

Enterprise financing constraints and accuracy of earnings forecast

—Evidence from Chinese A-share markets

Yiyang Wang^a

School of economics and management, Northeast Normal University, Changchun 130000, China

^a1012616426@qq.com

Abstract. This paper examines the impact of corporate financing constraints on the accuracy of earnings forecasts using the sample of non-financial firms in Shanghai and Shenzhen A-shares from 2008 to 2020. The empirical results reveal that the degree of corporate financing constraints reduces the accuracy of earnings forecasts. Further research finds that this effect is mainly achieved through the reduction of firms' financial performance. In addition, the effect of financing constraints on the accuracy of earnings forecasts is also influenced by media attention and firms' risk-taking level.

Keywords: Financing constraints; Accuracy of earnings forecast, Media attention, Risk taking.

1. Introduction

Information disclosure is a bridge between investment and financing, and earnings forecasts are an important part of information disclosure of listed companies, which is one of the main ways to adjust market expectations, convey information, and reduce investors' losses (He Weifeng et al., 2021). In order to protect the interests of investors in the capital market, the SEC of the United States officially allowed listed companies to voluntarily disclose their forecast financial statements in 1973. At the end of 1998, China Securities Regulatory Commission first required listed companies with losses to disclose performance information before the publication of annual reports. Unlike voluntary disclosure in western countries, China's earnings forecast disclosure is a system combining mandatory disclosure with voluntary disclosure (Song Chen, 2012). This flexibility leads to strong operability of management (Lu Guihua, 2017). Looking through the domestic literature, no article has been found to link the earnings forecast with the financing constraint, the most common problem of corporate governance.

Financing constraint is a common problem faced by listed companies. Franco Modigliani and Merton H. Miller (1959) believe that in a perfect capital market, there is no obstacle for enterprises to obtain external funds, that is, the investment behavior of enterprises only depends on investment demand. However, the real capital market is imperfect. Myers (1984) thinks that the existence of information asymmetry and agency problem makes the external financing cost of enterprises higher than the internal financing cost. FHP (1988) officially defines this problem as financing constraint. According to "Enterprise Cost and Its Operation Status in the Context of Epidemic Situation: Questionnaire Survey and Analysis Report of Enterprise Cost in 2020" published by China Academy of Fiscal Science, small and medium-sized enterprises in China have the problems of difficult and expensive financing.

Considering the universality of financing constraints and the importance of earnings forecast, it is of great practical significance to study the relationship between financing constraints and earnings forecast for enterprise development, investor decision-making and even the optimization of information disclosure system.

The marginal contributions of this paper are as follows: Firstly, the logical relationship between corporate financing constraints and the accuracy of earnings forecast is established and empirically investigated; Secondly, the moderating effect of media information and risk-taking is included in the analysis, which verifies the boundary conditions that financing constraints reduce the accuracy of earnings forecast, and helps to understand the earnings forecast behavior of heterogeneous companies

under financing constraints. Thirdly, it has a guiding role in alleviating corporate financing constraints and further optimizing China's existing earnings forecast system.

2. Literature Review and Hypothesis

2.1 Financing Constraints and Accuracy of Earnings forecast

When the agency cost increases, the management will release the earnings forecast with lower prediction accuracy in order to maximize its own interests, which is conducive to covering up the agency problem of the management (Yuan Zhenchao, 2014). According to the principal-agent theory, the separation of company ownership and management rights will lead to information asymmetry between owners and operators. Operators may deviate from the goal of maximizing shareholders' wealth for their own interests when managing the company, and the conflict of interests between owners and operators will lead to agency costs. Therefore, the basic premise of agency conflict is information asymmetry. Since the concept of financing constraint was put forward, scholars generally believe that information asymmetry is also one of the reasons for financing constraint (Jiang Fuxiu, 2018). As both agency cost and financing constraint are caused by information asymmetry, and agency cost will lead to the decrease of accuracy of earnings forecast, it can be predicted that financing constraint may have a similar effect. Therefore, the following assumptions are put forward: H1: The higher the corporate financing constraint, the lower the accuracy of earnings forecast.

For preventive or speculative motives, constrained financing companies tend to increase their holdings of cash or cash equivalents (Lian Yujun, 2010), showing strong dependence on liquid assets, which leads to their sensitivity to changes in the external financing environment and unstable cash flows. In addition, the increase of financing cost will lead to the company being forced to abandon projects with positive net cash flow, that is, the problem of insufficient investment (Kashif Naeem and Matthew C. Li, 2019). Unstable cash flow and insufficient investment will lead to the decline of the company's profitability. The profitability of the company is declining, and the confidence of external investors is insufficient. In order to avoid losing potential investment or being punished by existing shareholders, the management tends to issue vague earnings forecasts. Therefore, the following assumptions are put forward:

H2: This utility (H1) is mainly realized by reducing the profitability of enterprises.

2.2 The Moderating Effect of Media Attention

As a collector and disseminator of information, media plays an important role in the capital market. On the one hand, the media can reduce the information asymmetry and ease the financing constraints of enterprises by disclosing useful information. Coles and Loewenstein (1988) found that when investors have more comprehensive information, the accuracy of the company's future financial forecast will be improved, thus reducing the need for risk compensation, thus reducing the company's capital cost. On the other hand, media attention plays a significant supervisory role in corporate behavior (Kong Dongmin, 2013). A large number of literatures have shown that the supervisory role of media attention can reduce two types of agency problems (Ye Yong, 2017; Wu Peng, 2019). With increasing attention to media companies, managers' misconduct is more likely to be exposed. In order to protect their reputation or avoid punishment, managers will reduce their opportunism tendency, thus increasing the quality of information disclosure. Therefore, the following assumptions are put forward:

H3: Compared with enterprises with low media attention, the effect of financing constraints on the accuracy of earnings forecast will be weakened in enterprises with high media attention.

2.3 The Regulating Role of Enterprise Risk-taking Level

Academic circles have not yet reached an agreement on the relationship between enterprise risk-taking level and financing constraints. One view is that the future performance of enterprises with high risk-taking level is uncertain and it is difficult to obtain bank loans (Arnold, 2013), so enterprises with high financing constraints will avoid risks (Shen Jun and Zhang Renhui, 2018). Another view is

that enterprise risk-taking is restricted by the ability to acquire resources (Almeida and Campello, 2007). In order to improve the predicament, enterprises with strong financing constraints have to make efforts to find profitable investment opportunities and improve the investment efficiency of enterprises, thus improving the level of enterprise risk-taking (Zhang Wenwen, etc., 2021).

When an enterprise has a high level of risk-taking, the management will choose investment projects with high risks but high returns at the same time, which will increase the uncertainty of the future performance of the enterprise, thus aggravating the uncertainty of financing. Therefore, in order to protect the existing financing channels, the management will pay more attention to the attitude of investors and be more cautious when issuing earnings forecasts. Therefore, the following assumptions are put forward:

H4: Compared with enterprises with low risk, the effect of financing constraints on the accuracy of earnings forecast will be weakened in enterprises with high risk.

3. References Data Source and Research Design

3.1 Data Source

This paper selects the panel data of Shanghai and Shenzhen A-share listed companies from 2008 to 2020. The financial data and governance data at the company level are all from CSMAR and the media attention data is from CNRDS. Considering the particularity of the financial industry and the influence of extreme values, this paper deals with the selected samples as follows: (1) Eliminate ST listed companies and enterprises in the financial industry. (2) All continuous variables are processed by 1% bidirectional winsorize tail shrinking. (3) Eliminate the samples with missing values. Through the above processing, 12655 benchmark regression samples were finally obtained.

3.2 Variable Definition

3.2.1 Precision of Earnings forecast

There are four types of earnings forecasts issued by management: point forecast, closed interval forecast, open interval forecast and qualitative forecast. Based on the practices of Liu Bai and Lu Jiarui (2018), this paper only considers point forecast and closed interval forecast, and measures the accuracy of earnings forecast with Precision, which is defined as the size of earnings forecast interval. The smaller the value, the higher the accuracy of earnings forecast.

$$Precision = \frac{\text{Upper Limit of Earnings Forecast Interval} - \text{Lower Limit of Earnings Interval}}{\text{Mean Value of Upper and Lower Limits}}$$

3.2.2 Financing Constraint

In this paper, the classical KZ index (Kaplan&Zingales, 1997) is selected to measure the financing constraints. The larger the KZ index, the higher the financing constraints faced by listed companies.

3.2.3 Risk-taking

This paper uses the volatility of ROA to measure the risk-taking level. Following the ideas of He Ying et al. (2019), ROA is measured by the ratio of earnings before interest and tax to the total assets at the end of the year, and the adjusted ROA (*Adj_Roa*) is obtained by subtracting the industry average from the company ROA, and then the rolling standard deviation Risk is calculated by the method of rolling years, which is used as the proxy variable of enterprise risk-taking level.

$$Adj_Roa_{i,t} = \frac{EBIT_{i,t}}{ASSET_{i,t}} - \frac{1}{X} \sum_{K=1}^X \frac{EBIT_{i,t}}{ASSET_{i,t}}$$

$$Risk_{i,t} = \sqrt{\frac{1}{T-1} \sum_{t=1}^T (Adj_Roa_{i,t} - \frac{1}{T} \sum_{t=1}^T Adj_Roa_{i,t})^2} | T = 3$$

3.2.4 Media Attention

In this paper, the number of online news reports is used to measure the media attention. In particular, it consists of "The number of news with the company in content" and "The number of news with the company in the title".

3.2.5 Control Variable

This paper selects ownership concentration, independent director scale, director scale, growth, enterprise scale, enterprise age and property right nature as control variables. The variables involved in this paper are summarized in Table 1.

Table 1

Variable Name	Symbol	Definition
Prediction Accuracy	<i>Precision</i>	The ratio of the difference between the upper and lower limits of the earnings forecast closed interval and the absolute value of the average of the two
Financing Constraint	<i>KZ</i>	KZ index
Media Attention	<i>Media</i>	Number of related reports of online news platform enterprises
Risk-taking	<i>Risk</i>	ROA rolling standard deviation of 3 years
Concentration of Equity	<i>Top1</i>	The shareholding ratio of the largest shareholder
Scale of Independent Directors	<i>IndBoardSize</i>	The ratio of independent directors to the number of board members
Scale of Directors	<i>BoardSize</i>	Ln (number of board members)
Growth	<i>SalesGrowth</i>	Growth rate of main business income
Scale	<i>Size</i>	Ln (total assets)
Return on Assets	<i>ROA</i>	The ratio of net profit to total assets
Enterprise Age	<i>Age</i>	The age calculated since the listing of enterprises
Nature of the Property Right	<i>Soe</i>	State-owned enterprises:1, Otherwise: 0

3.3 Model Construction

In order to verify the relationship between financing constraints and the accuracy of earnings forecast, the following model is constructed:

$$Precision = \beta_0 + \beta_1 KZ_{i,t} + \beta_2 Control_{i,t} + YearF.E. + IndF.E. + \varepsilon_{i,t} \quad (1)$$

Precision indicates the size of the prediction interval, *KZ* means the degree of financing constraint, *Control* is the symbol of control variable, including Concentration of Equity, Scale of Independent Directors, Scale of Directors, Growth, Scale, Return on Assets, Enterprise Age and Nature of the Property Right. *YearF.E.* and *IndF.E.* are Year fixed effect and industry fixed effect, respectively. If β_1 is significantly positive, it indicates that the degree of financing constraint increases and the accuracy of earnings forecast decreases. Hypothesis 1 is proved to be correct.

4. Empirical Results

4.1 Descriptive Statistics

The descriptive statistical results of the main variables are listed on Table 2. The average value of Precision is 0.271, which is lower than the average value (0.343) of the sample from 2011 to 2015

selected by Liu Bai and Lu Jiarui (2018), indicating that the accuracy of earnings forecast of listed companies in China has improved in recent years. The standard deviation of KZ index is 2.499, which indicates that the financing constraints of different companies in China are quite different.

Table 2 Descriptive Statistics

	Observed Value	Mean	Std	Min	Max
<i>Precision</i>	12655	0.271	0.441	-2.000	25.748
<i>KZ</i>	29981	1.224	2.499	-11.344	13.662
<i>Top1</i>	29981	0.347	0.149	0.087	0.746
<i>IndBoardSize</i>	29979	0.374	0.054	0.313	0.571
<i>BoardSize</i>	29979	2.138	0.201	1.609	2.708
<i>SalesGrowth</i>	29981	0.412	1.160	-0.719	8.455
<i>Size</i>	29981	22.159	1.292	19.739	26.152
<i>Age</i>	29981	10.284	6.958	1.000	26.000
<i>Soe</i>	29981	0.403	0.491	0.000	1.000

4.2 Regression

In order to investigate the influence of listed companies' financing constraints on the accuracy of earnings forecast, this paper uses model (1) to regress all samples. The regression results (see Table 3) reveal that the coefficient of KZ is significantly positive before and after adding control variables, which indicates that the higher the financing constraint degree of listed companies, the more vague the earnings forecast issued.

Table 3 Regression Results of Financing Constraints and Accuracy of Earnings forecast

Variable	<i>Precision</i>	<i>Precision</i>
	(1)	(2)
<i>KZ</i>	0.004** (2.27)	0.006*** (3.09)
<i>Top1</i>		0.023 (0.77)
<i>IndBoardSize</i>		-0.074 (-0.82)
<i>BoardSize</i>		-0.011 (-0.43)
<i>SalesGrowth</i>		-0.003 (-0.76)
<i>Size</i>		0.003 (0.87)
<i>Age</i>		-0.002*** (-2.72)
<i>Soe</i>		-0.011 (-1.03)
<i>Year</i>	Yes	Yes
<i>Ind</i>	Yes	Yes
<i>F – value</i>	3.05	2.98
<i>Observations</i>	12,655	12,654

Note: The values of T in brackets, ***, ** and * are significant at the statistical levels of 1%, 5% and 10% respectively. All continuous variables are processed by 1% horizontal two-way winsorize tail shrinking. Year and Ind are virtual variables of year and industry respectively.

4.3 Mechanism Test

This section is used to test the intermediary effect of enterprise profitability. This paper uses ROA (the ratio of net profit to total assets) to measure profitability. Using the research of Wen Zhonglin (2004) for reference, this paper uses the three-step method to test. The regression results indicate that financing constraints can widen the forecasting horizon of firms by reducing their profitability and, in turn, their profitability.

Table 4 Test Results of Intermediary Mechanism			
Stage	I	II	III
Explained Variable	<i>Precision</i>	<i>ROA</i>	<i>Precision</i>
Variable	(1)	(2)	(3)
<i>KZ</i>	0.006*** (3.09)	-0.017*** (-98.67)	0.004* (1.79)
<i>ROA</i>			-0.102* (-1.85)
<i>Top1</i>	0.023 (0.77)	0.029*** (10.53)	0.026 (0.87)
<i>IndBoardSize</i>	-0.074 (-0.82)	-0.013 (-1.54)	-0.074 (-0.82)
<i>BoardSize</i>	-0.011 (-0.43)	0.002 (0.66)	-0.011 (-0.41)
<i>SalesGrowth</i>	-0.003 (-0.76)	0.003*** (8.06)	-0.003 (-0.65)
<i>Size</i>	0.003 (0.87)	0.006*** (16.78)	0.004 (1.06)
<i>Age</i>	-0.002*** (-2.72)	-0.000*** (-2.86)	-0.002*** (-2.76)
<i>Soe</i>	-0.011 (-1.03)	-0.004*** (-4.04)	-0.011 (-1.03)
<i>Year</i>	Yes	Yes	Yes
<i>Ind</i>	Yes	Yes	Yes
<i>F – value</i>	2.980	136.8	2.985
<i>Observations</i>	12,654	29,979	12,654

4.4 Grouping Regression

In order to verify the moderating effect of media attention, this paper divided firms into high attention group and low attention group according to trigonometry and the regression analysis is carried out respectively. The results (see Table 5.) indicate that, regardless of the measurement caliber, the KZ of the high attention group is not significant, while the KZ of the low attention group is significantly positive, which indicates that the effect of financing constraints on the accuracy of earnings forecast is significant in firms with low media attention instead of firms with high attention.

Table 5 Grouping Regression: The Moderating Effect of Media Attention

Variable	Number of News with the Company in Content		Number of News with the Company in Title	
	Low Media Attention (1)	High Media Attention (2)	Low Media Attention (3)	High Media Attention (4)
<i>KZ</i>	0.006*** (3.01)	0.004 (1.17)	0.005*** (2.67)	0.006 (1.57)
<i>Top1</i>	-0.031 (-0.99)	0.112* (1.82)	-0.036 (-1.13)	0.142** (2.32)
<i>IndBoardSize</i>	-0.017 (-0.17)	-0.261 (-1.40)	-0.079 (-0.83)	-0.109 (-0.59)
<i>BoardSize</i>	-0.010 (-0.34)	-0.031 (-0.59)	-0.018 (-0.66)	-0.005 (-0.08)
<i>SalesGrowth</i>	-0.005 (-1.21)	0.000 (0.03)	-0.003 (-0.72)	-0.001 (-0.11)
<i>Size</i>	0.002 (0.32)	0.002 (0.20)	-0.003 (-0.60)	0.005 (0.67)
<i>Age</i>	-0.002** (-2.40)	-0.002 (-1.34)	-0.002*** (-3.05)	-0.001 (-0.75)
<i>Soe</i>	-0.013 (-1.16)	0.002 (0.08)	-0.007 (-0.59)	-0.007 (-0.32)
<i>Year</i>	Yes	Yes	Yes	Yes
<i>Ind</i>	Yes	Yes	Yes	Yes
<i>F – value</i>	2.68	3.15	2.71	2.24
<i>Observations</i>	8,362	4,276	8,113	4,525

Subsequently, this paper uses grouping regression to verify the moderating effects of enterprise risk-taking level again. The coefficient of *KZ* in column (1) is significantly positive at 5%, while it is not significant in column (2)(see Table 6). It indicates that enterprises with low risk-taking level tend to issue inaccurate earnings forecasts.

Table 6 Grouping Regression: Adjustment of Enterprise Risk-taking Level

Variable	Low Risk-taking Group (1)	High risk-taking Group (2)
<i>KZ</i>	0.009** (2.22)	0.003 (1.49)
<i>Top1</i>	0.123* (1.65)	-0.035 (-0.99)
<i>IndBoardSize</i>	0.058 (0.25)	-0.121 (-1.12)
<i>BoardSize</i>	0.044 (0.67)	-0.042 (-1.32)
<i>SalesGrowth</i>	0.002 (0.17)	-0.004 (-0.89)
<i>Size</i>	0.017 (1.58)	-0.001 (-0.23)
<i>Age</i>	-0.001 (-0.53)	-0.003*** (-2.93)
<i>Soe</i>	-0.018 (-0.64)	-0.000 (-0.02)
<i>Year</i>	Yes	Yes
<i>Ind</i>	Yes	Yes
<i>F – value</i>	2.005	1.999
<i>Observations</i>	3,495	6,972

5. Robustness Test

According to the above regression results, corporate financing constraints will reduce the accuracy of earnings forecast. However, this result may also be attributed to "self-selection bias", which means the selected sample itself has the traits of low financing constraint and high precision of earnings forecast. In order to get more real results, this paper adopts the PSM (Propensity Score Matching) method. After the balance test, the standard deviation (absolute value) after matching is less than 10%, guaranteeing the validity.

Table 7 Average Treatment Effect

Type	Processing Group	Control Group	Difference Value	T Value
Unmatched	0.279	0.267	0.012	1.340
ATT	0.279	0.255	0.024	2.140
ATU	0.267	0.286	0.019	
ATE			0.020	

Table 7 shows the average treatment effect, ATT=0.024, which is significant at the level of 5%. It indicates that after the influence of the selected matching variables is excluded, the financing constraint can significantly decrease the accuracy of earnings forecast by 2.4%, which is consistent with the previous conclusions and ensures the robustness of the results. In addition, after the common support test, 5 samples were lost in the treatment group and the control group, and most of the observed values were in the common support domain.

6. Conclusions and Implications for Policy

Based on the panel data of Shanghai and Shenzhen A-share listed companies from 2008 to 2020, this paper investigates the influence of corporate financing constraints on the accuracy of earnings forecast by using the two-way fixed effect model based on principal-agent theory. The empirical results suggest that financing constraints of listed companies reduce the accuracy of their earnings forecast by reducing profitability. This finding remains robust after applying the PSM (Propensity Score Matching) method to address the "self-selection bias" problem. Further exploration discovers that firms with low media attention and low risk-taking level are more likely to disclose vague earnings forecast.

The research conclusion provides new decision-making ideas for various stakeholders in the capital market. For investors: the precision of earnings forecasts is affected by internal and external factors of enterprises, so that investors should appropriately refer to earnings forecasts and combine with market information. For enterprises: Financing-constrained enterprises should focus on working capital management, manage the enterprise's liquidity and minimize underinvestment. They should also establish long-term and stable cooperative relationships with external media. Meanwhile, they ought to raise risk awareness to avoid liquidity risk, so as to alleviate the degree of financing constraints. The research in this paper also provides vital empirical evidence for the further development of a transparent and open investment environment and securities market regulatory system in China.

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