



Investigating the Factors Affecting the Negative skewness of stock returns in Tehran Stock Exchange

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ABSTRACT

The aim of this study investigating the factors affecting the negative skewness of stock returns in Tehran Stock Exchange. For this purpose, the financial statements of 119 firms were collected during the period 2011-2017. Multivariate regression with panel data was used to test the hypotheses. The findings of the study indicate that debt maturity, conservatism, political connection, financial constraint, stock liquidity, and institutional ownership are the most important factors influencing stock prices crash risk

Keywords:

Conservatism, Debt Maturity, Financial Constraint, Stock Liquidity.

1. Introduction

The literature defines crash risk as related to negative skewness in the distribution of returns for individual stocks (Chen et al., 2001; Kim et al., 2014; Callen and Fang, 2015a). A number of approaches have been used to measure skewness in the crash risk literature and the bulk of the literature relates these estimates to a variety of explanatory variables in order to identify potential determinants of stock price crash risk. Crash risk captures higher moments of the stock return distribution – that is extreme negative returns (Kim et al., 2014; Callen and Fang, 2015a) – and hence has important implications for portfolio theories and for asset and option-pricing models (Kim and Zhang, 2015). Investors expect higher returns for stocks with more negative skewness, implying that skewness is a priced risk factor (Harvey and Siddique, 2000; Conrad et al., 2013). The stock market turmoil in recent years also indicates the significance of a crash risk to investors. Retail investors tend to concentrate investments in a small number of firms (Barber and Odean, 2013), and stock price crashes of firms in their portfolios can be highly detrimental to their personal wealth. Thus, understanding what affects investors' perceived crash risk has the potential to make a significant contribution towards protecting shareholder value.

The bulk of the recent empirical research on the determinants of crash risk follows the agency theoretical framework of Jin and Myers (2006), who argue that the existence of information asymmetries between corporate insiders and external stakeholders could contribute to crash risk. Asymmetric information allows managers to hide bad news for an extended period in order to maximize compensation, protect employment and minimise litigation concerns emanating from bad news disclosures (Kothari et al., 2009). When accumulated bad news comes out at once in the market, stock prices continue to fall, leading to a crash. Despite a proliferation of crash risk research over the last seven to 8 years, there is very little research on the consequences of crash risk. This is rather surprising, given that it is crucial to understand firms' responses, including those of the monitors, in order to mitigate future crash risk and to protect shareholders' value.

2. Literature Review

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.

3. Hypotheses Development

3.1. Debt Maturity and Crash Risk

Short-term debt is one of the things that can reduce the likelihood of stock prices. Debt is one of the financial tools for acquiring capital. In debt financing texts, the debt maturity structure of a company and investor has a major impact on the debt maturity. Due to defective debt contracts, creditors may not be able to exercise their right to control any future event in terms of the contract's financial condition. But short-term debt provides better protection for creditors' control over the threat of non-renewal, so creditors will demand greater control over debt repayment (Jiant, 2003). With the right to control short-term debt, creditors can better control borrowers and obtain reliable information about the company's operating performance before re-lending (Dang, 2016). Given that one of the reasons for the sharp decline in stock prices is the bad news accumulated by managers in

their own interests, creditors are expected to demand control and reliable information about the status of the company in order to reduce the fuel risk of their claims. Bad news diminishes and thereafter the likelihood of a sharp drop in stock prices. According to the above theoretical explanation, the research hypothesis is as follows:

H₁: There is a significant relationship between debt maturity and stock price crash risk.

3.2. Conservatism and Crash Risk

According to Lafond and Watts (2008) study, conservatism as a strategic mechanism restricts management's incentives and capabilities to expedite good news disclosure and delay bad news disclosure. In their view, conservatism accelerates the identification of bad news as a loss rather than good news as a profit by requiring asymmetric verifiability to identify gains and losses. This limits managers' incentives to not disclose bad news and to expedite the disclosure of good news. As a result, bad news, rather than unverified good news, is entering the market in a more timely manner. In other words, conservative accounting is expected to prevent the accumulation of bad news within the company, thereby reducing the likelihood of a sudden influx of bad news into the market. As a result, higher levels of conservatism mean lower levels of accumulation and non-disclosure of bad news and ultimately lower risk of falling stock prices. According to the above theoretical explanation, the research hypothesis is as follows:

H₂: There is a significant relationship between conservatism and stock price crash risk.

3.3. Political Connection and Crash Risk

Policy-dependent executives are expected to influence the risk of falling stock prices in Iranian companies. Because their presence exacerbates problems between small and large investors and makes the flow of information to external users difficult. First, because political executives are likely to interpret their confidential duties in the light of government preferences, a large proportion of political directors in board members may exacerbate the conflict of interest between the government as a controlling shareholder and capital market investors. In fact, government-imposed communications to better control and monitor the economy to achieve social and

political goals may be at odds with maximizing the value of other investors. As a result, the government, as a controlling shareholder, conceals the desire and power for autonomous activities by effectively controlling the board of directors through political directors (Gal et al, 2010). This concept is similar to a deal that claims that government intervention increases the risk of falling because of bad news or risky behaviors (Hutton et al, 2009). Since political executives may work with the government to conceal negative information, their presence disrupts company-specific information and results in a high valuation of stock prices and thus the risk of stock prices falling. According to the above theoretical explanation, the research hypothesis is as follows:

H₃: There is a significant relationship between political connection and stock price crash risk.

3.4. Financial constraint and Crash Risk

Companies facing financial constraints face a gap between domestic and foreign spending. When the difference between domestic and foreign investment funds in a company is high and high, that company is more financially constrained. In general, financial constraints prevent all the funds needed to provide the company with the right investment. Financial constraints persuade managers to hide bad news about the company because investor information about financial constraints may affect a company's stock price. When managers fail to keep track of undesirable financial restraint information, they are forced to disclose it. Therefore, the release of information will cause severe price fluctuations and thus the risk of falling stock prices (He and Ren, 2017). According to the above theoretical explanation, the research hypothesis is as follows:

H₄: There is a significant relationship between financial constraints and stock price crash risk.

3.5. Stock Liquidity and Crash Risk

One of the most important incentives for investors to enter the capital market is to earn adequate returns and ultimately increase wealth. Corporate performance is an important factor in changing the value of the stock market and, consequently, changing shareholder wealth. On the other hand, there are many factors affecting the performance of a company, one of which is liquidity of stocks, which means the ability to buy

and sell stocks at the least time and at the least cost. This criterion is one of the most important criteria to consider when selecting investment opportunities and therefore investors choose companies with high liquidity. Investors' attention to high liquidity stocks will attract more capital to these companies. According to the above theoretical explanation, the research hypothesis is as follows:

H₅: There is a significant relationship between stock liquidity and stock price crash risk.

3.6. Institutional ownership and Crash Risk

The presence of institutional investors in the mix of shareholders as one of the external mechanisms affecting the corporate governance system has become increasingly important in recent years. These shareholders have the incentive to exercise control and change managers' performance, and their active supervision can limit managers' behavior (McConnell & Service, 1990; Hartzel & Starks, 2003) and reduce managers' opportunistic actions by reducing information asymmetry. Control between them and shareholders (Karamano & Wafis, 2005; Kim & Zhang, 2010) and prevent profit management and accumulation of bad news (Zhi et al., 2003), thereby reducing the risk of stock prices falling. According to the above theoretical explanation, the research hypothesis is as follows:

H₆: There is a significant relationship between Institutional ownership and stock price crash risk.

4. Variables Definition and Measurement

4.1. Stock Price crash risk

Extant literature uses four measures of firm-specific crash risk. These measures are based on the firm-specific weekly returns, estimated as the residuals from the market model (Chen et al., 2001). This ensures that crash risk measures reflect firm-specific factors rather than broad market movements. Specifically, the following expanded market model regression is the starting point:

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

where $r_{j,s}$ is the return of firm j in week s and $r_{m,s}$ is the return value-weighted market return in week s . The lead and lag terms for the market index return are included to allow for non-synchronous trading (Dimson, 1979). The firm-specific weekly return for firm j in week s is calculated as the natural logarithm of one plus the residual return ($w_{j,s} = \ln(1 + e_{j,s})$) from Equation above. In estimating Equation above, each firm-year is required to have a certain amount of weekly stock returns data to alleviate the thin trading concern.

This measure of crash risk initially proposed by Chen et al. (2001) is based on skewness (NSKEW). This measure captures the asymmetry of the return distribution and is frequently used in the literature. Negative (positive) values for the skewness indicate data that are skewed to the left (right). NSKEW is calculated by taking the negative of the third moment of firm specific weekly returns for each year and normalising it by the standard deviation of firm-specific weekly returns raised to the third power. Specifically, for each firm j in years, NSKEW is calculated as:

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

This measure is multiplied by -1 so that a higher value corresponds to greater crash risk.

4.2. Debt Maturity

In general, there are two alternative ways to measure debt maturity. Our approach belongs to the balance sheet approach as we define debt maturity as the ratio of short-term debt (debts with less than one-year maturity) to total debt.

$$Debt\ Maturity = \frac{Short - term\ Debts}{Total\ Debts}$$

4.3. Conservatism

The Givoly and Hayn (2000) criteria are used for this purpose. The motivation behind this choice was that information on this model is readily available in Iran, and most foreign studies have used it:

$$CSCORE = \frac{AFCC}{TA} \times (-1)$$

4.4. Political Connection

We use the CEO's political connection, defined as serving as a current or former government bureaucrat—that is, a current or former officer of the central governments as a proxy for government intervention in the firm. In other word Dummy variable equal to 1 if the CEO was or is an officer of the central government, and 0 otherwise.

4.5. Financial constraint

For financial constraint use z-score measures the level of Altman Z-score of firm *i* in period of *t* calculated based on the model developed by Altman (1968). The greater the value of z-score, the greater the firm's financial strength.

$$Z = 0.717 \frac{\text{Working Capital}}{\text{Total Assets}} + 0.847 \frac{\text{Accumulated Earning}}{\text{Total Assets}} + 3.107 \frac{\text{Operating Income}}{\text{Total Assets}} + 0.420 \frac{\text{Book Value}}{\text{Total Debt}} + 0.998 \frac{\text{Sale}}{\text{Total Assets}}$$

4.6. Stock Liquidity

Stock liquidity (Liq) is turnover, defined as the ratio of total shares traded annually divided by shares outstanding. We rely on turnover for two reasons. At a theoretical level, Lo and Wang (2000) develop the volume implications of popular asset-market equilibrium pricing models and conclude that stock turnover is the most natural measure and that it yields the sharpest empirical implications. From an empirical standpoint, because turnover involves scaling shares traded by shares outstanding, it implicitly controls for firm size and enables comparison across firms and over time.

$$\text{Stock Liquidity} = \frac{\text{Total Shares Traded Annually}}{\text{Shares Outstanding}}$$

4.7. Institutional ownership

Institutional investors plays an active role in controlling managerial discretion and improving the efficiency of information in capital markets, as the investors are sophisticated with advantages in acquiring and processing information, so limiting

opportunism and promoting the reduction of agency costs. The corporate disclosures cover ownership patterns showing overall institutional ownerships and non-promoter ownerships. The Institutional ownership percentage is calculated based on Total Institutional Equity ownership compared to Total number of Equity outstanding shares. Shares held by institutions as non-promoters.

$$\text{Institutional Ownership} = \frac{\text{Total Institutional Equity ownership}}{\text{Total number of Equity outstanding shares}}$$

5. Research Method

This study's sample comprises firms listed on the TSE for the years 2011 and 2017. We exclude all financial firms (including banks) because this regulated industry is likely to have fundamentally different cash flow and accrual processes. We also eliminate firms with insufficient data to estimate dependant and independent variables. After adjusting for outliers, the sample comprises 119 firm years. We hand-collected stock price crash risk and other variables data directly from annual reports or from company handbooks. The financial and accounting data needed to compute firm performance indices are obtained from TSE reports on CDs and from the Internet. The following are the regression models used for testing Hypotheses:

$$\text{Crash risk}_{it} = \alpha_0 + \beta_1 \text{Debt Maturity}_{it} + \beta_2 \text{Conservatism}_{it} + \beta_3 \text{Political Connection}_{it} + \beta_4 \text{Financial Constraint}_{it} + \beta_5 \text{Stock Liquidity}_{it} + \beta_6 \text{Institutional Ownership}_{it} + \varepsilon_{it}$$

6. RESULTS

6.1. Descriptive Statistics

The description of the research variables is presented in Table 1.

Table 1. Descriptive Statistics

Variable	Mean	Median	Max	Min	Standard deviation	Skewness
Negative skewness of stock returns	0.003893	0.026147	2.893316	-2.442158	0.698010	0.000783
Debt Maturity	0.876441	0.919367	1	0.320442	0.123725	-1.900170
Conservatism	0.002854	-0.004292	1.370617	-0.678296	0.150689	1.361301
Political Connection	0.376202	0	1	0	0.484723	0.511106
Financial constraint	0.533654	1	1	0	0.499166	-0.134921
Stock Liquidity	0.380461	0.170737	3.070993	0	0.491852	2.142056
Institutional ownership	0.5885686	0.7041	0.9871	0	0.3200981	-0.756780

6.2. Testing research hypotheses

The results of the test of the research hypotheses are presented in Table (2).

Significance level was calculated for each of the variables as well as for the whole model at 95% confidence level. According to the coefficient of determination of the fitted model, it can be claimed that 11.63% of the dependent variable of the research hypothesis is explained by independent and control variables. Correlation autopsy is one of the standard assumptions of the regression model and the Durbin-Watson statistic can be used to determine whether autopsy is in the regression model. The calculated Durbin-Watson statistic (2.102), which ranges between 1.5 and 2.5, indicates the absence of autocorrelation and indicates the independence of the residuals of the

error components. As can be seen in Table 2, the significance level of the t-statistic for debt maturity, conservatism, political communication, financial constraint, stock liquidity, institutional ownership, is lower than the acceptable error level of 5%, so there is a significant relationship between the above variables and the criterion. The risk of falling stock prices is confirmed. Considering the significant level obtained from the F-Limer test, the sections under study were not homogeneous and did not have any individual differences. Therefore, using the combined data method is appropriate for the research hypotheses model. The heterogeneity of variance statistics and the calculated significance level indicate that the residual variance is constant.

Table 2. Result Research Hypotheses

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Debt Maturity	0.568342	0.232351	2.446050	0.0147
Conservatism	-0.481032	0.212200	-2.266876	0.0237
Political Connection	0.207819	0.063448	3.275453	0.0011
Financial constraint	0.164929	0.059750	2.760341	0.0059
Stock Liquidity	-0.130105	0.066992	-1.942109	0.0425
Institutional ownership	-0.001816	0.000959	-1.893535	0.0486
C	-1.525772	0.392823	-3.884120	0.0001
R-squared: 0.116312	F-statistic: 4.834067 Prob(F-statistic): 0.0000	Durbin-Watson stat: 2.102965	F-Limer: 0.741153 Prob(F-Limer): 0.9782	F- Breusch-Pagan- Godfrey: 1.141497 Prob(F- Breusch-Pagan- Godfrey): 0.2954

7. 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. Managerial incentives for hoarding bad news have been the primary focus of the burgeoning literature on crash risk. However, incentives alone would not be sufficient to withhold

bad news. Managers would have to devise mechanisms for concealing negative information. Earnings manipulation, tax avoidance and voluntary disclosures have been identified as some of the mechanisms used by managers. Finally, reporting conservatism, external auditing and corporate governance mechanisms can curb managerial opportunistic use of mechanisms for concealing negative information. While studies predominantly contend that stock price crash occurs when accumulated bad news is released all at once in the capital market, some studies document that such bad news hoarding may be reflected in stock trade volume and return, an observation that could provide a reasonable indication of future crash risk. For example, Chen et al. (2001) argue that trade volume reflects disagreement among investors and, as such, an increase in trading volume relative to trend over the prior 6 months indicates that some investors are aware of pending bad news, resulting in higher trading between informed and uninformed investors. In addition, studies also show that the capital market itself provides an incentive to hoard bad news, which increases the likelihood of a future price crash. Chang et al. (2016) use stock liquidity as a proxy for such an incentive and find a positive association between crash risk and stock liquidity, supporting the notion that bad news disclosures may lead transient investors to sell their stock. However, the extent to which stock liquidity affects crash risk directly and indirectly (through the transient investor channel) is not clear from their analysis. Callen and Fang (2015a) document that short interest in stocks predicts future crash risk. This is consistent with the view that short sellers are able to detect managerial bad news hoarding activities, prompting them to take short positions of stock in anticipation of price crashes. Using a regulatory change in China as an exogenous shock, Ni and Zhu (2016) document that the removal of short-sales constraints increases stock price crash risk. Using a composite strategy score, Habib and Hasan (2017) document that firms following innovative business strategies (prospectors) are more prone to future crash risk than defenders. Furthermore, prospectors are more prone to equity overvaluation which, in turn, increases future crash risk. The main purpose of the research is to present a model for the stock price crash risk in listed companies in Tehran Stock Exchange. For this purpose, first, all the factors affecting the stock price crash risk through the study of the Literature Review,

and then statistical tests were performed for each of the criteria for the stock price crash risk. The results of the relevant statistical tests show that: the significance level of the t-statistic for debt maturity, conservatism, political communication, financial constraint, stock liquidity, institutional ownership, is lower than the acceptable error level of 5%, so there is a significant relationship between the above variables and the criterion.

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