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The Impact of Bankruptcy Risk on Stock Price Crash Risk: The Moderating Role of Debt Maturity

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Abstract

Existing studies rely on agency theory to explain management motivations for hiding bad news. However, investors' irrational beliefs can cause stock prices to fall from their perspective. Whether concealing bad news—meaning a lack of transparency—increases heterogeneity among investors needs to be tested empirically. Developing a direct measure of investor heterogeneity is challenging and may lead research studies to examine its role in causing stock price crashes. In considering default risk as a prerequisite for price declines, a refined representation of default risk—such as breach of debt contracts rather than firm size or leverage—may provide better insight into why companies with high default risk are more prone to crash risk. This study investigates the effect of bankruptcy risk on stock price crash risk, emphasizing the role of debt maturity in companies listed on the Tehran Stock Exchange. The financial statements of 150 companies from 2010 to 2021 were collected for the study. Multivariate regression with panel data was used to test the hypotheses. The results of the hypothesis testing show that the effect of bankruptcy risk on stock price crash risk, with an emphasis on debt maturity, is not statistically significant, leading to the conclusion that the research hypotheses are not supported. The research findings can benefit investors, creditors, policymakers, and regulatory bodies. Additionally, they can effectively improve the quality of financial reporting and economic development by identifying existing weaknesses and challenges and providing insights into theoretical frameworks.

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1. Introduction

Due to the successive financial crises in Europe and Asia, many companies have struggled to raise funds in recent decades. Despite such crises, corporate financing has become one of the most important issues in the financial literature. The turbulent and changing economic environment of companies, characterized by the globalization of markets, changing customer needs, and increasing competition in the product market, forced companies to improve their performance constantly. Companies need sufficient financial resources for their activities and programs (Almeida and Campello, 2001). Lack of cash may cause serious problems for companies, as the managers of such companies will not have sufficient resources to finance investment projects. Recent financial crises have created more incentive to properly examine and predict the risk-fall process of stock prices (Hutton et al., 2009). Numerous theoretical models indicate that company executives are strongly incentivized to hide bad news and delay informing about the end of projects with a net negative present value. When such news accumulates and exceeds certain thresholds, the sudden release of bad news accumulated in the market will cause stock prices to fall (Benmelech et al., 2010; Bleck and Liu, 2007; Jin and Myers, 2006). In relation to traditional agency theory, the conventional feature of this type of theoretical model is that managers are considered to be a group of individuals who should reasonably be able to maximize the expected usefulness of the company. Still, at the same time, this group of managers may also jeopardize the company's ethical issues.

The stock price crash risk and various approaches, as well as the sudden fluctuations in stock prices in recent years, especially after the financial and economic crisis of 2008, have attracted much attention. These changes generally occur in the form of falling and rising stock prices. Given the importance that investors attach to their stock returns, the falling stock prices, which lead to a sharp decline in returns, have received more attention from researchers than stock price growth.

Blanchard and Watson (1982) introduced the random stock price bubble in describing the negative skewness of the stock return. According to modern financial theories, the value of a share is equal to the total present value of its future cash flows. Also, according to the efficient market hypothesis, the stock price in an efficient market fluctuates equally to or around its intrinsic value. But sometimes, due to a shock (release of new information, etc.), prices rise without any fundamental and economic justification; in other words, stock prices take a significant upward trend. This process is referred to as the price bubble. Blanchard and Watson believe that the bursting of price bubbles causes the negative skewness of stock returns or falling stock prices. French et al. (1987) and Campbell and Hentschel (1992) explained the reverse oscillation mechanism to explain the stock price crashes or negative skewness of stock returns. According to this procedure, the entry of new news (information) into the market, both favorable and unfavorable, leads to increased market volatility and, therefore, the risk will increase. Although this increase in risk reduction somewhat reduces the positive effect of good news, it reinforces the negative effect of bad news. Thus, the decrease in stock prices due to the entry of unfavorable news into the market will be greater than the increase due to the entry of favorable information. This mechanism leads to a negative skewness of stock returns or a stock price crash. Potterba and Summers criticized this mechanism. They believe market fluctuations are short-lived and cannot be expected to significantly affect risk alone (Hong and Stein, 2003).

From the necessity and importance of its research, it can be said that one of the constant concerns of investors is the unfavorable financial situation of the company. Poor financial

performance and persistence can lead to the company's bankruptcy. For this reason, financial turmoil will have significant adverse consequences, and one of its main effects is investors' fear of the company's future and the risk of falling stock prices. Suppose the company is in an unfavorable financial situation. In that case, it will have consequences such as reducing the credit of the company's managers and their salaries and benefits, which will increase agency costs (Leuz et al., 2003). Stability in the company's financial situation and no turmoil reduces the cost of representing the company and increases its market value. Topics on stock price crash risk rely heavily on arguments based on the agency theory for management incentives to hide bad news. However, the investor's heterogeneous belief can cause prices to fall from the investor's perspective. Whether concealing bad news - that is, lack of transparency - increases heterogeneity among investors needs to be tested empirically. Developing a direct scale of investors' heterogeneous beliefs is a challenging task that may lead to research examining the role of investor heterogeneity in causing a crash. Concerning default risk as a prerequisite for price falls, a refined representative of default risk - for example, breach of debt contract rather than firm size or leverage can be helpful in better understanding why companies with high default risk are more prone to crash risk. This study investigates the effect of bankruptcy risk on stock price risk, emphasizing debt maturity in companies listed on the Tehran Stock Exchange.

2. Theoretical principles and hypothesis development

2.1 The fall in stock prices has the following characteristics

A) a stock price crash is a large and unconventional change in stock prices without a major economic event; B) these large changes are negative; C) Falling stock prices are a contagious phenomenon at the market level. This means that stock price reductions are not limited to a specific stock but include all types of stocks available (Chen et al., 2001).

A considerable body of research theorizes that the desire of managers to preserve their wealth and human capital incentivizes them to strategically withhold bad news, which can keep investors' expectations at unjustifiable levels and inflate a firm's stock price beyond its intrinsic value at the expense of shareholders (e.g.Jin and Myers, 2006; Bleck and Liu, 2007; Benmelech et al., 2010). Accordingly, such opportunistic behavior prolongs investors' false impression of the firm's true state of economic fundamentals (Hutton et al., 2009; Kim et al., 2011a). Keeping the deception up is naturally unsustainable in the long-term and when the volume of negative information becomes overwhelming, managers tend to give up. At that point, the accumulated negative information abruptly spills into the market, causing a firm-specific stock price crash. The burgeoning literature attributes firm-specific stock price crashes to agency-related problems arising from managerial opportunism, which fuels the bad news hoarding mechanism (e.g. Hutton et al., 2009; Kim et al., 2011a; Callen and Fang, 2013; Andreou et al., 2017). From a different perspective, a number of other studies show that managers of firms facing rising bankruptcy risk situations act opportunistically to obfuscate their firm's poor operating performance; for example, by influencing contractual outcomes or misleading stakeholders about their firms' economic fundamentals (DeAngelo et al., 1994; Rosner, 2003; Andreou et al., 2017). Research also suggests that the link effect bankruptcy risk on managers' career concerns represents one of the reasons why managers persistently withhold bad news. Taking these ideas on board, we hypothesize that the negative externalities associated with rising financial distress risk incentivize managers to persistently withhold bad news from investors, a strategy that increases firms' susceptibility to future stock price crashes. Despite the plausibility and researchworthiness of this proposition, to the best of our knowledge, studies have yet to meticulously investigate the relationship between financial distress

risk and the future occurrence of stock price crashes. In this respect, our study fills this gap by seeking to empirically discover a positive distress-crash risk relationship.

Each of these characteristics is rooted in empirical, reasoned, and fundamental facts; regarding the first feature, Hong and Stein (2003) state that many of the major changes that have taken place in the S&P Index since World War II, and in particular the market crash in October 1987, have not been due to the disclosure of news about an important and significant event. Similarly, French et al. (1987) emphasize that it is very difficult to explain stock price changes by disclosing information about a particular event in many cases. The second characteristic of the above definition is an empirical and significant asymmetry in changes in market returns. This means that large price changes have resulted in more decreases and fewer increases. In other words, market returns were more likely to decline and less likely to increase. This asymmetry can be proved in two ways. First, this asymmetry can be clearly seen by looking at historical market returns data. An examination of these data shows that of the 10 major changes that have taken place in the S&P index since 1947, 9 have been reduced. A large part of the stock market literature indicates that stock returns over time indicate a negative skew of stock returns or asymmetric fluctuations in stock returns (Chen et al., 2001).

The third characteristic of defining a stock price fall is that a fall is a phenomenon that pervades the entire market. This means that this phenomenon spreads to all types of stocks in the market. Duffee (1995) states that this is because the correlation between the types of stocks in the market increases at the time of the collapse; Kelly (1994) proved that the study of historical price data trends related to the market price of stock options shows that in cases where the stock option price index has decreased, the correlation between different types of stock options has increased.

In general, the stock price crash risk equating to the negative skewness of stock returns is statistically defined as follows: stock price crash in the capital market occurs when in a company-specific monthly return over some time, 2.3 of standard deviation is less than the average specific monthly return of the company during the same period. This definition is based on the statistical concept that assuming the normal distribution of the company's specific monthly returns, fluctuations between the average plus 2.3 standard deviations and the average minus 2.3 standard deviations are among the normal fluctuations and those outside this distance are considered abnormal. Since the stock price crash is an abnormal fluctuation, 2.3 is considered the boundary between normal and abnormal fluctuations (Healy and Wahlen, 1999). Although all experts agree on negative asymmetry or negative skewness in stock market returns, the economic mechanism that leads to this phenomenon has not been clearly defined (Hutton et al., 2009). In the financial texts, various theories and approaches have been presented to explain the phenomenon of falling stock prices.

Cao et al. (2002) propose the "information blockage" model as another theoretical framework to explain price fall. In this model, the upward price trend causes informed investors to engage in active trading. Conversely, uninformed traders are naturally skeptical about the true nature of the marks and consequently delay trading until the price drops. Therefore, a price correction is inevitable when the pessimistic economic outlook and the final investors are less informed. As a result, information blockage leads to negative skewness of returns following the price increase but leads to positive skewness following the price decrease (Zhu, 2016). Another source of crash risk is the effects of volatility feedback, whereby large price movements can cause investors to re-evaluate market fluctuations and increase the required risk. Merely increasing risk reduces the balanced prices, reinforcing the effect of bad news but balancing the effect of bad news, resulting in negative skewness (Hutton et al., 2009).

The default risk-based explanation for crash risk relies on the argument that companies with

higher default risk are more likely to publish bad news or extremely good news because they have failed or continue to operate. The previous literature used firm size and leverage as representatives of default risk but failed to support that (Hutton et al., 2009; Kim et al., 2011a and b). Conversely, a negative correlation between leverage and fall risk is proven when leverage positively correlates with bankruptcy risk (Campbell et al., 2008). A potential explanation for this result is probably the fact that investors initially undervalue high-leverage companies and, as a result, are less likely to fall in price. Consistent with this explanation, Campbell et al. (2008) show that companies with high leverage have higher future average returns than companies with low leverage (Zhu, 2016).

2.2 The impact of bankruptcy risk on stock price crash risk

Firms facing financial constraints face a gap between domestic and foreign spending of allocated funds. When the difference between domestic and foreign spending on investing in a firm is large and high, that firm is more financially constrained. Financial constraints generally prevent the provision of all necessary funds for the firm's desired investment. Financial constraints encourage managers to hide unfavorable news about the firm because investors' knowledge of financial constraints may affect the company's stock price. Managers who can not maintain unfavorable information about financial constraints are forced to disclose this information. Thus, releasing information causes severe price fluctuations and, as a result, stock price crash risk.

Hypothesis 1: Bankruptcy risk significantly affects the stock price crash risk.

2.3 The role of debt maturity in the effect of bankruptcy risk on stock price crash risk

Jin and Myers' (2006) model is the most widely accepted paradigm in crash risk literature regarding information structure dynamics. According to this model, the withheld negative information spills into the market abruptly and all at once at the point where managers give up (i.e. become unwilling or unable) to continue concealing it. Nevertheless, based on the arguments above (e.g. Hong and Stein, 2003; Roychowdhury and Sletten, 2012; Callen and Fang, 2013), it is reasonable to assume that at least a portion of the hitherto undisclosed bad news that managers are strategically concealing from the market spills into the market in the short period preceding the tipping above point. In this respect, the discovery of such negative information increases the firms' bankruptcy risk level within a short period of time, as investors start revising their expectations downwards regarding the firms' true state of economic fundamentals.

One of the things that can lead to a possible decline in stock prices is short-term debt. Debt is one of the financial instruments for raising capital. The debt maturity structure mainly influences the company's investment decisions and the investor in debt financing texts. Due to defective debt contracts, creditors may not be able to exercise their right of control over any possible future events under the terms of the contract. However, short-term debt provides better protection for creditors' right to control by threatening not to extend the debt contract, so creditors will demand more control to repay the debt (Giannetti, 2003). Given the control right granted by the short-term debt, lenders can better control the borrowers (the company) and obtain more reliable information about the company's operating performance before re-granting credit (Dang et al., 2018). Since one of the reasons for the sharp decline in stock prices is the accumulation of bad news by managers in line with their interests, to reduce the risk of losing their claims, lenders are expected to demand control rights as well as reliable information about the company's status, which will reduce the risk of hiding bad news and lead to a sharp drop in stock prices.

Hypothesis 2: Debt maturity moderates the effect of bankruptcy risk on stock price risk.

3. Research methodology

3.1 Research method

This research is correlational in nature and content and practical in purpose. The research is conducted within the framework of deductive-inductive reasoning, which means that the theoretical foundations and background of the research are done through libraries, journals and other valid sites in deductive form, and data is collected to confirm and refute hypotheses inductively. Also, considering that the data used in the present study is real and historical information, it can be classified as a retrospective type.

3.2 Data analysis method

Due to the type of data studied and the simultaneous comparison of cross-sectional and longitudinal data, the panel data model method (data panel) has been used to estimate the coefficients and test the hypotheses. First, the F-Limer test was used to determine the method of using panel data and whether they are homogeneous or heterogeneous. In this test, the null hypothesis is that the data is homogeneous. If confirmed, all data should be combined and a classical regression should estimate the parameters; otherwise, the data should be considered panel data. If the results of this test are based on using data as panel data, one of the fixed or random-effects models should be used to estimate the research model. The Hausman test must be performed to choose one of the two models. The null hypothesis of the Hausman test is that the random-effects model is appropriate for estimating panel data regression models.

3.3 Statistical population and sample

The statistical population of this research includes all companies listed on the Tehran Stock Exchange. The research period is from 2010 to 2021. Also, in this research, a sample of 167 companies has been selected from the statistical population of companies listed on the Tehran Stock Exchange based on the following criteria:

1. According to the period of access to data of listed companies on the stock exchange before 2010 its name has not been removed from the list of companies mentioned until the end of 2021;
2. In order to increase the ability to assess and equalize the conditions of selected companies, the financial year of the companies should end at the end of March of each year;
3. Due to the lack of clear demarcation between operational activities and financing of financial companies (investment and financial intermediation companies, etc.), these companies have been excluded from the sample;
4. Companies whose information was incomplete to calculate the initial variables of the financial statements have been excluded from the sample.

Table 1. The statistical population of the research

All companies accepted in 1399	**517**
Limitations	
Inactive companies	185
Companies accepted and listed after 1392	52
Intermediary companies, finance, insurance, banks and holdings	57
Companies end of the fiscal year other than March 20	54
Lack of access to data	2
Total companies studied	167

3.4 Research variables

Given the proposed facts, the models and variables of the study are as follows:

$Z\_Altman_{it} = \beta_0 + \beta_1$ Stock Price Crash Risk $_{it} + \beta_2$ Size $_{it} + \beta_3$ Financial Leverage $_{it} + \beta_4$ Sale

Growth $_{it}$ + β_5 ROA $_{it}$ + β_6 BV/MV $_{it}$ + ε_{it}

Z_Altman $_{it}$ = β_0 + β_1 Stock Price Crash Risk $_{it}$ + β_2 Debt Maturity $_{it}$ + β_3 Stock Price Crash Risk $_{it}$ × Debt Maturity $_{it}$ + β_4 Size $_{it}$ + β_5 Financial Leverage $_{it}$ + β_6 Sale Growth $_{it}$ + β_7 ROA $_{it}$ + β_8 BV/MV $_{it}$ + ε_{it}

Dependent variable: stock price crash risk

The negative skewness criterion of stock returns is used to measure this variable. To measure the stock price crash risk, the company's specific monthly return is first calculated using Equation (1):

Equation (1)
$$W_{j,\theta} = Ln(1+\varepsilon_{j,\theta})$$

Where

$W_{j,\theta}$: the net monthly return of company j in the month θ

$\varepsilon_{j,\theta}$: The residual return on the stock of the company j in the month θ and is the residual the model in equation (2)

Equation (2)
$$r_{jt} = \alpha_j + \beta_{1j} r_{m,t-2} + \beta_{2j} r_{m,t-1} + \beta_{3j} r_{m,t} + \beta_{4j} r_{m,t+1} + \beta_{5j} r_{m,t+2} + \varepsilon_{jt}$$

Where

rjt: the return of stock of the company j in the month θ during the fiscal year

rm,θ: market return in month θ. To calculate the monthly market return, the beginning of the month index is deducted from the end of the month index and the result is divided by the beginning of the month index.

Then, using the company-specific monthly return, the negative skewness of stock returns and falls is calculated as follows:

Chen et al. (2001) believe that the signs of falling stock prices form one year before this phenomenon, and one of these signs is the existence of a negative skew in the company's stock returns. Therefore, companies that have experienced negative stock returns in the past year will likely face falling stock prices next year. Hong and Stein (2003) also stated that the negative skewness of stock returns is an alternative way to measure asymmetry in the distribution of returns. Equation (3) is used to calculate the negative skewness of stock returns:

Equation (3)
$$NCSKEW_{j,t} = -\frac{[n(n-1)^{\frac{3}{2}} \sum W_{j,t}^3]}{[(n-1)(n-2)(\sum w_{j,t}^2)^{\frac{3}{2}}]}$$

Where

NCSKEWjt: negative skew of monthly stock return of company j during the fiscal year t.

$W_{j,\theta}$: the net monthly return of company j in the month θ

N: number of months, the return of which is calculated.

In this study, the Altman criterion was used to assess financial constraints. According to the definition, this risk comprises those business units that stop their operations due to the transfer or bankruptcy or cessation of business operations or losses by creditors. In this study, the modified Altman (1983) model was used to measure financial health as follows:

Equation (4)

)0.998 X_5 + 0.420 X_4 + 3.107 X_3 + 0.847 X_2 (0.717 X_1 = Z'

Z': total bankruptcy index
X_1: working capital to total assets ratio
X_2: accumulated profit to total assets ratio
X_3: profit before interest and tax to total assets
X_4: book value of company stock to book value of total assets
X_5: sales to total assets ratio

If the calculated total index is less than 1.9, companies face a financial crisis, and when it is more than 1.9, the phenomenon of financial crisis does not threaten them.

Given that the modified Altman model has been accepted in most studies, and citing the coefficients of the Altman model in similar studies such as Cheng et al. (2013), Gomariz and Ballesta (2014), the coefficients of the same model were used in the research.

To operate the above variable, the number 1 was given to companies with financial constraints and the number zero was given to other companies.

The moderator variable in this study is debt maturity. For this purpose, we use the short-term debt ratio to total debt to calculate debt maturity (Huang et al., 2016).

Equation (5) debt maturity = short-term debts / total debts

Control variables

Firm size

The company's size mainly reflects the company's status in terms of profitability, volume of activity, and value. It is calculated through the natural logarithm of the book value of total assets.

Firm size = LN (book value of total assets)

Financial leverage

Represents the company's financial risk and is calculated by the book value of total liabilities to the book value of total assets.

Financial leverage = total debts / total assets

Sales growth

It indicates the company's profitability and is obtained from the ratio of the difference between this year's sales amount and the previous year's sales amount divided by the previous year's sales amount.

Sales growth = (this year's sales – previous year's sales) / previous year's sales

Return on assets rate

It represents the company's performance and is calculated from the net profit ratio to total assets.

Return on assets rate = net profit / total assets

Book value to market value ratio

It is calculated by calculating the book value of equity to market value.

4. Findings

4.1. Descriptive statistics

The obtained findings from descriptive statistics of the research variables are as follows:

Table 2. The statistical description of research variables

Variable	Mean	Median	Max	Min	Std. Dev.	Skewness
Negative skewness of stock returns	0.169	0.167	3.099	-2.348	0.675	0.034
Firm size	14.395	14.170	20.768	10.031	1.663	0.768
Financial Leverage	0.576	0.580	2.077	0.031	0.212	0.501
Sales growth	0.161	0.054	1.000	4.070	0.255	2.213

Asset return rate	0.180	0.125	1.974	-0.605	0.236	2.042
The ratio of book value to market value	0.449	0.387	3.527	-5.668	0.438	-1.164

The average calculated financial leverage is about 57% and shows the high level of liabilities in the companies under study. The average sales growth calculated is about 12, indicating low sales growth in listed companies. The average calculated rate of return on assets is about 31%, which indicates that the average rate of return on assets is below average. Most variables' standard deviation and skewness are calculated to indicate the appropriate and logical data distribution. Examining the amount of skewness and kurtosis of each variable and comparing it with the normal distribution shows that all research variables are normally distributed.

4.2 Testing the first hypothesis

The obtained results from H1 testing are as follows:

Table 3. Findings from the test of the first hypothesis

Variable	Coefficients	Standard deviation	t- Statistics	P-value
Bankruptcy risk	-0.010	0.039	-0.274	0.783
Firm Size	0.024	0.010	2.391	0.016
Financial Leverage	0.035	0.102	0.343	0.731
Sales growth	-0.026	0.063	-0.423	0.672
Asset return rate	-0.079	0.093	-0.852	0.394
The ratio of book value to market value	-0.090	0.039	-2.283	0.022
c	-0.134	0.151	-0.886	0.375
R^2	Adj- R^2	F-test	F-Limmer	Durbin-Watson Test
0.107	0.104	2.255 (0.03)	1.161 (0.086)	2.003

The significance level for each variable and the whole model is calculated at a 95% confidence level. According to the coefficient of determination of the fitted model, it can be claimed that about 10.73% of the dependent variable changes are explained by independent and control variables. As shown in Table 3, the significance level of the test statistic for the bankruptcy risk variable is higher than the acceptable error level of 5%, so the effect of the significance of the bankruptcy risk criterion on the stock price crash risk is rejected, and the first hypothesis is not accepted. The control variables of firm size and book value ratio to market value significantly correlate with the risk criterion of a stock price crash.

Table 4. Findings from the test of the second hypothesis

Variable	Coefficients	Standard deviation	t- Statistics	P-value
Bankruptcy risk	0.131	0.049	2.638	0.008
Debt maturity adjuster variable	-0.006	0.002	-2.933	0.003
Bankruptcy risk × Debt adjustment variable	-0.006	0.002	-2.863	0.004
Firm size	0.031	0.009	3.146	0.001
Financial Leverage	0.377	0.101	3.720	0.000
Sales growth	0.232	0.062	3.700	0.001
Asset return rate	0.123	0.092	1.334	0.182

The ratio of book value to market value	0.030	0.039	0.770	0.441
c	-0.598	0.150	-3.992	0.000
R2 0.136	Adj- R2 0.131	F-test 8.537 (0.000)	F-Limmer 1.172 (0.297)	Durbin-Watson Test 2.011

4.3 Testing the second hypothesis

The obtained results from H2 testing are as follows:

The significance level for each variable and the whole model is calculated at a 95% confidence level. According to the coefficient of determination of the fitted model, it can be claimed that about 13.608% of the dependent variable changes are explained by independent and control variables. As shown in Table 4, the significance level of the test statistic for the bankruptcy risk variable × the moderating variable of debt maturity is greater than the acceptable error level of 5%, so the moderating role of the debt maturity in influencing the significance of the bankruptcy risk criterion on stock price risk is confirmed. The second research is accepted. The control variables of firm size, Financial Leverage, and sales growth significantly correlate with the risk criterion of a stock price crash.

5. Discussion and conclusion

Conceptually, crash risk is based on the argument that managers tend to withhold bad news for an extended period, allowing bad news to stockpile. If managers successfully block the flow of negative information into the stock market, the distribution of stock returns should be asymmetric (Hutton et al., 2009). When the accumulation of bad news passes a threshold, it is revealed to the market immediately, leading to a large negative drop in stock price. Although financial reporting opacity and its effect on crash risk has become the standard research approach, other mechanisms could also generate price crashes. In the Bleck and Liu (2007) model, historical cost financial reporting allows a manager to continue with a poor investment project, thus receiving compensation prior to the project's maturity. This is facilitated because outsiders cannot assess the project's market value until maturity. The Benmelech et al. (2010) model proposes that managers with equity-based contracts continue with negative NPV projects to maximize the value of their compensation packages. Both these models hint towards managerial incentives for hoarding bad news—the precursor for a price crash. Eventually, the manager has to disclose the bad news, causing a large stock price drop. Hong and Stein (2003) developed a model incorporating heterogeneity in investors' beliefs, one of the key drivers of stock price crashes. Investor heterogeneity can potentially reveal the private signals of relatively pessimistic investors. This model begins with the observation that a group of investors (e.g. mutual funds) cannot short-sell stocks. Such constraints inhibit the revelation of negative information known to pessimistic investors about stock prices. However, if other previously optimistic investors exit the market, the former investors may become the marginal buyers. Thus, previously hidden bad news surfaces and results in a price crash. Cao et al. (2002) propose an 'information blockage' model as another theoretical framework for explaining price crash. This model's upward price trend prompts favourably informed investors to engage in active trading. In contrast, less informed traders are naturally sceptical about the true nature of the signals and hence delay trading until the price drops. The price correction is, therefore inevitable when the economic outlook becomes pessimistic and the less informed marginal investors enter the market. Information blockage therefore generates negative returns skewness following price increases but positive skewness following price decreases (Zhu, 2016). Another source of crash risk is volatility feedback effects (Campbell and Hentschel, 1992), whereby 'big price movements could cause investors to reassess market volatility

and increase required risk premia. An increased risk premium reduces equilibrium prices, reinforcing the impact of bad news but offsets the impact of good news, thus generating negative skewness' (Hutton et al., 2009). The default risk-based explanation for crash risk rests on the notion that firms with higher default risks are more likely to release extremely bad news or extremely good news because they will either fail or continue as a going concern. Prior literature used firm size and leverage as proxies for default risk but failed to find support for this proposition. On the contrary, a negative association between leverage and crash risk is documented when leverage should be positively associated with bankruptcy risk (Campbell et al., 2008). One potential explanation for this surprising result may be that high leverage firms are initially underpriced by investors, making it less likely that price crashes will follow. Consistent with this explanation, Campbell et al. (2008) show that high leverage firms generate higher future mean returns than low leverage firms.

Investors and lenders are more inclined to predict the bankruptcy of firms because, in the event of bankruptcy, they will incur high costs. One of the constant concerns of investors is the unfavorable financial situation of the company. Poor financial performance and persistence can lead to the company's bankruptcy. For this reason, financial turmoil will have important adverse consequences, and one of its main effects is investors' fear of the company's future. If the company is in an unfavorable financial situation, it will have consequences such as reducing the credit of the company's managers. Stability in the company's financial situation and lack of turmoil will increase its market value. The risk-based explanation for default risk is based on the argument that companies with higher default risk are more likely to publish extremely bad news or extremely good news because they fail or continue to operate. The previous literature used the size and leverage of the company as representatives of default risk but did not manage to support that. Conversely, a negative correlation between leverage and the crash risk of a fall is proven when the leverage positively correlates with the risk of bankruptcy. A potential explanation for this result is that investors initially undervalue high-leverage companies and are therefore less likely to fall in price. Consistent with this explanation, Campbell et al. (2008) show that companies with high leverage have higher average future returns than companies with low leverage. One of the things that can reduce the likelihood of stock prices is short-term debt. Debt is one of the financial instruments for raising capital. The debt maturity structure mainly influences the company's investment decisions and the investor in debt financing texts. Due to defective debt contracts, creditors may not be able to exercise their right of control over any possible future events under the terms of the contract. However, short-term debt provides better protection for creditors' right to control by threatening not to extend the debt contract, so creditors will demand more control to repay the debt. Due to the right of control granted by short-term debt, lenders can more favorably control the borrowers (the company) and obtain more reliable information about the company's operating performance before re-granting credit. Given that one of the reasons for the sharp decline in stock prices is the accumulation of bad news by managers in line with their interests, creditors are expected to demand the right to control as well as reliable information about the status of the company to lower the risk of losing their claims. In such a case, hiding the bad news is reduced, and the possibility of a sharp drop in stock prices decreases. This study investigates the effect of bankruptcy risk on stock price risk, emphasizing debt maturity in companies listed on the Tehran Stock Exchange. Findings from the test of research hypotheses show that the effect of bankruptcy risk on the stock price crash risk and the role of debt maturity adjustment is not statistically significant and is not confirmed. The results are inconsistent with that of He and Ren (2023) and consistent with Kim et al. (2016).

6. Implications

According to the result, it can be stated that the stock price crash risk as one of the crucial criteria for the continuation of the company should be considered by investors, whether the company is a reliable and stable source to provide the funds needed for favorable investments. And whether the company's net assets are positive and the liquidity of the assets according to the market situation. Despite the lack of significant impact in the general case, the levels of stock price crash risk of companies for investors can influence their decisions in the long or short term. Therefore, it is suggested that stakeholders, especially external investors and creditors, consider companies' stock price crash risk in line with the existence of conditions related to the assumption of continued operation or cessation of activity in their analysis. In line with future research, it is suggested that other bankruptcy criteria, such as Springgate, Falmer, etc., be considered in future research.

Since short-term debts give creditors the right to control in a desirable and ideal way in line with the companies, creditors can access more relevant and reliable information as creditors seek more control rights to lower the risk of loss claims. Therefore, considering the effectiveness of debt maturity criteria, it is suggested that other characteristics of debt such as capacity, structure and type of debt be considered in future research.

References

1. Almeida, H. and Campello, M. (2001). Financial constraints and investment-cash flow sensitivities: New research directions. *Twelfth Annual Utah Winter Finance Conference*. University of Illinois at Urbana-Champaign, Champaign, IL, United States. https://dx.doi.org/10.2139/ssrn.298027
2. Altman, E.I. (1983). Corporate financial distress: A complete guide to predicting, avoiding, and dealing with bankruptcy. New York: NY, John Wiley and Sons, New York, NY.
3. Andreou, P. C., Karasamani, I., Louca, C. and Ehrlich, D. (2017). The impact of managerial ability on crisis-period corporate investment. *Journal of Business Research*, 79, pp. 107-122. https://doi.org/10.1016/j.jbusres.2017.05.022
4. Benmelech, E., Kandel, E. and Veronesi, P. (2010). Stock-based compensation and CEO (dis) incentives. *The Quarterly Journal of Economics*, 125(4), pp. 1769-1820. https://doi.org/10.1162/qjec.2010.125.4.1769
5. Blanchard, O. J. and Watson, M. W. (1982). Bubbles, rational expectations and financial markets, Crises in the Economic and Financial Structure, Working Paper, France
6. Bleck, A. and Liu, X. (2007). Market transparency and the accounting regime. *Journal of Accounting Research*, 45(2), pp. 229-256. https://doi.org/10.1111/j.1475-679X.2007.00231.x
7. Callen, J. L. and Fang, X. (2013). Institutional investor stability and crash risk: Monitoring versus short-termism?. *Journal of Banking & Finance*, 37(8), pp. 3047-3063. https://doi.org/10.1016/j.jbankfin.2013.02.018
8. Campbell, J. Y. and Hentschel, L. (1992). No news is good news: An asymmetric model of changing volatility in stock returns. *Journal of Financial Economics*, 31(3), pp. 281-318. https://doi.org/10.1016/0304-405X(92)90037-X
9. Campbell, J. Y., Hilscher, J. and Szilagyi, J. (2008). In search of distress risk. *The Journal of Finance*, 63(6), pp. 2899-2939. https://doi.org/10.1111/j.1540-6261.2008.01416.x
10. Cao, H. H., Coval, J. D. and Hirshleifer, D. (2002). Sidelined investors, trading-generated news, and security returns. *The Review of Financial Studies*, 15(2), pp. 615-648. https://doi.org/10.1093/rfs/15.2.615
11. Chen, J., Hong, H. and Stein, J. C. (2001). Forecasting crashes: Trading volume, past returns, and conditional skewness in stock prices. *Journal of Financial Economics*, 61(3), pp. 345-381. https://doi.org/10.1016/S0304-405X(01)00066-6

12. Cheng, P., Man, P. and Yi, C. H. (2013). The impact of product market competition on earnings quality. *Accounting & Finance*, 53(1), pp. 137-162. https://doi:10.1111/j.1467-629X.2011.00457.x
13. Dang, V. A., Lee, E., Liu, Y. and Zeng, C. (2018). Corporate debt maturity and stock price crash risk. *European Financial Management*, 24(3), pp. 451-484. https://doi.org/10.1111/eufm.12134
14. DeAngelo, H., DeAngelo, L. and Skinner, D. J. (1994). Accounting choice in troubled companies. *Journal of Accounting and Economics*, 17(1-2), pp. 113-143. https://doi.org/10.1016/0165-4101(94)90007-8
15. Duffee, G. R. (1995). Stock returns and volatility: a firm-level analysis. *Journal of Financial Economics*, 37(3), pp. 399-420. https://doi.org/10.1016/0304-405X(94)00801-7
16. French, K. R., Schwert, G. W. and Stambaugh, R. F. (1987). Expected stock returns and volatility. *Journal of Financial Economics*, 19(1), pp. 3-29. https://doi.org/10.1016/0304-405X(87)90026-2
17. Giannetti, M. (2003). Do better institutions mitigate agency problems? Evidence from corporate finance choices. *Journal of Financial and Quantitative Analysis*, 38(1), pp. 185-212. https://doi.org/10.2307/4126769
18. Gomariz, M. F. C. and Ballesta, J. P. S. (2014). Financial reporting quality, debt maturity and investment efficiency. *Journal of Banking & finance*, 40, pp. 494-506. https://doi.org/10.1016/j.jbankfin.2013.07.013
19. He, G. and Ren, H. M. (2023). Are financially constrained firms susceptible to a stock price crash?. *The European Journal of Finance*, 29(6), pp. 612-637. https://doi.10.2139/ssrn.3021307
20. Healy, P. M. and Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, 13(4), pp. 365-383. https://doi.org/10.2308/acch.1999.13.4.365
21. Hong, H. and Stein, J. C. (2003). Differences of opinion, short-sales constraints, and market crashes. *The Review of Financial Studies*, 16(2), pp. 487-525. https://doi.org/10.1093/rfs/hhg006
22. Huang, H. H., Lobo, G. J., Wang, C. and Xie, H. (2016). Customer concentration and corporate tax avoidance. *Journal of Banking & Finance*, 72, pp. 184-200. https://doi.org/10.1016/j.jbankfin.2016.07.018
23. Hutton, A. P., Marcus, A. J. and Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics*, 94(1), pp. 67-86. https://doi.org/10.1016/j.jfineco.2008.10.003
24. Jin, L. and Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of Financial Economics*, 79(2), pp. 257-292. https://doi.org/10.1016/j.jfineco.2004.11.003
25. Kelly, M. (1994). Correlation: stock answer. *Risk*, *7*(8), pp. 40-43.
26. Kim, J. B., Li, L., Lu, L. Y. and Yu, Y. (2016). "Financial statement comparability and expected crash risk". *Journal of Accounting and Economics*, 61(2-3), pp. 294-312. https://doi.org/10.1016/j.jacceco.2015.12.003
27. Kim, J. B., Li, Y. and Zhang, L. (2011b). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, 100(3), pp. 639-662. https://doi.org/10.1016/j.jfineco.2010.07.007
28. Kim, J. B., Li, Y. and Zhang, L. (2011a). CFOs versus CEOs: Equity incentives and crashes. *Journal of financial economics*, 101(3), pp. 713-730. https://doi.org/10.1016/j.jfineco.2011.03.013

29. Leuz, C., Nanda, D. and Wysocki, P. D. (2003). Earnings management and investor protection: an international comparison. *Journal of financial economics*, 69(3), pp. 505-527. https://doi.org/10.1016/S0304-405X(03)00121-1
30. Rosner, R. L. (2003). Earnings manipulation in failing firms. *Contemporary accounting research*, 20(2), pp. 361-408.
31. Roychowdhury, S. and Sletten, E. (2012). Voluntary disclosure incentives and earnings informativeness. *The Accounting Review*, 87(5), pp. 1679-1708. https://doi.org/10.2308/accr-50189
32. Zhu, W. (2016). Accruals and price crashes. *Review of Accounting Studies*, 21(2), pp. 349-399. https://doi.org/10.1007/s11142-016-9355-1