Commercial Credit Financing and Stock Price Crash Risk---From the Perspective of Debt Governance Effect

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Abstract

Using a sample of A--share listed firms in China for the period 2003--2014,our paper investigates the relationship between trade credit and stock price crash risk. The study finds, trade credit can decrease stock price crash risk significantly in the following year. Our result suggests the trade credit suppliers perform a beneficial role in the corporate governance of China's listed firms. In the robustness test, with taking into account the endogenous problems and the influence of the time window of the stock price crash，the conclusions are consistent with the above. This paper extends the study of the risk factors of stock price crash, and deepens the understanding of commercial credit financing.

Keywords: trade credit; stock price crash risk; governance effect

1. Introduction

The stock price crash risk also known as crash risk, the risk of stock price collapse, refers to the company's stock price without any information in the case of a sudden drop in the probability of a sudden drop. In 2015,a strong shock of China's capital market experienced a surge and collapse. In order to maintain the stability of the capital market, regulators take a series of rescue measures, such as fuse issued by the mechanism at the beginning of 2016, the mechanism only ran for 4 days ,then halted. The main reason is the stock price collapse. The stock price crash seriously damaged the interests of minority investors and shook their confidence in the stock market, thus affected the direction of capital flows, resulting in mismatch of resources and seriously damaging the healthy and stable development of the real economy. Such urgent problems have attracted attention of the regulatory authorities. Therefore, in order to reduce the risk of stock price collapse, exploring the factors that affect the risk of stock price collapse and its transmission path has become an important research topic of the capital market participants and gradually become a hot topic of academic discussion.

In this regard, the domestic and foreign scholar studies the factors of the risk of stock price crash from different dimensions. These factors on the risk of stock price risk path are mainly derived from the principal-agent theory and information asymmetry theory. Some scholars investigate the impact of the transparency of information, accounting conservatism, internal control information disclosure, information disclosure quality to the stock price crash risk from the quality of information. Some other scholars study the impact of stock price crash risk from the view of company's internal and external governance, internal governance such as: large shareholders controlling, controlling shareholder holding, executive gender, independent directors and so on; external governance such as: institutional investors, analyst coverage and forecast, auditor industry expertise and tax administration and so on. Additionally, some scholars base on the institutional environment to carry out research, such as: investor protection, debt litigation, margin trading system and so on. However, few scholars have paid attention to the impact of the capital market participants (debtor) on the stock price crash risk. It lacks of examining the governance effects of debt financing sources. This article attempts to explore this issue from this perspective. Domestic and foreign scholars have done a lot of research on the debt governance effect which is from the supervision and restraint of creditors. The traditional Western financial theory considers that creditors have the power and ability to supervise the management of the company.

However, based on the special institutional background of China's emerging market transition economy, the creditor's ability to play such a role cannot be consistent. Some scholars have found that creditors play a supervisory role to improve corporate value and restrict over-investment. However, other scholars have shown that due to the existence of soft budget constraints bank debt cannot play an effective governance effect .In addition, some studies have found that debt has played a partial role of the governance effect. In general, bank loans, commercial credit and corporate bonds are the three major sources of corporate debt. At present, due to the imperfection of financing channels in China's capital market, the proportion of bond financing of listed companies is very small. The liabilities mainly come from bank loans and commercial credit. The issuing strategy and scale of bank loans are dominated by government, and the credit rationing is serious. So it cannot effectively play the corporate governance effect. The commercial credit financing is based on the trust between the two sides of the supply and distribution, formed in the company's daily business process and linked to a specific transaction behavior. In the past, the research mostly focused the corporate governance effect of debt on the bank, little consideration of the governance effect of commercial credit financing. Regarding this, using 2003 - 2014 China Shanghai and Shenzhen A shares listed companies as a sample, I study the impact of commercial credit financing on the risk of stock price risk. The study finds that commercial credit financing significantly reduced the risk of future stock price risk. This suggests that commercial credit financing play a supervisory role by mitigating the information asymmetry between the company and the creditor.

Compared with the previous research, the contribution of this paper is mainly reflected in the following aspects: Firstly, enriching the risk of stock price crash factors. Previous research mainly paid attention to the influence of the major shareholders, controlling shareholders and managers on the of stock price risk. The influence of the creditors as the stakeholders on the stock price crash risk is still lacking. Secondly, extending the effect of debt governance. The existing research on the effect of debt governance was mainly on its effect of investment activities, agency costs and the corporate value. This paper starts from the perspective of stock price crash to study the debt's governance and further enforces the research of creditor's rights. Thirdly, extending the commercial credit financing research. At present, the research on commercial credit financing mainly focuses on the external determinants and the substitution effect with the bank debt. There is little research on the separation of commercial credit financing from the debt and the attention of the existence of the supervision effect. This paper provides a new perspective and new evidence for further understanding of commercial credit financing.

2. Theoretical analysis and research hypotheses

The mechanism of the stock price crash risk forms from the company to get profit, so long-term to hide the bad news with continuous cumulative operating cycle, eventually release into the capital market through stock price crash risk, which causes severe negative impact to the company's shares (Jin and Myers, 2006; Hutton et al.,2009). In this way, scholars have examined the factors that led to stock price crash risk from different dimensions. From the perspective of corporate governance, Kim et al. (2011a) found that the managers can make tax avoidance which can better hide the company's bad news provide convenience for their access to private profit. Thus, tax avoidance positively related to the stock price crash risk. Kim et al. (2011b) examined the relationship between the stock incentive of managers(CEOs and CFOs) and stock price crash risk, the results show that in order to obtain equity incentive, the management will conceal the bad news, finally the stock price crash risk occur. Li Xiaorong et al.(2012)examined the impact on the risk of stock price crash using the gender of senior executives. Wang Huacheng et al.(2015)study the impact of the large shareholders holdings on stock price risk, the result shows that the large shareholders holdings can decrease the stock price risk, it indicates the monitoring and less tunneling effect of large shareholders in corporate governance. Shen Huayu et al.(2017) , such as the controlling shareholder control is discussed the impact on the stock price crash risk, found that the controlling shareholders with the increase of control does not have the corporate governance effect, instead they would eventually hollowed out company and improve stock price crash risk.

Besides shareholders, creditors play an important role in corporate governance. Jensen and Meckling (1987) firstly explain the effect of debt governance in theory. They propose that debt financing can bring conflicts of interest between shareholders and creditors, which make shareholders excessive or insufficient investment. Jensen (1986) put forward free cash flow hypothesis, that debt-servicing problem can reduce the free cash flow of the enterprise, restrain manager blindly expansion behavior, thus finally ease the conflict of interest between shareholders and managers. Comprehensive literature discusses the corporate governance role of creditors in theory, but there is a lack of empirical evidence.

Some scholars have provided some research on this aspect, mainly focusing on enhancing enterprise value (Wang Hui, 2003; Jiang Fuxiu et al., 2011) and curb over-investment (Huang Qianfu et al., 2009). The commercial credit financing arises from mutual trust with the common interests of both sides in the process of selling goods, providing labor services, which belongs to the enterprise important source of short-term financing. As a member of the creditors, commercial credit providers can deeply understand the debtor's financial situation, control the debt risk, ensure timely debt recovery, which play a positive effect on corporate governance. Along this thought, scholars have carried out large research. Burkart and Ellingsen (2004)propose that the commercial credit financing tend to bring tangible assets(stocks) instead of large amounts of cash. For firms with high agency cost, the tangible assets of misappropriation are more difficult than cash, finally suppressing over-investment of cash flow problems. Yang Yong et al.(2009) study that the different sources of debt influence the change of CEO in listed companies, find bank loans don't play a role in the CEO change, even have a negative effect; but commercial credit financing plays an active role in improving corporate governance. Based on the positive corporate governance effect of commercial credit financing, this paper makes the following assumptions from the perspective of the risk of stock price crash: Under the same conditions, the higher the proportion of commercial credit financing in debt financing, the lower the stock price crash risk.

3. Research Design

3.1. Sample Selection and Data Source

Using A--share listed firms in China for the period 2003--2014 as the initial research samples, the relevant data are as follows:(1) excluding the sample of the financial and insurance companies; (2) excluding the total assets or the owner's equity is negative (3) excluding the company's annual stock trading weeks less than 30 samples; (2) Of the company's samples;(4) excluding firms with missing data. Finally, this paper obtains 15740 companies-annual sample observations. In order to eliminate the influence of extreme values, I deal with continuous variables in this paper. The required data are from the CSMAR database. The empirical results were analyzed by stata12.0.

3.2. Variable Definition

3.2.1 The Dependent Variable: the risk of stock price crash

Based on the existing literature, this paper uses the following two indicators to measure the risk of stock price collapse of listed companies. The specific algorithm is as follows: Firstly, the formula (1) is used to calculate the rate of return on stock i excluding market factors. $R_{i,t}$ is the stock i in the t weeks considering the cash dividend reinvestment rate of return; $R_{M,t}$ is the market value of the weighted average return rate in the t weeks considering the cash dividend reinvestment; $\xi_{i,t}$ is the stock i rate of return that cannot be explained by the market. In the calculation of the stock weeks rate of return, you need to consider the impact of the market return on the company's stock. In order to reduce bias caused by the non-synchronization in the stock trading, weighted average rate of return would be forward and lag. The unique rate of return of stock i in the t week is expressed in this paper using $W_{i,t} = \ln(1 + \xi_{i,t})$.

$$R_{i,t} = \alpha_i + \beta_1 R_{M,t-2} + \beta_2 R_{M,t-1} + \beta_3 R_{M,t} + \beta_4 R_{M,t+1} + \beta_5 R_{M,t+2} + \xi_{i,t} \tag{1}$$

Then, based on $W_{i,t}$, constructing two metrics of stock price crash:

①Negative Yield Skew Factor (NCSKEW): :

$$NCSKEW_{i,t} = -[n(n-1)^{3/2} \sum W_{i,t}^3] / \left[(n-1)(n-2)(\sum W_{i,t}^2)^{3/2}\right] \tag{2}$$

In model (2), n is the number of weeks of stock i per year. The larger the value of NCSKEW, the more serious the degree of skew is, and the greater stock price crash risk.

②Return Fluctuation Ratio (DUVOL):

$$DUVOL_{i,t} = \log\left\{\left[(n_u - 1) \sum_{DOWN} W_{i,t}^2\right] / \left[(n_d - 1) \sum_{UP} W_{i,t}^2\right]\right\} \tag{3}$$

In model (3), n_u (n_d) represents the week every year that rate of return in $W_{i,t}$ of stock i is higher than (below) $W_{i,t}$'s annual average rate of return. The larger the value of DUVOL, the greater the risk of the stock price crash. NCSKEW and DUVOL are positive indicators, that is to say, the higher the risk of stock price crash risk, the greater the value of NCSKEW (DUVOL).

3.2.2 Explanatory Variable: Commercial Credit

Based on the existing literature, this paper uses (accounts payable + advance receipts + notes payable)/total liabilities to measure commercial credit.

3.2.3Control Variables

According to previous research, the set of control variables includes Turnovert, Sigmat, Rett, Sizet, Roat, BMt, Abacct.The variable Turnovert is the detrended average monthly stock turnover in year t. Turnover is the average monthly share turnover over the current fiscal year period minus the average monthly share turnover over the previous fiscal year period, where monthly share turnover is calculated as the monthly trading volume divided by the total number of shares outstanding during the month. Sigma is the standard deviation of firm-specific weekly returns over the fiscal year period. Ret is the mean of firm-specific weekly returns over the fiscal year period. Size is the log of the total assets. Roa is income before extraordinary items divided by lagged total assets.BM is the book value of equity divided by the market value of equity. The variable Abacc is calculated by the modified Jones model. In addition, this article also controls the annual and industry fixed effects.

3.3. Model Setting

In order to test the hypothesis H1,I estimate the following regression that link our measures of crash risk in year t+1 to our proxies for commercial trade financing in year t and to a set of control variables in year t:

$$\text{Crash}_{t+1} = \alpha + \beta_1 TC_t + \sum_{q=2}^{m} \beta_q \times ControlVariables + YR + IND + \xi_{i,t} \qquad (4)$$

In the model (4), Crash represents the two stock price risk indicators NCSKEW and DUVOL in the year t+1; TC is the commercial credit financing variable in year t; control variables includes Turnovert, Sigmat, Rett, Sizet, Roat, BMt, Abacct.In addition, this article also controls the annual and industry fixed effects.

4. Empirical Results and Analysis

4.1. Descriptive Statistical

Table 1 presents the descriptive statistics for all the variables used in the regression analyses, based on the sample of firm-years with non-missing control variables. As can been seen in Table 1, the mean and median of two measures of stock price are respectively -0.188(-0.153) and -0.224(-0.178), which are not different from previous studies. The mean and the median of TC are 0.357 and 0.315, respectively, which show that as an important source of financing, commercial credit financing accounts for the proportion of total debt in the sample company. It is necessary to pay attention to their impact on the company. From the minimum and maximum value of TC, we can see that there is a wide gap in the commercial credit financing of different companies. The descriptive statistics of other variables in the table are within a reasonable range.

Table 1 Descriptive Statistics

Variable	Observation	Mean	Median	Std	Minimum	Maximum
NCSKEW$_{t+1}$	15740	-0.188	-0.224	0.780	-2.036	1.789
DUVOL$_{t+1}$	15740	-0.153	-0.178	0.685	-1.724	1.587
TC$_t$	15740	0.357	0.315	0.226	0.016	0.924
NCSKEW$_t$	15740	-0.181	-0.220	0.781	-1.970	1.846
DUVOL$_t$	15740	-0.141	-0.173	0.694	-1.704	1.669
Turnover$_t$	15740	-0.048	-0.007	0.384	-1.498	0.841
Sigma$_t$	15740	0.047	0.046	0.014	0.020	0.086
Ret$_t$	15740	-0.001	-0.001	0.006	-0.016	0.017
Size$_t$	15740	21.669	21.541	1.198	19.102	25.367
Roa$_t$	15740	0.031	0.031	0.064	-0.274	0.195
BM$_t$	15740	1.086	0.822	0.882	0.113	4.844
Abacc$_t$	15740	0.102	0.072	0.123	0.008	0.945

4.2. Correlation Coefficient Analysis

Table 2 shows Pearson correlation coefficient analysis for all the variables used in the regression analyses, based on the sample of firm-years with non-missing control variables. The results show that under 1% significance level the two metrics of stock price crash risk are highly positive correlation, and the correlation coefficient is 0.921, which shows two indicators have high correlation and the variables' selection are reasonable. More importantly, both measures of future crash risk are negatively correlated with commercial credit financing (TC) at the 1% significant level, which is consistent with our predictions that the commercial credit financing can reduce the future stock price crash risk of listed companies. Other control variables are basically related to two measures of stock price crash risk.

Table 2   Pearson Correlation Coefficient Analysis

	$NCSKEW_{t+1}$	TC_t	$Abacc_t$	$Turnover_t$	$Sigma_t$	Ret_t	$Size_t$	Roa_t	BM_t
$NCSKEW_{t+1}$	1.000								
$DUVOL_{t+1}$	0.921***								
TC_t	-0.005***	1.000							
$Abacc_t$	-0.051***	-0.201***	1.000						
$Turnover_t$	0.024***	-0.076***	0.029***	1.000					
$Sigma_t$	0.014*	0.019**	0.092***	0.216***	1.000				
Ret_t	0.071***	0.075***	-0.072***	0.041***	0.2750***	1.000			
$Size_t$	-0.044***	-0.004	-0.331***	-0.003	-0.217***	0.015	1.000		
Roa_t	-0.001	0.187***	-0.375***	-0.056***	-0.057***	0.234***	0.171***	1.000	
BM_t	-0.117***	-0.095***	-0.160***	-0.043***	-0.310***	-0.230***	0.506***	-0.221***	1.000

***indicates the result is significant at the level of 10%;**indicates the result is significant at the level   of 5%,*indicates the result is significant at the level of 1%.

4.3. Regression Analysis: The impact of commercial credit financing on the risk of stock price crash

Table 3 shows the results of multiple regression of model (4). It can be seen that, in the controlling other factors, regardless of the future stock price crash risk of listed companies in which way to measure, it is significantly negatively correlated with commercial credit financing at a 5% level. It shows that commercial credit financing reduces the risk of future stock price crash. This kind of debt financing mode plays a debt governance effect and supports hypothesis H1.

In terms of control variables, the Sigma, Ret, Size, Abacc and the current stock price crash risk were significantly related with the stock price crash risk in the next year. Roa and BM were significantly negatively correlated with the risk of the next issue of stock price crash, consistent with previous research findings.

Table 3 Commercial Credit Financing and Stock Price Crash Risk

VARIABLES	$NCSKEW_{t+1}$		$DUVOL_{t+1}$	
	Coefficient	T value	Coefficient	T value
TC_t	-0.050**	-2.06	-0.058**	-2.18
$NCSKEW_t$	0.040***	3.76		
$DUVOL_t$			0.035***	3.04
$Turnover_t$	-0.058	-0.65	-0.035	-1.23
$Sigma_t$	4.557***	7.6	3.696***	6.93
Ret_t	6.504***	5.16	5.764***	4.52
$Size_t$	0.065***	9.14	0.063***	9.95
Roa_t	-0.435***	-4.32	-0.424***	-4.56
BM_t	-0.163***	-15.5	-0.141***	-15.33
$Abacc_t$	0.355***	3.45	0.273***	2.98
Constant	-1.446***	-9.12	-1.327***	-9.56
INDUSTRY	CONTROL		CONTROL	
YEAR	CONTROL		CONTROL	
N	15,740		15,740	
R^2	0.092		0.094	

***indicates the result is significant at the level of 10%;**indicates the result is significant at the level of 5%,*indicates the result is significant at the level of 1%.

5. Robustness test

In order to ensure the reliability of the empirical results in this paper, on the implementation of the following aspects of the robustness test, the final empirical results did not change the original research conclusions.

5.1. Using the tool variable method to re-test the relationship of commercial credit financing and the risk of stock price crash

Although the use of lagged explanations can alleviate the causal endogeneity between dependent variables and explanatory variables to a certain extent, this paper is based on robustness and is to be re-examined with tool variables. Based on the existing research, this paper chooses the mean value of commercial credit financing of other listed companies in the industry as the tool variable of commercial credit financing of the Company.

Effective tool variables are required to satisfy both the relevance and exogenous conditions. Firstly, from the point of view of relevance, the commercial credit financing of other companies in the same industry in the same year has a correlation between the two variables because of similar industry characteristics which affect the company's commercial credit financing. Secondly, there is no evidence to support that other companies of commercial credit financing in the same industry affect the company's own stock price crash risk. According to this two points, the tool variable's selection should be effective.

Table 4 reports the results of the two-stage regression. From the table, we can see that the commercial credit financing can reduce the stock price crash risk and play the corporate governance effect after controlling the endogenous problem. The above hypothesis is validated.

Table 4 Commercial Credit Financing and Stock Price Crash Risk: IV Estimate

Variables	（1） The first stage TC$_t$	（2） The second stage NCSKEW$_{t+1}$	（3） The first stage TC$_t$	（4） The second stage DUVOL$_{t+1}$
TC$_t$		-0.153***		-0.137***
		(-2.89)		(-3.10)
NCSKEW$_t$	-0.041	0.028		
	(1.78)	（1.61）		
DUVOL$_t$			0.038***	0.023
			(2.72)	（1.14）
Turnover$_t$	-0.056**	-0.054	-0.032	-0.035
	(-2.19)	(-1.54)	(-1.39)	(-1.21)
Sigma$_t$	4.764***	3.842***	3.590***	3.654***
	(6.29)	(3.94)	(5.32)	(4.18)
Ret$_t$	6.547***	5.599***	5.898***	4.904**
	(4.12)	(2.69)	(3.74)	(2.31)
Size$_t$	0.068***	0.058***	0.064***	0.056***
	(7.78)	(4.06)	(8.20)	(4.53)
Roa$_t$	-0.235	-0.469***	-0.350**	-0.394***
	(-1.40)	(-3.56)	(-2.34)	(-3.20)
BM$_t$	-0.160***	-0.157***	-0.140***	-0.139***
	(-13.05)	(-6.39)	(-13.25)	(-6.36)
Constant	-1.495***	-1.287***	-1.333***	-1.186***
	(-7.77)	(-4.12)	(-7.87)	(-4.34)
Industry	Control	Control	Control	Control
Year	Control	Control	Control	Control
F Value	141.63		141.63	
N	15740	15740	15740	15740
R^2	0.2549	0.0485	0.2532	0.0453

***indicates the result is significant at the level of 10%;**indicates the result is significant at the level of 5%,*indicates the result is significant at the level of 1%.

5.2. Extending The Stock Price Crash Risk window.

Based on the management to hide the bad news until the final outbreak due to various reasons, especially the outbreak of the time window length is different. The text examines the impact of commercial credit financing on the risk of the next year's stock price crash. The robustness test section extends the stock price crash risk for the next two years to re-analyze the multiple regression analysis. Table 5 reports the regression results, Commercial credit financing significantly reduces the risk of future stock price collapse.

Table 5 Commercial Credit Financing and Stock Price Crash Risk in the Next Two Years

Variables	$NCSKEW_{t+2}$		$DUVOL_{t+2}$	
	Coefficient	T value	Coefficient	T value
TC_t	-0.059*	-1.79	-0.067**	-2.31
$NCSKEW_t$	0.017	-1.38		
$DUVOL_t$			0.001	-0.10
$Turnover_t$	-0.038*	-1.68	-0.026	-1.30
$Sigma_t$	3.566***	5.21	2.546***	4.15
Ret_t	6.798***	4.84	4.276***	3.12
$Size_t$	0.058***	7.43	0.055***	7.76
Roa_t	-0.088	-0.69	-0.102	-0.92
BM_t	-0.081***	-6.67	-0.059***	-5.51
$Abacc_t$	0.234*	1.85	0.079	1.29
Constant	-1.289***	-7.50	-1.164***	-7.55
Industry	Control		Control	
Year	Control		Control	
N	11,242		11,242	
R^2	0.072		0.074	

***indicates the result is significant at the level of 10%;**indicates the result is significant at the level of 5%,*indicates the result is significant at the level of 1%.

6. Research Conclusions

From the perspective of stock price crash risk, this paper selects listed companies of Shanghai and Shenzhen during 2003-2014 as the research sample, exploring the relationship between the stock price crash risk and commercial credit financing. The results show that there is a significant negative correlation between commercial credit financing and stock price crash risk. This illustrates the commercial credit financing as a kind of financing channels formed from production and marketing can reduce the creditors' asymmetric information problems in the process of supervision, eventually reduce the company's future stock price crash risk, play a corporate governance effect. In view of the above discussion, the author thinks that the government should actively provide guarantee for the effective use of trade credit financing, standardize the use of commercial credit financing and perfect the commercial credit financing in the supply chain transmission channels, strengthen the role of the commercial credit financing in economic development, make the supervision of the commercial credit effect making up for the deficiency of the formal system, and finally promote the healthy and quick development of listed companies.

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