text{Funds from operations}}{\text{Total liabilities}} + 0.285 \text{NL\_dummy} - 0.521 \frac{\text{Net income}_t - \text{Net income}_{t-1}}{|\text{Net income}_t| + |\text{Net income}_{t-1}|} \quad (2)$$

The value of the dummy variable *NL\_dummy* gets 1 if the company has had a net loss over the last two years and zero otherwise. The value of the dummy variable *TL\_dummy* is 1 if total liabilities exceed total assets and equal 0 otherwise.



$$ZM = -4.336 - 4.513 \frac{\text{Net income}}{\text{Total Assets}} + 5.679 \frac{\text{Total liabilities}}{\text{Total assets}} + 0.004 \frac{\text{Current assets}}{\text{Current liabilities}} \quad (3)$$

A higher Zscore implies a lower risk of financial distress. A higher Oscore implies a higher risk of financial distress. An increase in ZMscore implies a greater risk of financial distress.

### 3.2. Business strategy measurement

The two business strategies used in this paper are the low-cost strategy and the differentiation strategy. The low-cost strategy is implemented by reducing the cost to gain a competitive advantage or increasing the efficiency of the workforce. Previous research by Hambrick (1983) and David et al. (2002) suggests that Asset Turnover of Operation (ATO) is used as a proxy of low-cost strategy. In which, the greater the difference between outputs and inputs, the more companies can use their resources to make operations more efficient, reducing production costs and increasing productivity. Wu et al. (2015) also uses Asset Turnover of Operation (ATO) as a proxy variable of low production cost strategy.

Asset operating turnover (ATO) is a financial ratio that assesses a company's efficiency in using assets to generate sales or income. High profit margin companies typically have low asset turnover, while low profit margin companies typically have high asset turnover.

$$\text{Asset Turnover of Operation (ATO)} = \frac{\text{Operating Sales}}{\text{Average Operating Assets}} \quad (4)$$

In Which: Operating Assets = Total Assets—Cash—Short-term Investments

Companies use a differentiation strategy to outperform their rivals in the market by providing customers with a unique good or service. The main objective of implementing a differentiation strategy is to create a competitive advantage. To achieve this objective, companies must review the advantages, disadvantages, and the target market requirements, then make an overall value proposition. In Wu et al. (2015) study, the profit margin (MP) is used as a proxy to measure the differentiation strategy. According to Selling and Stickney (1989), firms try to maximize their profits by providing differentiated products, which is related to a profit-maximizing strategy. In addition, companies must devote all their resources to developing new products through R&D activities. As a result, a differentiation strategy can be measured accurately by looking at the profit margin.

$$\text{Profit margin (PM)} = \frac{\text{Operating Income} + \text{R\&D expenditure}}{\text{Sales}} \quad (5)$$

A higher PM reveals a firm that is more geared toward differentiation, has a high overall profit margin, and spends more on R&D than its competitors.

### 3.3. Earning management measurement

According to earlier research, the following techniques can be used to manipulate earnings: (1) real operating decisions, such as adjustments to R&D spending, which affect selling and administrative costs (Roychowdhury, 2006; Zang, 2012); (2) Accruals management, or management of accruals through changes in estimates and accounting policies; and (3) classification-shifting (McVay, 2006). Previous papers on this topic, discuss that the aggregate accrual method is the most typical way to assess earnings management. Therefore, the aggregate accruals method was highlighted in this study.

Accruals are separated into non-discretionary and discretionary (Nguyen & Duong, 2021). The non-discretionary accruals are dictated by existing operational conditions. The discretionary accruals (DAs) are determined by managers, who exercise discretion over accounting

policies and estimates. As a result, the discretionary accrual accounting is used popularly in managing profits. In reality, total accruals are the sum of discretionary and non-discretionary accruals, so we can calculate the non-discretionary accruals by running the regression of total accruals, then the discretionary accumulation parts are the residuals of the regression. We apply Kothari et al. (2005) model, an improvement to the Jones model to estimate the discretionary accruals for each fiscal year. The return on assets ratio is used in this model to control the return effect, along with the growth of revenues and assets, facilities, and equipment as a primarily influenced dimension. The estimate is as follows:

$$\frac{\text{Total accruals}_{i,t}}{\text{Assets}_{i,t-1}} = \partial 1 + \partial 2 \times \frac{1}{\text{Assets}_{i,t-1}} + \partial 3 \times \frac{\Delta \text{Sales}_{i,t}}{\text{Assets}_{i,t-1}} + \partial 4 \times \frac{\text{PPE}_{i,t}}{\text{Assets}_{i,t-1}} + \partial 5 \times \text{ROA}_{i,t} + \delta_{i,t} \quad (6)$$

Total accruals are calculated for the company  $i$  in year  $t$ . ROA is the return on assets. Sales are annual changes in sales. PPE is property, plant, and equipment. After running the regression above equation, we put the obtained coefficients ( $\partial$ ) into the following expression to measure non-discretionary accruals (NDA)

$$\text{NDA}_{i,t} = \partial 1 + \partial 2 \times \frac{1}{\text{Assets}_{i,t-1}} + \partial 3 \times \frac{\Delta \text{Sales}_{i,t}}{\text{Assets}_{i,t-1}} + \partial 4 \times \frac{\text{PPE}_{i,t}}{\text{Assets}_{i,t-1}} + \partial 5 \times \text{ROA}_{i,t} \quad (7)$$

Finally, discretionary accruals value (DA) is the difference between total accruals and non-discretionary accruals

$$\text{DA}_{i,t} = \frac{\text{Total accruals}}{\text{Assets}_{i,t-1}} - \text{NDA}_{i,t} \quad (8)$$

To avoid the bias problem, the robustness tests are implemented by adding 2 more variables to measure earning management activities. They are the abnormal cost of goods sold and the abnormal change in inventories. Roychowdhury (2006) analyzes earning management through actual operations activities. He examines trends in operating cash flow, discretionary cost (defined as the sum by selling, administrative, advertising, and R&D expenses), and production costs (the cost of goods sold and change in inventories). To manipulate earnings, managers must increase sales by offering better terms of payment or temporary discounts. When companies' operating cash flows go down and more units are produced, the cost of goods sold will be lower due to a decrease of the average cost of production per unit. The operating cash flow (OCF) is measured by the following formula:

$$\frac{\text{OCF}_{i,t}}{\text{Assets}_{i,t-1}} = \partial 1 + \partial 2 \times \frac{1}{\text{Assets}_{i,t-1}} + \partial 3 \times \frac{\text{Sales}_{i,t}}{\text{Assets}_{i,t-1}} + \partial 4 \times \frac{\Delta \text{Sales}_{i,t}}{\text{Assets}_{i,t-1}} + \delta_{i,t} \quad (9)$$

In which

$$\text{OCF} = \text{net income} + \text{depreciations} - \text{the change of variation of non} \\ - \text{cash current assets} + \text{the change of current liabilities} \quad (10)$$

Using the coefficients obtained from the previous equation, the abnormal operating cash flow (AOCF) is the actual operating cash flow (OCF) minus the usual level of operating cash flow (NOCF).

$$\text{AOCF}_{i,t} = \frac{\text{OCF}_{i,t}}{\text{Assets}_{i,t-1}} - \text{NOCF}_{i,t} \quad (11)$$

The normal level of cost of goods sold (COGS) is calculated by:

$$\frac{COGS_{i,t}}{Assets_{i,t-1}} = \partial 1 + \partial 2 \times \frac{1}{Assets_{i,t-1}} + \partial 3 \times \frac{Sales_{i,t}}{Assets_{i,t-1}} + \delta_{i,t} \quad (12)$$

The normal level of inventories change ( $\Delta INV$ ) is calculated by the following model:

$$\frac{\Delta INV_{i,t}}{Assets_{i,t-1}} = \partial 1 + \partial 2 \times \frac{1}{Assets_{i,t-1}} + \partial 3 \times \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \partial 4 \times \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \delta_{i,t} \quad (13)$$

The abnormal cost of goods sold (ACOGS), abnormal level of inventories change ( $\Delta \Delta INV$ ) is a non-actual value minus the normal level calculated using the coefficients obtained in the previous equations. In addition, other control variables are also included, such as return on assets, loss, leverage, price to book value, liquidity, size, and audit by the big four companies (Agrawal & Chatterjee, 2015; Alves, 2012; Bryan et al., 2013).

$$FDR_{i,t} = C + \beta 1 \times EM_{i,t} + \beta 2 \times ATO_{i,t} + \beta 3 \times PM_{i,t} + \beta 4 \times LEV_{i,t} + \beta 5 \times LIQ_{i,t} + \beta 6 \times Size_{i,t} + \beta 7 \times LOSS_{i,t} + \beta 8 \times PBV_{i,t} + \beta 9 \times ROA_{i,t} + \beta 10 \times Dbig4_{i,t} \quad (14)$$

Where Zscore, Oscore, or ZMscore represents the financial distress risk (FDR); EM stands for earnings management and refers to discretionary accruals, the abnormal change in inventories, and the abnormal cost of goods sold; PBV stands for price-to-book value, and LIQ stands for liquidity ratio; Size: natural logarithmic of total assets; ROA is the return on the asset; PM: profit margin; ATO: asset turnover of operation; Dbig4: dummy variable that gets 1 when the audit is one of the big four firms (Pricewaterhouse Coopers, Ernest & Young, Deloitte, KPMG), and gets 0 otherwise; Loss is dummy variable that gets 1 when net income is negative and gets 0 otherwise.

**Table 1. Descriptive statistics. All variables are reported in Appendix**

	Mean	Median	Min	Lower Quartile	Max	Upper Quartile	Standard deviation
Panel A. Financial distress risk variables							
Zscore	1.5162	1.4754	-3.5017	-2.5930	1.9624	1.5332	0.9431
Oscore	-1.6224	-1.5155	-8.9083	-7.9432	2.0332	1.9440	1.8175
ZMscore	-1.5834	-1.5936	-6.3722	-4.7451	2.4780	2.2301	1.2564
Panel B. Earning management variables							
DA	0.0012	0.0163	-0.8449	-0.5632	0.2921	0.2123	0.1035
ACOGS	0.0011	0.0261	-0.6065	-0.5344	0.5582	0.4782	0.1801
$\Delta INV$	0.0024	0.0102	-0.4032	-0.3673	0.3553	0.2337	0.0039
Panel C. Business strategy variables							
ATO	1.2690	0.9937	0.0000	1.2422	19.555	17.830	1.3328
PM	0.7852	0.9440	-15.289	-13.787	1.0000	0.8930	0.6009
Panel D. Control variables							
LEV	44.776	44.178	0.0001	1.8372	241.73	231.92	28.675
PBV	1.6716	0.6882	-3.8283	-2.3334	62.705	57.590	4.9814
LIQ	0.0967	0.0606	0.0000	0.2537	0.9437	0.7674	0.1080
ROA	0.0075	0.0027	-2.2483	-1.3893	1.6754	0.9832	0.1683
SIZE	19.072	19.121	10.0892	13.332	23.837	20.343	2.2245

#### 4. Empirical results and discussion

Table 1 shows descriptive statistics of the important variables that include the mean, median, maximum, minimum, lower/upper quartile, and standard deviations. Panel A reports the financial distress variable, panel B indicates the earnings management variables, and panel C shows the control variables in the regression models. The mean values of discretionary accruals (DA), the abnormal cost of goods sold (ACOGS), and the abnormal change in inventories ( $\Delta \text{INV}$ ) are all close to zero. This result demonstrates that some companies use earnings management to increase incomes, while others use earnings management to decrease incomes. This finding is consistent to Alves (2012) and Xu and Ji (2016). Table 1 indicates that the average value and standard deviation of the Zscores are 1.5162 and 0.9431, respectively. In panel B, the mean value of ATO is higher than PM, which suggests that firms seem to focus on assets turnover (1.2690) than profit margin (0.7852) in business strategy.

By observing the control variables, it can be inferred that 44.7% of the firms' assets are financed by leverage. The sample is highly dispersed, indicating that some companies have excessive debt levels while others do not. The PBV is greater than 1, indicating that investors are willing to offer more for the company than its accounting worth because of their hopes for the future. ROA is near 0% (0.0075), and some firms even report negative values. The company size, as determined by the logarithm of assets, is 19.072 on average.

Table 2 shows the correlation between variables. There is an inverse correlation between Zscore and DA/Lev, but a positive correlation between Zscore and PM/ATO/ROA/PBV/LIQ/Size. This suggests that firms with higher discretionary accruals value are lower Zscore and getting financial distress risk. Regarding debt, the relationship is found to be in line with expectations, as firms that increase debt exposure face a higher risk of financial distress. Finally, the positive correlation between Size and Zscore proposes that large firms face less financial risk than small ones.

Table 3 analyzes the relationship between business strategy and the risk of financial distress (Zscore) using various regression techniques. Our regressions take into account some firm characteristics that have been shown to affect the risk of financial distress, such as size, liquidity, leverage, return on assets (ROA), price to book value, and loss (Boubaker et al., 2020; Verwijmeren & Derwall, 2010). Column 1 (Table 3) presents the results of an OLS regression of the Zscore support business strategy. To specific, PM and ATO have a positive relationship with the Zscore. In other words, more profit margin and asset turnover firms imply a lower financial distress risk than other ones. This finding is consistent to the hypothesis that better business strategies weaken the financial distress risk. It also supports prior literature suggesting that a company with a lower-cost strategy has a lower risk of financial distress, and the higher the differentiation strategy, the lower the risk of financial distress (Chen & Keung, 2019).

To test the robustness of the conclusion, Column 2 to 4 (Table 3) repeats the same regression but apply different estimation methods. The second model (Model 2, Column 3, Table 3) applies the Fama and MacBeth (1973) regression. The findings indicate that Zscore rises with a profit margin and asset turnover of operations, indicating that firms with better differentiation and lower-cost strategies have lower financial distress risk (higher Zscores). The control variable coefficients all continue to be statistically significant and maintain the old sign. Model 3 uses the inverse number of firm-year observations in each industry as weights to account for heteroscedasticity across observations, and Model 4 uses Newey and West (1987) estimation to explain for serial correlation of standard errors. Our evidence continues to support the idea that business strategy can reduce the risk of financial distress. Overall, the findings of our study are in agreement with Chen and Keung (2019). A reduced likelihood of financial distress is expected for firms pursuing low-cost and differentiated

Table 2. The correlation coefficients between regression variables and the variance inflation factor (VIF). All variables are reported in Appendix. *Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level									
Variable	Zscore	DA	PM	ATO	LEV	PBV	LIQ	ROA	SIZE
Zscore	1								
DA	-0.30**	1							
PM	0.36*	-0.16*	1						
ATO	0.34**	-0.09**	0.02*	1					
LEV	-0.49**	0.15*	-0.02**	-0.07***	1				
PBV	0.20*	-0.14**	0.44*	0.07*	-0.12	1			
LIQ	0.08**	-0.06***	0.04**	0.13**	-0.07**	0.05**	1		
ROA	0.06**	-0.01*	0.02*	0.21	-0.05*	0.02*	0.39**	1	
SIZE	0.44***	-0.21***	0.04***	0.02*	-0.06*	0.03***	0.25**	0.02**	1
VIF	1.23	1.56	1.90	2.03	1.67	1.84	2.12	1.88	1.36

**Table 3. Business strategy and financial distress risk.** This table reports the results of the regressions between variables using various estimation methods. Financial distress risk (Zscore) is dependent variable. A high Zscore indicates a low risk of financial distress. Two key explanatory variables are profit margin (PM) and assets turnover of operation (ATO). Other control variables are reported in Appendix. All variables are winsorized and standardized (mean value of zero and unit variance value). We follow (Petersen, 2009) to adjust standard errors for clustering by company and year. T ratio is reported in parenthesis. \*, \*\*, \*\*\* is significant at the 10%, 5% and 1% level, respectively

Variable	OLS (1)	Fama-MacBeth (2)	Weighted least squares (3)	Newey-West (4)
ATO	0.695*** (3.201)	0.678** (1.998)	0.549* (1.762)	0.505** (1.980)
PM	0.272* (1.771)	0.342** (2.109)	0.329* (1.689)	0.298** (2.341)
LEV	-9.687* (-1.793)	-9.767* (-1.973)	-9.381 (-1.196)	-9.791 (-1.085)
PBV	1.450 (1.329)	1.560 (0.730)	1.411 (0.873)	1.340 (0.653)
LIQ	2.989** (2.231)	2.780** (1.980)	2.809* (2.391)	2.922** (2.203)
ROA	0.033 (0.779)	0.043 (0.678)	0.151 (0.893)	0.042 (0.887)
SIZE	0.166** (2.109)	0.216** (2.139)	0.226* (1.789)	0.284* (1.873)
LOSS	-0.741** (-1.992)	-0.799** (-2.102)	-0.651** (-2.009)	-0.756** (-2.301)
Dbig4	0.043* (1.784)	0.077** (2.100)	0.044** (2.121)	0.063** (2.311)
Adjusted R <sup>2</sup>	0.229	0.432	0.421	0.355
F statistic	20.85	51.80	49.53	37.74
Prob(F-Statistic)	0.000	0.000	0.000	0.000

strategies because they are anticipated to have better access to financial resources and be viewed as more reliable.

The effects of earning management on financial distress risk (Zscore) are then examined in Table 4 using a variety of estimation techniques. The negative significant coefficients of DA for all estimation techniques, imply that the financial risk increases as the discretionary accrual value increases, Zscore decreases, and vice versa. Our finding is consistent to most previous research (Agrawal & Chatterjee, 2015; Aharony et al., 2000; Chen et al., 2010). The risk of financial distress for the company will rise as earnings management practices increases, it is explained as follows. (1) By hiding financial weakness through earnings management practices, early problem detection and resolution are hampered, potential threats to the company's daily operations go unaddressed, and the company loses its ability to compete in the market. (2) When the CEO tries to manipulate earnings to achieve expected earnings, there will be a lack of transparency, and investors cannot accurately monitor corporate performance. Without accurate investor supervision, the company will tend to invest in inefficient assets or projects, exposing the company to financial risk.

Table Table 5 presents the regression result of financial distress risk on business strategy and earning management contemporaneously. In Table Table 5, the coefficient of discretionary accruals is negative significant (-0.246). The abnormal cost of goods sold (ACOGS) significantly explains Zscore. The abnormal cost of goods sold increases in firms with high Zscore or lower risk of financial distress. This is explained as follows: When a firm tries to

**Table 4. Earning management and financial distress risk.** This table reports the results of the regressions between variables using various estimation methods. Financial distress risk (Zscore) is dependent variable. A high Zscore indicates a low risk of financial distress. The key explanatory variable is discretionary accruals (DA). Other control variables are reported in Appendix. All variables are winsorized and standardized (mean value of zero and unit variance value). We follow (Petersen, 2009) to adjust standard errors for clustering by company and year. T ratio is reported in parenthesis. \*, \*\*, \*\*\* is significant at the 10%, 5% and 1% level, respectively

Variable	OLS (1)	Fama-MacBeth (2)	Weighted least squares (3)	Newey-West (4)
DA	-0.291** (-2.296)	-0.161*** (-3.590)	-0.675*** (-4.902)	-0.224** (-2.231)
LEV	-6.611* (-1.779)	-7.127 (-1.320)	-9.612* (-1.895)	-9.458 (-1.226)
PBV	1.354 (1.099)	1.467 (1.221)	1.411 (1.093)	1.423 (0.998)
LIQ	2.781* (1.778)	2.469 (0.904)	2.945 (0.653)	2.563* (1.886)
ROA	0.017 (0.777)	0.123 (0.993)	0.056 (1.187)	0.077 (1.163)
SIZE	0.134** (2.211)	0.135** (2.309)	0.246* (1.792)	0.216* (1.646)
LOSS	-0.341** (-2.331)	-0.752** (-1.995)	-0.561** (-1.990)	-0.721** (-2.166)
Dbig4	0.063* (1.681)	0.123* (1.778)	0.056*** (4.323)	0.113*** (4.590)
Adjusted R <sup>2</sup>	0.321	0.390	0.296	0.388
F statistic	32.48	43.77	29.40	41.98
Prob(F-Statistic)	0.000	0.000	0.000	0.000

manipulate earnings through actual business operations (reduces the cost of goods sold), it will promote the firm to sell more goods and generate positive cash flow, lowering the risk of financial distress. The abnormal change in inventories ( $\Delta\Delta INV$ ) also significantly explains Zscore. Future financial risk may result from manipulating the earnings of CEO through increased inventory changes. Our finding is similar to Lisboa (2017) who discusses that the management of inventories is deemed as one of the main strategies to manage earnings through real activities.

The independent variable's results for asset turnover of operation (ATO) and profit margin (PM) support the theory and previous studies. ATO coefficient is positive and significant (coefficient = 0.775). This suggests that companies that adopt a cost leadership strategy, with the primary goal of becoming the lowest-cost producer in the sector, see notable improvements in their financial performance. Additionally, the outcome suggests that companies that employ differentiation strategies significantly, experience lower financial distress risk. The profit margin (PM) coefficient, which is also positive and significant (coefficient = 0.332), suggests that when firms employ one of the distinctive or innovative cost-cutting techniques, they build stronger financial positions and are consequently less likely to be exposed to the danger of significant financial distress.

Using Tables 3, 4, and 5, compare the coefficients of the variables ATO, PM, and DA. We can see that Table 5's coefficients for the variables ATO (0.775) and PM (0.332) are higher than Table 3's (0.695 and 0.272). This provides evidence that when the company simultaneously pursues differentiation and lower-cost strategies, combined with minimizing the intensity of earning manipulation will make the financial risk of the company much lower than that of the



**Table 5. Effect of both business strategy and earning management on financial distress risk.** This table reports the results of the regressions between variables using various estimation methods. Financial distress risk (Zscore) is dependent variable. A high Zscore indicates a low risk of financial distress. Five key explanatory variables are profit margin (PM), assets turnover of operation (ATO), discretionary accruals (DA), abnormal cost of goods sold (ACOGS), and abnormal change in inventory (AΔINV). Other control variables are reported in Appendix. All variables are winsorized and standardized (mean value of zero and unit variance value). We follow (Petersen, 2009) to adjust standard errors for clustering by company and year. T ratio is reported in parenthesis. \*, \*\*, \*\*\* is significant at the 10%, 5% and 1% level, respectively

Variable	OLS (1)	Fama-MacBeth (2)	Weighted least squares (3)	Newey-West (4)
DA	-0.246** (-2.098)	-0.234** (-2.207)	-0.381* (-1.690)	-0.443* (-1.784)
ACOGS	0.116** (1.997)	0.145** (2.100)	0.226** (2.108)	0.121** (2.098)
AΔINV	0.022* (1.872)	0.021** (2.290)	0.034** (2.185)	0.087** (2.100)
PM	0.332* (1.771)	0.252* (1.672)	0.373* (1.880)	0.452** (1.997)
ATO	0.775* (1.722)	0.678** (2.008)	0.895** (2.121)	0.475** (2.075)
LEV	-6.514** (-2.077)	-5.541** (-2.134)	-5.711** (-2.331)	-6.564 (-1.206)
PBV	1.556 (0.997)	1.459 (0.121)	1.351 (0.740)	1.689 (1.109)
LIQ	2.485** (2.172)	2.570** (2.091)	2.751** (2.111)	2.450* (1.801)
ROA	0.112 (0.551)	0.115 (0.601)	0.187 (0.520)	0.054 (0.922)
SIZE	0.163*** (5.901)	0.231*** (4.337)	0.159** (2.104)	0.188** (2.213)
LOSS	-0.321* (-1.691)	-0.456* (-1.730)	-0.249** (-2.001)	-0.377** (-2.116)
Dbig4	0.089* (1.883)	0.164* (1.699)	0.133** (1.999)	0.178** (2.110)
Adjusted R2	0.307	0.276	0.367	0.277
F statistic	25.19	21.87	32.11	21.97
Prob(F-Statistic)	0.000	0.000	0.000	0.000

company's mere pursuit of a business strategy. Similarly, the coefficient of the variable DA in Table Table 5 (-0.246) is lower than that in Table Table 4 (-0.291), suggesting that the financial risk to the company is less serious when it manipulates earnings in conjunction with a different business strategy than when it only manipulates earnings without pursuing any business strategy.

Regarding the control variables, it has been demonstrated that the firm's leverage and liquidity are important determinants of financial distress risk. The relationship between a firm's leverage and its Zscore is demonstrated to be adverse and significant for all 3 models except Newey and West (1987). This shows that increasing a company's level of debt exposes the firm to a higher risk of financial distress. Firms are forced to be extremely prudent when borrowing either long-term or short-term debt because the high debt level will create the high future interest costs (Black & Scholes, 1973). Liquidity (LIQ) is identified to have a positive and significant linkage (the coefficient of each model is 2.485; 2.570; 2.751 and 2.450, respectively). Additionally, the evidence proves that firms' size (Size), (Loss), and Dbig4 can explain the risk of financial distress. In detail, the risk of financial distress is reduced as a company's size increases because larger companies are more

**Table 6.** Effect of both business strategy and earning management on financial distress risk (measure by Oscore. This table reports the results of the regressions of the O-score on business strategy and earning management. A higher Oscore indicates a greater chance of financial distress. Other variables are reported in Appendix. All variables are winsorized and standardized (mean value of zero and unit variance value). We follow (Petersen, 2009) to adjust standard errors for clustering by company and year. T ratio is reported in parenthesis. \*, \*\*, \*\*\* is significant at the 10%, 5% and 1% level, respectively

Variable	Oscore (model1)	Oscore (model2)	Oscore (model3)	Oscore (model4)
ATO	-0.685** (-2.004)	-0.679** (-1.987)	-0.377* (-1.772)	-0.699* (-1.710)
PM	-0.643** (-1.992)	-0.622* (-1.753)	-0.180* (-1.666)	-0.650* (-1.699)
LEV	4.618*** (3.229)	4.568*** (3.773)	4.682** (2.205)	4.780** (2.007)
PBV	-1.543 (-1.197)	-1.543 (-0.994)	1.565 (1.233)	1.889 (1.451)
LIQ	-2.589* (-1.796)	-3.510* (1.776)	-3.559* (-1.882)	-3.120* (-1.688)
ROA	0.753 (0.836)	0.711 (0.447)	0.851 (0.663)	0.878 (0.237)
SIZE	-0.380** (-2.223)	-0.430* (-1.767)	-0.390* (-1.686)	-0.210* (-1.740)
LOSS	0.481** (2.004)	0.494* (1.669)	0.451** (2.215)	0.676** (2.221)
Dbig4	-0.183* (-1.802)	-0.185* (-1.777)	-0.154* (-1.659)	-0.229* (-1.761)
DA	0.278*** (3.963)	0.224*** (4.221)		
ACOGS	-0.156** (-2.329)		-0.325** (-2.128)	
AΔINV	-0.125* (-1.889)			-0.277* (-1.767)
Adjusted R2	0.336	0.476	0.410	0.365
F statistic	28.20	50.62	38.77	32.40
Prob(F-Statistic)	0.000	0.000	0.000	0.000

transparent and capital accessible. Because LOSS is a dummy variable, implies that financial distress risk increase when the firm gets loss. Dbig4 is a dummy variable, it means that the financial distress risk decreases when the firm is audited by one of the big 4 companies.

Tables 6 and 7 check the robustness of the above results by replacing the proxies of financial distress risk. The Zscore of Altman (1968) is used in our primary analysis. Altman et al. (2017)'s research offers proof of the Zscore's effectiveness and reassuringly high prediction accuracy. Subsequently, O and the ZMscore, two new risk assessment techniques, became widely used (Megginson et al., 2016; Richardson et al., 2015; Tykvová & Mariela, 2012). We apply the O and ZMscores as alternatives to the Zscore as financial distress risk measures. Most of the coefficients in the O and ZMscore models show reversal signs compared with the ones in the previous tables except for ROA (insignificant statistic). This empirical findings support our earlier conclusions that earning management through discretionary accrual value (DA) harms financial distress risk, but manipulating earning through real operation will effect positively to financial distress risk. The differentiation and low cost strategies also improve the company's financial standing. All variables Liquidity, Loss, Size, Leverage are significant in explaining the change of financial distress risk.

**Table 7.** Effect of both business strategy and earning management on financial distress risk (measure by ZMscore). This table reports the results of the regressions of the ZMscore on business strategy and earning management. A higher ZMscore indicates a greater chance of financial distress. Other control variables are reported in Appendix. All variables are winsorized and standardized (mean value of zero and unit variance value). We follow (Petersen, 2009) to adjust standard errors for clustering by company and year. T ratio is reported in parenthesis. \*, \*\*, \*\*\* is significant at the 10%, 5% and 1% level, respectively

Variable	ZMscore (model1)	ZMscore (model2)	ZMscore (model3)	ZMscore (model4)
ATO	-0.608** (-2.198)	-0.787* (-1.799)	-0.909* (-1.688)	-0.780* (-1.720)
PM	-0.601*** (-4.653)	-0.782*** (-5.220)	-0.677** (-5.201)	-0.698** (-2.322)
LEV	4.620** (2.167)	4.532* (1.609)	4.555* (1.744)	4.668* (1.677)
PBV	-1.596 (-0.573)	-1.522 (-0.449)	1.514 (0.784)	1.506 (1.244)
LIQ	-2.249* (-1.741)	-2.233* (-1.884)	-2.298* (-1.805)	-3.245* (-1.779)
ROA	0.778 (0.556)	0.791 (0.725)	0.889 (0.327)	0.579 (0.860)
SIZE	-0.397** (-1.689)	-0.567** (-1.870)	-0.667** (-1.794)	-0.717** (-1.685)
LOSS	0.483** (1.878)	0.402** (1.700)	0.440*** (3.644)	0.433*** (3.228)
Dbig4	-0.174* (-1.669)	-0.374* (-1.802)	-0.224** (-2.066)	-0.166** (-2.163)
DA	0.235*** (4.094)	0.239** (2.355)		
ACOGS	-0.146** (-2.137)		-0.447** (-2.265)	
ΔΔINV	-0.190* (-1.699)			-0.694** (-2.337)
Adjusted R2 =	0.427	0.394	0.422	0.561
F statistic	40.39	37.20	40.38	70.56
Prob(F-Statistic)	0.000	0.000	0.000	0.000

## 5. Conclusion

First, the result supports previous research conducted by Agrawal and Chatterjee (2015), which implies that efficient firms manage their earnings less, whereas inefficient firms manage their earnings strongly and tend to hide their true earnings. Large firms face less financial risk than small ones. Our results also indicate that firms that manipulate earnings by enhancing the discretionary accrual value have a high financial distress risk because earnings management activities prevent early problem detection and resolution that reduce the company's ability to compete in the market. However, when businesses inflate their profits through actual business operations, it lowers the likelihood that they will experience financial trouble because it encourages them to sell more products and produce positive cash flow. Second, our result confirms Porter's (1997) theory regarding business strategy. Specifically, companies aim to achieve a sustainable competitive advantage through various ways. Companies can choose to pursue a cost leadership strategy or a differentiation strategy, whichever is chosen, the end result shows that an effective business strategy on the market decreases the likelihood of financial distress. These results are consistent with a prior study by Bryan et al. (2013) that claims business strategy reduces the financial distress risk. Third, when a company simultaneously pursues differentiation and lower-cost strategies while minimizing the intensity of earning

manipulation, the financial risk to the company is significantly lower than when the company only pursues a business strategy or only manipulates earnings without pursuing any business strategy.

Regarding the control variables, the firm's leverage and liquidity are important variables of financial distress risk. Firms are more vulnerable to financial distress when their corporate debt levels rise. Firms are forced to be extremely prudent when borrowing either long-term or short term debt because higher levels of debt result in higher future interest costs. As a company gets bigger, the risk of financial distress decreases because they are more transparent and have access to more capital. Financial distress risk decreases when the firm is audited by one of the big 4 companies

This research broadens the literature of Porter's (1997) and Chen and Keung's (2019) business strategy typologies. Additionally, it contributes to the body of existing research on earnings management and the risk of financial distress. This paper is significant for all parties involved because it gives a broad overview of the connections that exist simultaneously between financial risk, profitability management, and business strategy. Investors can assess bankruptcy risk before investing in a stock, and creditors can assess credit risk before deciding to provide capital. Managers can develop strategies to deal with related problems. As a result, this paper offers empirical support for the use of business strategy in reducing the risk of bankruptcy. Future research on the effects of business strategy can be expanded to the financial sector and other emerging markets since this study's scope is restricted to non-financial sector companies in Vietnam.

#### Funding

Is provided by Ho Chi Minh University of Banking

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#### Disclosure statement

No potential conflict of interest was reported by the author(s).

#### Ethical statement

The manuscript is not submitted to other journals. The manuscript has not been published elsewhere

#### Citation information

Cite this article as: Impact of earning management and business strategy on financial distress risk of Vietnamese companies, Quang Luu Thu, *Cogent Economics & Finance* (2023), 11: 2183657.

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## Appendix

Variables	Describe	Source
Z score	The representative variable of financial distress risk, calculated by Equation 1	Datastream (Reuters)
O score	The representative variable of financial distress risk, calculated by Equation 2	Datastream (Reuters)
ZM score	The representative variable of financial distress risk, calculated by Equation 3	Datastream (Reuters)
ATO	Asset Turnover of Operation is calculated by Equation 4	Datastream (Reuters)
PM	Profit margin is calculated by Equation 5	Datastream (Reuters)
NDA	Non-discretionary accrual is measured by Equation 7	Datastream (Reuters)
DA	Discretionary accruals value is measured by Equation 8	Datastream (Reuters)
COGS	The normal level of cost of goods sold is calculated by Equation 12	Datastream (Reuters)
ΔINV	The normal level of inventories change is calculated by Equation 13	Datastream (Reuters)
LEV	Leverage is debt to total assets	Datastream (Reuters)
PBV	Price-to-book value	Datastream (Reuters)
LIQ	Liquidity ratio is current assets to current liabilities	Datastream (Reuters)
ROA	Return on assets	Datastream (Reuters)
SIZE	Natural logarithmic of total assets	Datastream (Reuters)
LOSS	Dummy variable that get 1 when net income is negative and get 0 otherwise	Finnpro
Dbig4	Dummy variable that get 1 when the audit is one of the big four firms (Pricewaterhouse Coopers, Ernest & Young, Deloitte, KPMG), and get 0 otherwise	Hand-collected from Finnpro





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