



Paper Type: Original Article

Identifying the Dimensions of Earnings Management on Bankruptcy Risk in Firms Listed on the Tehran Stock Exchange

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Citation:

Received: 06 September 2024	Feyz Javadian, S. H., & Mehri, M. (2025). Identifying the dimensions of earnings management on bankruptcy risk in firms listed on the Tehran Stock Exchange. <i>Transactions on quantitative finance and beyond</i> , 2(3), 178-188.
Revised: 14 October 2024	
Accepted: 16 January 2025	

Abstract

Firms need to maintain their value to attract investors. A decline in firm value can erode investor confidence. Managers can influence firm value through earnings management. Accordingly, this study examines the impact of accrual-based and real earnings management on bankruptcy risk. To achieve this objective, financial data from a sample of 133 firms listed on the Tehran Stock Exchange (TSE) over the period 2019–2023 were analyzed. Hypotheses were tested using logistic regression implemented in SPSS. The findings indicate that both accrual-based and real earnings management have a positive and statistically significant effect on firms' bankruptcy risk.

Keywords: Accounting earnings management, Real earnings management, Bankruptcy risk.

1 | Introduction

The rapid expansion of economic activities necessitates accurate accounting information. Financial statements serve as the primary source for users to obtain the required information and play a key role as the most important informational resource in financial decision-making. Among these, the income statement attracts particular attention from shareholders, analysts, creditors, and other stakeholders by providing information about the profitability of business units. Net income, reported in this statement, is readily identifiable and holds significant importance for its users.

Earnings management refers to the process by which managers deliberately influence a firm's reported earnings through accounting judgments or operational decisions. This practice may be motivated by a variety of objectives, including achieving personal benefits such as bonuses or job security, satisfying shareholder

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📄 <https://doi.org/10.22105/tqfb.v2i3.70>



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expectations, stabilizing stock prices, concealing poor performance, minimizing corporate tax liabilities, or avoiding violations of loan covenants.

Broadly, earnings management can be categorized into two types: accounting earnings management and real earnings management. Accounting earnings management occurs when managers attempt to manipulate reported earnings using accounting methods, such as altering depreciation policies, adjusting the timing of revenue and expense recognition, and other similar accounting procedures. In contrast, real earnings management involves the deliberate manipulation of actual business operations to achieve target earnings. This may include modifying the timing of investments, reducing research and development expenditures, or even lowering product quality.

Some researchers consider earnings management to be a routine practice, as it is carried out within the framework of generally accepted accounting principles. Others, however, view it as the result of managerial efforts to reduce abnormal fluctuations in earnings. It should be noted that earnings management can serve multiple objectives. One key objective is preserving the firm's credibility and competitive position in the market. Such manipulation is often motivated by the belief that firms with stable and consistently positive earnings trends, exhibiting lower fluctuations, are perceived as more valuable. This, in turn, can enhance the firm's stock value in the market and attract new investors.

On the other hand, increasing competition among economic enterprises limits profit opportunities and raises the likelihood of bankruptcy, making decision-making more strategic than in the past. Financial decisions are inherently associated with risk and uncertainty. Bankruptcy, and efforts to prevent it, remain central concerns in corporate literature. Factors such as managerial incompetence, high production costs, weak financial operations, and an ineffective board of directors are among the primary drivers that push firms toward bankruptcy. Bankruptcy imposes significant economic and social costs on society and is a matter of macroeconomic concern.

All stakeholders are interested in forecasting bankruptcy before it occurs. Firms seek to attract investment, while investors are averse to volatility and risk and are particularly concerned about bankruptcy and financial distress. Since bankruptcy risk constitutes a barrier between investors and firms seeking capital, earnings management emerges as an important determinant of bankruptcy risk. Understanding the mechanisms of earnings management and its impact on bankruptcy risk can therefore assist both firms and investors in mitigating this risk and making more informed investment decisions.

2 | Research Background

Earnings management is a key topic in the field of accounting. The primary objective of earnings management is to present the quality of earnings in a manner that reasonably meets the expectations of users, particularly shareholders. When corporate management engages in earnings manipulation, the quality of accounting earnings deteriorates. Earnings quality is closely related to earnings management in assessing the financial health of a business entity. In other words, on the one hand, because managers possess superior knowledge of the company's condition, it is expected that financial information is prepared and presented in a way that most accurately reflects the firm's status. On the other hand, for reasons such as managerial incentives to maintain their position, receive bonuses, or other factors, managers may intentionally or unintentionally present the company's condition in a distorted or misleading manner.

Bankruptcy risk is an implicit factor that influences the informational content of current accounting data relative to future cash flows. Firms may report inflated financial performance for various reasons, including meeting forecast benchmarks, achieving profit targets, or concealing poor financial conditions. For instance, earnings management is often employed to avoid defaulting on debt obligations during periods of financial distress. The use of earnings management reflects a managerial tendency to prioritize short-term objectives over accountability to long-term goals, potentially sustaining debt flows or equity investments and thereby mitigating stakeholder concerns. Moreover, concealing weak operational or financial performance through

earnings management can hinder early detection and corrective action, leaving problems latent within day-to-day operations. Consequently, the firm may be ill-equipped to withstand competitive pressures.

Leach [1] provided empirical evidence of positive discretionary accruals in firms facing imminent bankruptcy, confirming that excessive earnings management is a primary factor contributing to bankruptcy filings. The impact of earnings management in the context of bankruptcy risk is crucial for external stakeholders, such as investors and creditors, in assessing a firm's bankruptcy risk, financial capacity, and creditworthiness.

Dzung et al. [2], in an international study, examined the relationship between earnings management and the financial distress of firms. Their findings indicated that as earnings management increases, the likelihood of financial crises and deterioration in financial health also rises. Kiaei and Samadi Lergani [3] investigated the effects of earnings management and business strategies on corporate bankruptcy risk, reporting that earnings management has a significant and positive impact on bankruptcy risk. Similarly, Pazhooyan et al. [4] demonstrated that earnings management exerts a significant positive effect on increasing bankruptcy risk. Habib et al. [5] explored the relationship between earnings management, bankruptcy risk, and accrual pricing during financial crises, finding that managers of financially distressed firms are more likely than those of financially healthy firms to engage in profit-increasing earnings management activities.

In any case, two approaches to earnings management exist: accrual-based earnings management and real earnings management. Accrual-based earnings management is carried out by altering estimates or accounting methods when reporting events in the financial statements. Examples of this approach include changes in the allowance for doubtful accounts and depreciation methods [6]. In real earnings management, deliberate manipulations are made to a firm's actual operations to influence reported earnings in a desired direction. This is achieved through the timing or structuring of operational, investment, or financing activities.

Research has identified three types of real earnings management techniques:

Overproduction: overproduction allows a firm to allocate manufacturing overhead costs across a larger number of units. Consequently, the fixed cost per unit decreases, reducing the cost of production per unit and increasing the profit margin per unit. Because unsold production is added to inventory, overproduction effectively assigns a greater portion of overhead to inventory and a smaller portion to the cost of goods sold for the current period, enabling the firm to report higher profit margins. However, the company incurs additional costs for producing and holding excess inventory, which cannot be recovered through current-period sales. As a result, operating cash flows are lower than normal. Moreover, the increased profit reported in the current period is unlikely to be sustainable. Therefore, if demand for the company's products remains relatively constant, future-period cash flows and profitability may decline.

Manipulation of discretionary expenses: this approach involves the deliberate reduction or increase of expenditures that are largely under managerial discretion. Companies can reduce discretionary expenses to lower reported costs and thereby increase profits. Expenditures such as research and development, advertising, and similar items can be classified as discretionary. Conversely, in periods where reported earnings exceed managerial targets, these expenses may be intentionally increased.

Sales manipulation: this refers to the acceleration of sales through the provision of discounts or favorable credit terms to increase current-period profits. However, the profit gains achieved in the current period are not sustainable. If demand for the company's products remains relatively stable, current-period sales manipulation may negatively affect cash flows and profitability in subsequent periods.

Identifying the exact causes of bankruptcy and financial distress in any specific case is not straightforward, as multiple factors often contribute simultaneously to the occurrence of bankruptcy [7]. The primary causes of bankruptcy are financial and economic difficulties [8]. In some cases, the reasons for bankruptcy can be detected through analysis of financial statements and records. Experienced accountants analyzing the financial position of deteriorating firms can readily identify and determine the causes of bankruptcy. However, in some situations, certain issues may temporarily support the smooth operation of a business, concealing bankruptcy

from accountants' scrutiny [9]. Generally, the causes of bankruptcy can be categorized into two groups: internal (organizational) and external (environmental) factors.

Internal (organizational) factors: these include excessive credit extension, ineffective management, insufficient capital, fraud, and embezzlement, among others.

External (environmental) factors: these encompass characteristics of the economic system, market competition, changes in trade, shifts in overall demand, financing conditions, and unforeseen events or accidents.

Bankruptcy and efforts to prevent it are among the most prominent topics in corporate literature, with the pursuit of improving the predictive accuracy of bankruptcy models remaining an ongoing challenge. Managerial incompetence, high production costs, weak financial activities, and ineffective boards of directors are among the primary factors that drive firms toward bankruptcy.

Firms engaged in earnings management are driven more rapidly toward financial distress and bankruptcy. In this regard, studies by Campa [10] and Rostami [11] demonstrated that earnings management serves as a tool for Small and Medium-Sized Enterprises (SMEs) facing pre-bankruptcy financial distress. Firms with high levels of financial vulnerability tend to engage heavily in earnings management through both real and accrual-based manipulations. Today, avoiding bankruptcy has become a fundamental strategic objective aimed at ensuring the continuity of business operations. Within this context, earnings management is a critical factor in determining bankruptcy risk and can significantly inform financial decision-making.

3 | Problem Statement

Profitability and bankruptcy avoidance are among the most critical factors influencing financial decision-making, as investors are generally risk-averse and highly sensitive to the prospect of bankruptcy, while increases in earnings are of considerable importance to them. Earnings management refers to the process by which managers intentionally influence reported company earnings through accounting judgments or discretionary decisions. This practice may be employed for various purposes, such as advancing managerial self-interest (e.g., bonuses or job security), satisfying shareholder expectations, maintaining stable stock prices, concealing poor operational performance, minimizing tax obligations, or avoiding loan covenant violations. Given that bankruptcy risk acts as a barrier between investors and capital-seeking firms, understanding earnings management and its impact on bankruptcy risk can assist both companies and investors in mitigating bankruptcy risk and making more informed financial decisions.

Previous studies conducted both in Iran and internationally on this topic have not fully examined the effects of accrual-based and real earnings management, nor have they considered potential moderating variables such as firm size, time horizon, and others. The significance of the present study thus becomes evident, as different types of earnings management may have distinct impacts on bankruptcy risk, which is relevant for all stakeholders, including investors, creditors, and managers. This research specifically examines two variables: accrual-based earnings management and real earnings management, each of which exerts different influences on users' decisions. Given that severe negative fluctuations in a firm's stock price can significantly affect shareholders and, in some cases, the general public, identifying the dimensions of earnings management can play a crucial role in controlling corporate bankruptcy risk. Accordingly, this study addresses the question: what is the nature and significance of the relationship between earnings management and bankruptcy risk?

4 | Research Hypotheses

Hypothesis 1. there is a significant relationship between accrual-based earnings management and bankruptcy risk.

Hypothesis 2. there is a significant relationship between real earnings management and bankruptcy risk.

5 | Independent Variables

In this study, accrual-based and real earnings management were selected as the independent variables. To measure accrual-based earnings management, the method proposed by Kasznik [12] was employed, whereas real earnings management was assessed using the approach of Cohen and Zarowin [13].

Accrual-based earnings management: one of the most commonly used metrics in the accounting literature to assess accrual-based earnings management is the amount of discretionary accruals. In this study, discretionary accruals were also used as a proxy for accrual-based earnings management. Accordingly, employing Kasznik's model [12], discretionary accruals were estimated, and the residual from the model was considered as the measure of accrual-based earnings management (DAC).

$$TA_{i,t} = a_0 + a_1(\Delta REV_{i,t} - \Delta AR_{i,t}) + a_2PPE_{i,t} + a_3\Delta CFO_{i,t} + \varepsilon_{i,t} \quad (1)$$

where, $TA_{i,t}$ represents total accruals in year t-1 calculated as the difference between operating profit and operating cash flows; $\Delta REV_{i,t}$ revenue in year t minus revenue t-1; $\Delta AR_{i,t}$ net accounts receivable in year t minus net accounts receivable in year t-1 ; $PPE_{i,t}$ gross value of property, plant, and equipment in year t and $\Delta CFO_{i,t}$ operating cash flows in year t minus operating cash flows in year t-1 ; $\varepsilon_{i,t}$ the residual of the model, which represents discretionary accruals (DAC).

Real earnings management: researchers in studies on real earnings management aim to identify abnormal levels of firm activities. They have introduced three methods—overproduction, discretionary expense manipulation, and sales manipulation—to detect such abnormal activity levels. Accordingly, real earnings management is defined as the sum of abnormal production costs, abnormal discretionary expenses, and abnormal operating cash flows in the year in which earnings management occurs. The measurement of these components is described as follows:

- I. Abnormal production costs: following Cohen and Zarowin [13], abnormal production costs are estimated using the model below, with the residual of the model serving as the measure of Abnormal production Costs (ABCOST).

$$\frac{PROD_{it}}{TA_{it-1}} = a_0 \frac{1}{TA_{it-1}} + a_1 \frac{sales_{it}}{TA_{it-1}} + a_2 \frac{\Delta sales_{it}}{TA_{it-1}} + a_3 \frac{\Delta sales_{it}}{TA_{it-1}} + \delta_{it}, \quad (2)$$

where, $PROD_{it}$ firm's production costs i at the end of the year t which is equal to the cost of goods sold adjusted for changes in inventory; TA_{it-1} total assets of the firm i at the end of the year t-1 ; $sales_{it}$ firm's sales i during the year t, $\Delta sales_{it}$ changes in the firm's sales i at the end of the year t which is equal to sales in year t minus sales in year t-1 ; δ_{it} the residual of the model, which represents ABCOST.

- II. Abnormal discretionary expenses: following Cohen and Zarowin [13], abnormal discretionary expenses are estimated using the model below, with the residual of the model serving as the measure of Abnormal discretionary Expenses (ABEXP).

$$\frac{DISEXP_{it}}{TA_{it-1}} = a_0 \frac{1}{TA_{it-1}} + a_1 \frac{sales_{it}}{TA_{it-1}} + \lambda_{it}, \quad (3)$$

where, $DISEXP_{it}$ firm's discretionary expenses i at the end of the year t which is equal to selling, general, and administrative expenses, TA_{it-1} total assets of the firm i at the end of the year $sales_{it} : t - 1$ firm's sales i during the year $\lambda_{it} : t$ the residual of the model, which represents ABEXP.

- III. Abnormal operating cash flows: following Cohen and Zarowin [13], abnormal operating cash flows are estimated using the model below, with the residual of the model serving as the measure of Abnormal Operating Cash Flows (ABCFO).

$$\frac{Cfo_{it}}{TA_{it-1}} = a_0 \frac{1}{TA_{it-1}} - a_1 \frac{sales_{it}}{TA_{it-1}} + a_2 \frac{\Delta sales_{it}}{TA_{it-1}} + \varepsilon_{it} \quad (4)$$

where, Cfo_{it} firm's operating cash flows i at the end of the year t ; TA_{it-1} total assets of the firm i at the end of the year $t-1$; $sales_{it}$ firm's sales i during the year t ; $\Delta sales_{it}$ changes in the firm's sales i at the end of the year t which is equal to sales in year t minus sales in year $t-1$; ϵ_{it} the residual of the model, which represents ABCFO.

Dependent variable of the study

In this study, the adjusted Altman model [14], as modified by Namazi et al. [15], is used to calculate the bankruptcy risk variable. This model, which is computed based on the values of several financial variables, indicates the probability of bankruptcy for a firm. A lower value obtained from the model signifies a higher likelihood of bankruptcy risk, whereas a higher value reflects a lower bankruptcy risk for the firm.

$$Risk_{i,t} = 0/7171X_1 + 0/847X_2 + 3/107X_3 + 0/420X_4 + 0/998X_5. \quad (5)$$

- I. $Risk_{i,t}$: firm's bankruptcy risk
- II. X_1 : working capital to total assets ratio
- III. X_2 : retained earnings to total assets ratio
- IV. X_3 : earnings before interest and taxes to total assets ratio (EBIT/TA)
- V. X_4 : market value of equity to book value of total liabilities ratio
- VI. X_5 : sales to total assets ratio

In this model, the higher the risk value, the lower the firm's bankruptcy risk. Specifically, firms with a Risk value below 1.9 are classified as having higher bankruptcy risk, whereas firms with a Risk value above 1.9 are considered low-risk and financially healthy. Accordingly, after calculating the model, firms with a risk value above 1.9 are assigned a value of zero, while firms with a Risk value below 1.9 are assigned a value of one, indicating the presence of bankruptcy risk.

Statistical population

Statistical population: the statistical population of this study comprises all firms listed on the Tehran Stock Exchange (TSE) that have the necessary information for calculating the study variables during the period under investigation and each of which belongs to a specific industry. Based on the review conducted, the population includes firms that were listed on the TSE for at least the period from the beginning of 2019 to 2023. A systematic elimination method was used to determine the sample size.

Table 1. Method of selecting firms for testing the research hypotheses.

Number	Criteria
786	Number of firms as of 20 March 2024
157	Firms are not part of banks, financial institutions, investment companies, or leasing companies.
171	To ensure comparability, the fiscal year must end on 20 March.
81	The firm must have been listed on the TSE by the end of 2019 and must not have been delisted from the TSE during the period from 2019 to 2023.
97	Firms must not have changed their fiscal year during the period from 2019 to 2023.
80	The financial statements of the aforementioned firms must be available.
67	Firms must not have experienced a financial reporting gap exceeding 150 days at any point.
133	Selected Sample

In this study, the relationships among the variables were analyzed in accordance with the research objectives. Data related to the TSE were collected from the Stock Exchange database using the Rahavard Novin software

and the comprehensive disclosure systems of issuers¹. The model was specified using a logistic regression approach, and the following formula was applied after taking the logarithm of the variables.

$$y_i = \log(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \sum_{i=1}^k \beta_i X_{ij} \quad i = 1, 2, \dots, n. \quad (6)$$

Descriptive statistics

When large volumes of quantitative data are collected for analysis and interpretation, they must be organized and summarized in a clear and comprehensible manner. The first step in organizing data is to arrange them according to a logical criterion, such as ordering values from largest to smallest. Subsequently, the researcher may wish to describe the characteristics of a specific set of data in detail. To achieve this, a series of numerical indicators—commonly referred to as measures of central tendency and dispersion (mean, median, maximum, minimum, standard deviation)—are employed. Descriptive statistics provide a mechanism to accomplish these objectives. In fact, this type of statistics is used to describe and determine the characteristics of the collected data. In the present study, most of these indicators, which are appropriate for the research context, have been utilized. In this section, the data and the relevant indicators are described. The table below presents the descriptive statistics of the variables under investigation.

Table 2. Descriptive statistics of the study variables.

Standard Deviation	Minimum	Maximum	Median	Mean	Variable
0.239	2.171	2.479	0.036	0.038	Accrual-based earnings management
0.263	2.127	2.156	0.037	0.041	Real earnings management
1.351	2.524	14.448	2.038	2.232	Bankruptcy risk
1.713	8.412	21.078	14.234	14.418	Firm size
0.478	3.141	4.176	3.0382	3.148	Firm age

Accrual-based earnings management is considered one of the independent variables in this study and is measured using the Kasznik [12] model. The results presented in the above table indicate that this variable has a mean of 0.038 and a standard deviation of 0.239, with a maximum value of 2.479 and a minimum value of -2.171. The fact that the standard deviation is greater than the mean indicates some dispersion in this variable, suggesting that the level of accrual-based earnings management varies across firms, although the variations are not extreme.

Real earnings management is considered one of the independent variables in this study and is measured using the Cohen and Zarowin [13] model. The results presented in the table above indicate that this variable has a mean of 0.041 and a standard deviation of 0.263, with a maximum value of 2.156 and a minimum value of -2.127. The fact that the standard deviation exceeds the mean indicates some dispersion in this variable, suggesting that the level of real earnings management varies across firms, although the variations are not substantial.

Bankruptcy risk is considered the dependent variable in this study and is measured using the modified Altman model [14]. The results presented in the table above indicate that this variable has a mean of 2.232 and a standard deviation of 1.351, with a maximum value of 14.448 and a minimum value of 2.524. The fact that the standard deviation is smaller than the mean indicates low dispersion, suggesting that bankruptcy risk is relatively similar across the firms.

Firm size, as a moderating variable, has a mean of 14.418 and a standard deviation of 1.713, indicating substantial variation in firm size across the sample, with firms ranging from small to large.

¹ www.codal.irw

Firm age, also as a moderating variable, has a mean of 3.148 and a standard deviation of 0.478, indicating that the firms in the sample are generally mature.

Normality of the variables

In order to apply statistical methods and conduct regression analyses, the variables must follow a normal distribution. The table below examines the normality of the study variables. The normality hypothesis is tested using the Kolmogorov–Smirnov (K–S) test.

Table 3. Test of normality for the variables.

Significance Level (Sig.)	Variable
0.654	Accrual-based earnings management
0.702	Real earnings management
0.224	Bankruptcy risk

Given that the significance level of the K–S test for all variables exceeds 0.05, the normality of the variables is accepted.

Inferential statistics

Hypothesis 1. there is a significant relationship between accrual-based earnings management and bankruptcy risk. Statistically, the corresponding test is formulated as follows.

H_0 : there is no significant positive relationship between accrual-based earnings management and bankruptcy risk.

H_1 : there is a significant positive relationship between accrual-based earnings management and bankruptcy risk.

Table 4. Results of the logistic regression analysis.

Accuracy Rate	Significance Level	Wald Statistic	Standard Deviation	Coefficients	Variable
98.43	0.001	3.762	0.02	0.264	Accrual-based earnings management
85.39	0.000	2.726	0.084	0.0507	Firm size
71.86	0.207	-1.762	0.302	-0.38	Firm age

The table below presents selected statistical indices used to evaluate the model under investigation.

Table 5. Statistical indices and hypothesis test results showing the positive and significant effect of accrual-based earnings management on bankruptcy risk.

Hosmer–Lemeshow Goodness-of-Fit Test = $\chi^2(0.004)$ 22.719	Log-Likelihood = 670.409
McFadden's test = 0.834	Cox and Snell R^2 = 0.829
	Nagelkerke R^2 = 0.772

In the table above, considering the significance level column and the column reporting the hypothesis test results, since the significance level of the accrual-based earnings management variable is less than 5%, it has a statistically significant effect on bankruptcy risk. Moreover, because the coefficient of this variable is positive, its effect on bankruptcy risk is both positive and significant. This indicates that an increase in accrual-based earnings management is associated with a higher risk of bankruptcy. In other words, firms that engage in manipulations of accrual-based earnings exhibit lower informational transparency and are more likely to face financial distress. Therefore, the first hypothesis is supported, and the logistic regression model is specified as follows:

Bankruptcy risk = $-0.38(\text{Firm age}) + 0.0507(\text{Firm size}) + 0.264(\text{Accrual-based earnings management})$.

Hypothesis 2. there is a statistically significant relationship between real earnings management and bankruptcy risk. In statistical terms, the hypothesis is formulated as follows:

H_0 : there is no positive and statistically significant relationship between real earnings management and bankruptcy risk.

H_1 : there is a positive and statistically significant relationship between real earnings management and bankruptcy risk.

Table 6. Results of the logistic regression analysis.

Accuracy Rate	Significance Level	Wald Statistic	Standard Deviation	Coefficients	Variable
96.76	0.003	2.524	0.04	0.327	Real earnings management
84.27	0.000	2.841	0.072	0.0408	Firm size
77.64	0.106	-1.527	0.207	-0.29	Firm age

The table below presents selected statistical indices used to evaluate the model under study.

Table 7. Statistical indices and hypothesis test results indicating the positive and significant effect of real earnings management on bankruptcy risk.

Hosmer–Lemeshow Goodness-of-Fit Test = 761, p = 0.005	Log-Likelihood = 229.390
McFadden's $R^2 = 0.841$	Cox and Snell $R^2 = 0.768$
	Nagelkerke $R^2 = 0.772$

In the table above, considering the significance level column and the column reporting the hypothesis test results, the significance level of the real earnings management variable is less than 5%, indicating that it has a statistically significant effect on bankruptcy risk. Moreover, since the coefficient of this variable is positive, its effect on bankruptcy risk is both positive and significant. This finding suggests that an increase in real earnings management is associated with a higher risk of bankruptcy. In other words, firms that engage in manipulations of real earnings exhibit lower informational transparency and are more likely to face financial distress. Therefore, the second hypothesis is supported, and the logistic regression model is specified as follows:

Bankruptcy Risk = $-0.29(\text{Firm Age}) + 0.408(\text{Firm Size}) + 0.327(\text{Real earnings management})$.

6 | Conclusion

The present study aims to examine the impact of earnings management on bankruptcy risk. Earnings management is a global phenomenon in corporate financial reporting and the disclosure of profit-related information. Its primary objective is to present a firm's performance in line with shareholder expectations or to comply with regulatory requirements. In recent years, following the bankruptcies of major global firms such as Enron and WorldCom, researchers analyzing corporate events have identified earnings management as a key underlying cause of these failures, which has also contributed to widespread distrust in accounting practices. The results of the first hypothesis indicate that accrual-based earnings management has a positive and statistically significant effect on a firm's bankruptcy risk; in other words, an increase in accrual-based earnings management is associated with a higher likelihood of bankruptcy. These findings are consistent with prior studies, such as Dechow et al. [6] and Habib et al. [5], which demonstrate that earnings management reduces the reliability of financial statements and increases unforeseen risk for creditors. Similarly, Salehi and Bazrgar [16] examined the relationship between earnings quality and bankruptcy, showing that the association

between discretionary accruals and adjusted discretionary accruals with bankruptcy is significant and positive. Therefore, the results obtained in the present study align with the findings of the first hypothesis.

One of the most important items reported in financial statements is net profit. When this item is of high quality and reliable, it can play a critical role in supporting accurate decision-making by financial statement users. Since the preparation of financial statements is the responsibility of a firm's management, managers may engage in practices that serve specific interests, which could conflict with the broader interests of external users. In this context, real earnings management—through strategies such as increasing production volume to reduce cost of goods sold—can lead to lower cash outflows, higher operating cash inflows, and an increase in non-cash components of operating cash flows. These actions, for example by granting cash sales discounts, can enhance the firm's value derived from free cash flow. Previous studies [17–19] have demonstrated the positive effect of earnings management on the cost of capital. Additionally, a positive and significant relationship has been observed between real earnings management, through abnormal discretionary expenses, and firm value derived from economic value added. The results of the second hypothesis indicate that real earnings management has a positive and statistically significant effect on a firm's bankruptcy risk; that is, an increase in real earnings management is associated with a higher likelihood of bankruptcy.

Recommendations

It is recommended that financial statement users consider firms' earnings management practices to assess the likelihood and early warning signs of bankruptcy, incorporating this information into their economic decision-making. Additionally, it is advised that managers and creditors pay greater attention to corporate earnings management, as net profit—one of the most important items reported in financial statements—can significantly influence the accuracy and reliability of users' decisions.

Research limitations

The present study has certain limitations that necessitate cautious interpretation of its findings. The limitations identified by the researcher are as follows:

- I. The first limitation pertains to the inherent characteristics of quasi-experimental research, which is common in the social sciences. In other words, the influence of other variables, which are beyond the researcher's control, cannot be ruled out. Variables such as capital market conditions, the education and experience of firm managers, the characteristics of financial statement users, and other information disclosed in the financial statements and accompanying notes may all potentially affect the results, yet they remain inaccessible to the researcher.
- II. Macroeconomic variables were not controlled in this study; therefore, their influence on the results cannot be dismissed. For instance, over the five-year study period, the real value of money decreased due to rising inflation, which may have affected the study's findings.

Author Contributions

Seyyed Hamed Feyz Javadian contributed to the conceptualization of the study, development of the research design, data analysis, and preparation of the manuscript. Mehdi Mehri assisted in data collection, statistical analysis using SPSS, interpretation of the results, and critical revision of the manuscript. Both authors reviewed and approved the final version of the paper

Funding

This research did not receive any specific grant from public, commercial, or not-for-profit funding agencies.

Data Availability

The data used in this study were extracted from the financial statements of firms listed on the Tehran Stock Exchange during the period 2019–2023. Processed data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

References

- [1] Leach, R. (2006). Do firms manage their earnings prior to filing for bankruptcy? *Allied academies international conference*. Jordan Whitney Enterprises.
<https://www.proquest.com/openview/23da5aad4740907d0f9245bd61d967ee/1?pq-origsite=gscholar&cbl=38637>
- [2] Dzung, N. V., Ngoc, H. T., Linh, M. T. K., & Van Cuong, N. (2024). Financial distress and earnings management: Evidence from non-financial companies listed on the Ho Chi Minh stock exchange. *Journal of international economics and management*, 24(2), 54-72. <https://doi.org/10.38203/jiem.024.2.0086>
- [3] Kiaei, M., & Samadi Lergani, M. (2021). The effect of profit management and business strategies on the company's bankruptcy risk. *Journal of business management and entrepreneurship*, 1(2), 58–77. <https://dx.doi.org/10.22034/JBME.2022.322917.1012>
- [4] Pazhooyan, A., Rashid, M., & Mohammadi, M. (2020). Investigating the impact of earnings management and business strategy on bankruptcy risk (A case study: Companies listed on the Tehran Stock Exchange). *New applied studies in management, economics and accounting*, 3(3), 99-113. <https://doi.org/10.22034/nasmea.2020.181160>
- [5] Habib, A., Uddin Bhuiyan, B., & Islam, A. (2013). Financial distress, earnings management and market pricing of accruals during the global financial crisis. *Managerial finance*, 39(2), 155-180. <https://doi.org/10.1108/03074351311294007>
- [6] Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of accounting and economics*, 50(2-3), 344-401. <https://doi.org/10.1016/j.jacceco.2010.09.001>
- [7] Ahmadpour, A., & Shahsavari, M. (2016). Earnings management and the effect of earnings quality in relation to bankruptcy level (Firms listed at the Tehran Stock Exchange). *Iranian journal of management studies*, 9(1), 77. <https://doi.org/10.22059/ijms.2016.55036>
- [8] Hassanpour, S., & Ardakani, M. N. (2017). The effect of pre-bankruptcy financial distress on earnings management tools. *International review of management and marketing*, 7(3), 213-219. <https://izlik.org/JA67BT63MB>
- [9] Newton, G. W. (1974). *Bankruptcy and insolvency: Accounting practice and procedure*. New York University, Graduate School of Business Administration.
<https://www.proquest.com/openview/ea670525074e216aa306df6590d3db04/1?pq-origsite=gscholar&cbl=18750&diss=y>
- [10] Campa, D. (2015). The impact of SME's pre-bankruptcy financial distress on earnings management tools. *International review of financial analysis*, 42, 222-234. <https://doi.org/10.1016/j.irfa.2015.07.004>
- [11] Rostami, Y., Asgari, E., Rajaei, N., & JafarzadehTaraghdari, S. (2025). Investigating the impact of financial reporting quality on the risk of stock price collapse with regard to the moderating role of corporate governance. *Accounting and auditing with applications*, 2(4), 312-325. <https://doi.org/10.22105/aaa.v2i4.80>
- [12] Kasznik, R. (1999). On the association between voluntary disclosure and earnings management. *Journal of accounting research*, 37(1), 57-81. <https://doi.org/10.2307/2491396>

- [13] Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of accounting and economics*, 50(1), 2-19. <https://doi.org/10.1016/j.jacceco.2010.01.002>
- [14] Altman, E. I., & Hotchkiss, E. (1993). *Corporate financial distress and bankruptcy* (Vol. 1998, pp. 105-110). New York: John Wiley & Sons. <https://ndl.ethernet.edu.et/bitstream/123456789/27600/2/68.pdf.pdf>
- [15] Namazi, M., Hajiha, Z., & Chenari, H. (2019). Modeling and identifying hierarchy of the effective measures of the earning management on the prediction of the bankruptcy. *Journal of financial management strategy*, 6(23), 1-27. **(In Persian)**. <https://doi.org/10.22051/jfm.2018.13604.1257>
- [16] Salehi, M., & Bazargar, H. (2015). The relationship between earnings quality and bankruptcy risk. *Financial management strategy*, 3(8), 108-181. **(In Persian)**. <https://doi.org/10.22051/jfm.2015.1961>
- [17] Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The accounting review*, 79(4), 967-1010. <https://doi.org/10.2308/accr.2004.79.4.967>
- [18] Kim, J. B., & Sohn, B. C. (2013). Real earnings management and cost of capital. *Journal of accounting and public policy*, 32(6), 518-543. <https://doi.org/10.1016/j.jaccpubpol.2013.08.002>
- [19] Mojudiniay Kasmaei, S., & Tasaddi Kari, M. J. (2023). The relationship between earnings management and firm performance in the companies listed in Tehran Stock Exchange: The function of firm size. *Environmental energy and economic research*, 7(1), 1-10. <https://doi.org/10.22097/EEER.2022.362492.1264>