The Impact of Bankruptcy Risk on Stock Price Crash Risk by Emphasis on Debt Maturity

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Abstract

Purpose: Existing studies rely mainly on the agency theory argument for management motivations to hide bad news. However, the investor's irrational 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 investor heterogeneity is a challenging task that may cause the research studies to examine 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, emphasising debt maturity in companies listed on the Tehran Stock Exchange.

Design/methodology/approach: For the purpose of the study, the financial statements of 150 companies in the period 2010-2021 have been collected. Multivariate regression with panel data was used to test the hypotheses.

Findings: The results of hypothesis testing show that the effect of bankruptcy risk on stock price crash risk with an emphasis on debt maturity is not statistically significant and research hypotheses are not accepted.

Originality/value: The research results can be helpful for investors, creditors, policymakers, standards and regulatory bodies. It can also effectively develop and improve the quality of financial reporting and economic development by identifying existing weaknesses and challenges and explaining theoretical frameworks.

Keywords: Stock Price Crash Risk, Bankruptcy Risk, Debt Maturity

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, the issue of 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, Marcus and Tehranian, 2009). Numerous theoretical models indicate that company executives have a strong incentive 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, Kandel and Veronesi, 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, the issue of 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 phenomenon of falling stock prices, which leads to a sharp decline in returns, has received more attention from researchers than stock price growth.

In describing the negative skewness of the stock return, Blanchard and Watson (1982) introduced the random stock price bubble. 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, Schwert and Stambaugh (1987) and Campbell and Hentschel (1992) explained the mechanism of reverse oscillation to explain the phenomenon of 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 that 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, Nanda and Wysocki, 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, emphasising 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 that occurs without a major economic event; B) these large changes are negative; C) Falling stock prices is 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, Hong and Stein, 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 the false impression investors have regarding the firm's true state of economic fundamentals (Kothari et al., 2009; 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 spills into the market in an abrupt fashion, 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., 2016; Andreou et al., 2017b). 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; Charitou et al., 2007; Andreou et al., 2021). Research also suggests that the link effect bankruptcy risk on managers' career concerns represents one of the reasons why managers persistently withhold bad news (e.g.Kothari et al., 2009). 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 research-worthiness 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, Schwert and Stambaugh (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 changes in prices have been more in decreases and less in 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 directly at historical data on market returns. 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, Hong and Stein, 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, Marcus and Tehranian, 2009). In the financial texts, various theories and approaches have been presented to explain the phenomenon of falling stock prices.

Cao, Coval and Hirshleifer (2002) propose the "information blockage" model as another theoretical framework to explain the fall in prices. 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, the 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 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, which reinforces the effect of bad news but balances the effect of bad news, resulting in negative skewness (Hutton, Marcus and Tehranian, 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, Marcus and Tehranian, 2009; Kim, Li and Zhang, 2011a and b). Conversely, a negative correlation between leverage and fall risk is proven when leverage positively correlates with bankruptcy risk (Campbell, Hilscher and Szilagyi, 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, Hilscher and Szilagyi (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 kind of 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. In general, financial constraints prevent the provision of all necessary funds for the desired investment for the firm. Financial constraints encourage managers to hide unfavorable news about the firm because investors' knowledge of financial constraints may affect the company's stock price. When managers can not maintain unfavorable information about financial constraints, they are forced to disclose this information. Thus, the release of information causes severe price fluctuations and, as a result stock prices crash risk.

Hypothesis 1: Bankruptcy risk has a significant effect on the stock price crash risk.

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

The Jin and Myers (2006) model is the most widely admitted 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, 1999, 2003; Roychowdhury and Sletten, 2012; Callen and Fang, 2015; An et al., 2020; Deng et al., 2020), 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 aforementioned tipping point. In this respect, the discovery of such negative information increases the firms' bunkruptcy 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. But 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 (Gianti, 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, 2016). 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 has a moderating role in 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 the use of 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 the regression models of panel data.

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 and 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:

$Z\_Altman_{it} = \beta_0 + \beta_1 Stock\ Price\ Crash\ Risk_{it} + \beta_2 Size_{it} + \beta_3 Financial\ Leverage_{it} + \beta_4 Sale\ Growth_{it} + \beta_5 ROA_{it} + \beta_6 BV/MV_{it} + \varepsilon_{it}$

$Z\_Altman_{it} = \beta_0 + \beta_1 Stock\ Price\ Crash\ Risk_{it} + \beta_2 Debt\ Maturity_{it} + \beta_3 Stock\ Price\ Crash\ Risk_{it} \times Debt\ Maturity_{it} + \beta_4 Size_{it} + \beta_5 Financial\ Leverage_{it} + \beta_6 Sale\ Growth_{it} + \beta_7 ROA_{it} + \beta_8 BV/MV_{it} + \varepsilon_{it}$

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, Hong and Stein (2001) believe that the signs of falling stock prices are formed one year before the occurrence of 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 are more likely to 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 for 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)

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

Z': total bankruptcy index

X1: working capital to total assets ratio

X2: accumulated profit to total assets ratio

X3: profit before interest and tax to total assets

X4: book value of company stock to book value of total assets

X5: 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 Doss and Pandit (2010), Cheng et al. (2013), Gomeres and Balsta (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 ratio of short-term debt 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, the volume of activity and the value of the company and 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 ratio of net profit 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	Middle	Max	Min	Std. Dev.	Skewness
Negative skewness of stock returns	0.169478	0.167874	3.099433	-2.348259	0.675988	0.034264
Firm size	14.39510	14.17003	20.76869	10.03122	1.663956	0.768338
Financial Leverage	0.576320	0.580347	2.077506	0.031431	0.212131	0.501716
Sales growth	0.161677	0.054543	1.0000	4.07E-05	0.255476	2.213314
Asset return rate	0.180000	0.125163	1.974632	-0.605449	0.236205	2.042036
The ratio of book value to market value	0.449405	0.387576	3.527819	-5.668458	0.438149	-1.164267

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 and indicates a 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 calculated 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 hypothesis one

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	-0.010813	0.039401	-0.274443	0.7838
Firm Size	0.024149	0.010097	2.391657	0.0169
Financial Leverage	0.035166	0.102463	0.343210	0.7315
Sales growth	-0.026942	0.063653	-0.423260	0.6722
Asset return rate	-0.079642	0.093472	-0.852039	0.3943

The ratio of book value to market value	-0.090421	0.039596	-2.283595	0.0225
c	-0.134364	0.151624	-0.886164	0.3756
R^2 0.107339	Adj- R^2 0.104085	F-test 2.255057 (0.035811)	F-Limmer 1.161889 (0.0867)	Durbin-Watson Test 2.003399	

The significance level for each of the variables 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 changes of the dependent variable 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 has a significant relationship with the risk criterion of a stock price crash.

4.3. Testing hypothesis two

The obtained results from H2 testing are as follows:

Table 4. Findings from the test of the second hypothesis

Variable	Coefficients	Standard deviation	t- Statistics	P-value
Bankruptcy risk	0.131588	0.049878	2.638223	0.0084
Debt maturity adjuster variable	-0.006405	0.002184	-2.933257	0.0034
Bankruptcy risk × Debt adjustment variable	-0.006781	0.002368	-2.863309	0.0042
Firm size	0.031335	0.009960	3.146137	0.0017
Financial Leverage	0.377265	0.101390	3.720940	0.0002
Sales growth	0.232581	0.062856	3.700217	0.0011
Asset return rate	0.123229	0.092321	1.334783	0.1821
The ratio of book value to market value	0.030091	0.039068	0.770210	0.4413
c	-0.598835	0.150000	-3.992236	0.0001

R2	Adj- R2	F-test	F-Limmer	Durbin-Watson Test
0.1360	0.1317	8.537	1.172	2.011841
		(0.000)	(0.297)	

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 changes of the dependent variable 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, 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 have a tendency 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; Kothari et al., 2009). When the accumulation of bad news passes a threshold, it is revealed to the market at once, 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, certain other mechanisms could also generate price crash. 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 of outsiders' inability to 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 maximise 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) develop a model that incorporated heterogeneity in investors' beliefs, one of the key drivers of stock price crash. Investor heterogeneity has the potential to 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 the pessimistic investors in stock prices. However, if other previously optimistic investors exit the market, the former group of 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. In this model, an 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. 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, which reinforces 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 in reality leverage should be positively associated with bankruptcy risk (Campbell et al., 2008). One potential explanation for this surprising result may be the fact that high leverage firms are initially underpriced by investors, thereby 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 high-leverage companies are initially undervalued by investors and are therefore less likely to fall in price. Consistent with this explanation, Campbell, Hilscher and Szilagyi (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. But 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 is decreased. This study investigates the effect of bankruptcy risk on stock price risk, emphasising 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 Hee and Ren (2017) and consistent with Kim et al. (2016).

Suggestions

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 the stock price crash risk of companies 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.

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