Managers' Overconfidence, Resource Market Constraints and Corporate Financial Flexibility

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Abstract: In the actual business operation process, managers are often affected by various factors and do not meet the "rational economic man" assumption. Therefore, it is necessary to introduce managers' psychological characteristics into related research on corporate governance. Financial flexibility reflects the ability of an enterprise to obtain external financing in a timely manner to cope with difficulties and grasp development opportunities when facing financial difficulties or investment opportunities. This paper will start from the perspective of managerial irrationality, use the manager's earnings forecast deviation to measure managerial overconfidence and use the financial flexibility index to measure the level of financial flexibility. Selecting the unbalanced panel data of Shanghai and Shenzhen listed A-share non-financial companies from 2015 to 2018, and using Excel and stata to make data processing and empirical analysis. This paper studys the influence of managers' overconfidence on the financial flexibility of enterprises. The conclusion is obtained: (1) Managers 'overconfidence is significantly negatively related to the level of corporate financial flexibility, that is, managers' overconfidence keeps lower level of financial flexibility. The samples are grouped and regressed to test the moderating effects of resources and market constraints on the relationship between managers' overconfidence and financial flexibility where the property rights and the degree of the competition are used to define resource constraints and market constraints. The conclusion shows that (2) compared with state-owned enterprises, the overconfidence of non-state-owned enterprise managers has a more significant negative impact on financial flexibility; (3) compared with non-competitive enterprises, the overconfidence of competitive industry managers has an more significant impact on financial flexibility.

1. Introduction

In the complex and changeable operating environment under the New Normal, modern enterprises face more fierce competition and more uncertain market risks. If the lack of a strong response to sudden challenges and seize potential business opportunities, enterprises will be hard hit, reduce market share, or even be removed from the market by rivals. Only those who can deal with cash flow deterioration, sharp decline in revenue and other adverse shocks, through flexible access to funds to seize profit opportunities, will have better and further development. The ability to effectively prevent, resist and respond to emergencies with sufficient funds and good borrowing ability is called financial flexibility.

In traditional economics, there is the assumption of “Rational economic man”, who makes rational investment and management decision according to the principle of maximizing the target after he has got enough information. However, the phenomenon of herd behavior and equity premium in economic life makes scholars begin to question this hypothesis. Because in reality, people have cognitive biases such as self-attribution bias, better-than-average effect, and over-optimism, among which over-optimism cognitive bias is the most common, the main performance is overestimating oneself to the question analysis judgment, the event process control ability, is excessively optimistic to the result anticipation. Managers, therefore, are not always rational. Overconfident managers tend to increase their earnings expectations, believing that the economic costs of maintaining greater financial flexibility, rather than the competitive advantages that come with it, will hinder the growth of the company, and therefore choose to maintain lower financial flexibility, to make more aggressive

financial decisions. Then how should the enterprise formulate the financial policy under the changeable environment to deal with the risk? As an important basis of financial policy, is financial flexibility influenced by overconfidence of managers? Are there other factors that contribute to or inhibit the degree to which overconfident managers reduce their levels of financial flexibility? This article will explore these issues.

This paper selects the a-share listed companies from 2015 to 2018 as the research sample, selects the appropriate measurement standard to quantify the degree of overconfidence and the level of financial flexibility, and then uses the method of empirical test to draw the conclusion of the internal relationship between them. Then, the samples were divided into groups according to different resource and market constraints, and the effects of resource and market constraints on managers' overconfidence and financial flexibility were found, and according to the results for the managers to make rational recommendations.

2. Summary of research

2.1 Current research on overconfidence of managers

The "Over-confidence" in managers is not easy to describe numerically, so the relevant research is still in its infancy and the measurement indicators are not yet unified:

(1) The status of the holding of stock options by the manager or the number of shares held Malinendier and Tate (2005) first proposed and used this method several times. When executives buy stock or options, they argue, it is usually because they are optimistic about the company's future earnings and expect the share price to rise. Therefore, when managers are overconfident, the following situations tend to occur:

(a) Compared with the benchmark time, the company's managers delayed the exercise of rights;

(b) Holding company options until the expiry;

(c) Habitual increase in the holding of shares in the company.

Because of the immaturity of equity incentive mechanism in China, the limited number of implementing companies and the diversification of the purpose of executive stock ownership, there are some restrictions on the use of this method in China. On this basis, Hao Ying et al. (2005) revised the method, which takes the change of the number of executive stock as a measure of overconfidence. Later, ye Bei (2008) used the method of calculating the increase or decrease of self-holding company shares by Chairman and general manager in the study to quantify.

(2) Managers' earnings forecast bias

Lin, Hu and Chen (2005) began their research by suggesting that managers who overestimated a company's annual profits beyond their actual value were seen as overconfident and likely to make larger investments. Hribar and Yang (2010) also found that overconfidence can lead decision makers to subconsciously raise earnings expectations. Ben-david, et al. (2007) used the difference between expected and actual returns to measure overconfidence. Wang Xia et al. (2008) and Jiang Fuxiu et al. (2009) limited their sample to companies that were optimistic about the forecast. Yu Minggui et al. (2006) also used this limitation method to improve the measurement of overconfidence level.

(3) Evaluation of managers by relevant mainstream media

This kind of measurement method is seldom used in our country, but it is more common in Europe and America. Malinendier and Tate (2007) collate reviews of managers in mainstream media, such as business journals, and use the words in the reviews (confidence, optimism, pragmatism, etc.) as indicators of overconfidence.

(4) Executive compensation

Brown et al. (2007) argue that executives' influence on decision-making increases with pay, and that they are prone to overconfidence as their financial ability and managerial standing increase. Scholar Jiang Fuxiu et al. (2009) used the top three executive compensation in the study to quantify the proportion of all executive compensation.

At the same time, there are other methods used in the study of scholars, but compared with the above four methods, they are not direct enough, lack of rationality and broad recognition, so gradually eliminated in the process of scholars' research.

2.2 Current situation of research on financial flexibility of enterprises

As a new part of management research, the financial flexibility of enterprises is still in the embryonic stage.

Modigliani and Miler (1958), the authors of the study, noted that while debt can be tax-efficient, companies are still willing to retain a certain amount of debt capacity for financing when necessary, a view that will inform future research. Donaldson (1969) advocates that companies need to maintain a degree of financial flexibility to respond effectively to changing market conditions. Cayzac (1937) points out that under the guidance of the goal of value maximization, it is an important test for the financial level of an enterprise whether it has a good ability to deal with unexpected changes of cash flow and investment opportunities.

At present, scholars at home and abroad mainly focus on financial flexibility and the following topics: Bonaim é (2014); Wang Fan and ni Juan (2016); Marchica and Mura (2010); Ma Chunai et al (2015); business value (Gamba and Triantis (2008)); capital structure (Zhang Xindong and Chen Yiping (2015); and corporate decay (Ang and Dema (2011)) and competition among rivals (Hoberg, 2014).

For the quantification of financial flexibility, there are three main methods: single-index measurement, two-index combination and multi-index synthesis.

Zhao Pu and Sun Aiying (2014) use the percentile method to sort the selected data sample according to the level of the selected financial indicators, and use the median or other percentile of the financial indicators as the benchmark to classify the high and low financial flexibility companies. Marchica et al (2010) put forward the target fit value method, through calculating the company's target cash holdings or target capital structure, judge the company's financial flexibility level.

Zeng Aimin et al. (2011) proposed a two-index combination method of cash elasticity and debt elasticity. Arslan et al. (2014) combine cash holdings and asset-liability ratios to measure financial resilience.

Han Peng (2010) selected nine indicators such as cash flow and debt financing to create the Financial Resilience Index. Ma Chunai (2010) set out from the cash, debt and financing cost angle, created a multi-angle complex financial flexibility index system. Ma Chunai (2014) then combined the potential and basic sources of cash flow and the financing costs of enterprises to optimize the system and determine the weight of indicators according to the importance.

2.3 Current research on the relationship between managerial overconfidence and financial flexibility

Most of the current studies focus on the effect of managerial overconfidence on the level of cash and liabilities, but less on the overall financial flexibility. GE Jiapeng and Jim Mason (2008) point out that financial flexibility, as a comprehensive ability of enterprises, is influenced by the investment decision and management ability of decision-makers. Oliver (2005) found that overconfident decision-makers had higher debt ratios and were more willing to use debt as a source of funding. Li Meng (2018) pointed out that the effects of political correlation and overconfidence of managers on financial flexibility can be substituted for each other, and both are negatively correlated. Ma Chunai and Yi Cai (2017) found that overconfidence of managers can significantly reduce the level of financial flexibility of enterprises, and further research indicates that the relationship between the two is more significant in private enterprises and competitive enterprises.

2.4 Current research on the relationship among resources, market constraints and financial flexibility

Zhang and Li Sihai (2012) point out that politically connected companies have a competitive advantage in obtaining long-term bank loans at low cost. Sun Zheng and others (2005) said political

ties could allow companies to benefit from preferential government subsidies and relief. Justin Yifu Lin et al. (2004) argue that the soft budget constraint suggests that the government will help soes out of their financial difficulties.

The product market competition is an unavoidable external pressure, which will make the enterprise encounter the difficulties such as the decrease of market share, the decrease of income and the instability of cash flow. Bonaim é et al. (2014) found that companies tend to adopt conservative financial policies as competition in product markets increases. Lyandres (2006)'s results show that prudent budgetary policy can effectively reduce operational risk and improve the ability to cope with market risks. Research by Haushalter et al. (2007) and Clayton (2008) shows that companies with competitive products will actively maintain high liquidity and low prices and maintain high levels of financial flexibility to control debt and overall operational risk.

2.5 Literature review

Based on the above literature, it can be found that the study of overconfidence in managers is a combination of traditional corporate finance and psychological theories, and then become the category of behavioral corporate finance. Managers in the management of the company's business process due to involvement, forecast and optimistic factors such as bias, easy to come out, now overconfident. The existing research measures the overconfidence of managers by the way of increasing or decreasing stock holdings, deviation of Earnings Forecast, media evaluation, executive compensation, etc.. Although the research on financial elasticity started late, there are some achievements in the connotation and measurement of financial elasticity. In the past, the research on financial flexibility focused on the objective factors such as payment policy, market competition and so on, ignoring the main decision-maker's influence. Most of the studies on the effect of overconfidence focus on the level of cash and liabilities, but less on the impact of financial flexibility. Previous studies have found a negative relationship between overconfidence and financial flexibility, and this relationship is more significant when political correlation is high and market competition is fierce. The relationship among resources, market constraints and financial elasticity also shows that the enterprises with political relations can get rid of economic difficulties better, and the enterprises in the fierce market competition tend to adopt conservative financial policies. Based on the existing research, it can be concluded that the negative relationship between overconfidence and financial flexibility may be aggravated by the weakening of political resources and fierce market competition. Therefore, based on the existing research, this paper will explore the relationship between overconfidence and financial flexibility, and focus on the impact of resource and market constraints on the relationship.

3. Related concepts and theoretical basis

3.1 Definition of relevant concepts

3.1.1 Overconfidence of managers

Rao (2016) points out that the traditional assumption of "Rational economic man"is that managers can not adapt themselves to the changing business environment by making rational decisions aimed at maximizing the interests of stakeholders or shareholders. Therefore, the psychological theory begins to merge into the traditional corporate finance theory, and develops into the behavioral corporate finance theory system. The theory system holds that people are influenced by many factors, such as overconfidence of managers, which makes decision-making not rational but deviant.

In the current study, Roll (1986) used the word "Arrogant,"Heaton (2002) used the word "Optimistic,"Malmendier and Tate (2005) used the word "Overconfident.". It is usually defined as managers who are influenced by internal factors, such as beliefs, emotions, and biases, in making decisions that overestimate the likelihood of success and underestimate the potential cost of risk.

Psychologists explain overconfidence in three ways: (1) overestimation. Miller (1975) and others argue that people overestimate their own judgment and decision-making success rate. (2) over-positioning. Larrick (2007) and others point out that it's common for people to think their abilities are above average. (3) accuracy. Griffin (2004)'s experiments showed that when randomly selected people

were asked to solve numerical problems and were asked to define a 90% confidence interval, the range they gave was very small, this suggests that people generally think they can easily get the right answer.

To sum up, overconfidence generally refers to overoptimism, overestimation of one's own judgment in dealing with events, control over the development of events and the probability of success in making decisions, and underestimation of the risk of failure.

3.1.2 Financial flexibility

Ang and Smedema (2011) argue that financial resilience is a company's ability to seize investment opportunities and react to declining profits. Gamba and Triantis (2008) see it as the ability to change financial structures or stabilize financial resources at low cost. At present, the Financial Accounting Standards Board (FASB) defines the definition of financial flexibility as the ability of a business to adjust its cash flow position in the face of unexpected opportunities and demands. The definition of financial flexibility is different from each other, but in essence it refers to the ability of an enterprise to maintain its financial resources or adjust its financial structure with less cost under the goal of maximizing its value. This study is also based on the financial flexibility of the identification.

3.1.3 Political resources

Property right system is one of the criteria to decide whether an enterprise is state-owned or not. State-owned enterprises, which are mainly funded and controlled by the state, have more political resources because of their political nature. Such as debt financing concessions, financial subsidies, government relief and other non-state-owned enterprises can not enjoy the resources, these political resources can increase the state-owned enterprises' market competitiveness and financial stability.

3.1.4 Market competition

Product market competition refers to the behavior that enterprises compete with competitors for resources and squeeze each other in order to enhance their market position and share and increase profits. Traditional product market competition is divided into price competition and non-price competition. With the development of market economy and competitive means, competitive strategy becomes the key of market competition. In this paper, the product market does not involve cross-industry competition, but is limited to the scope of the industry.

3.2 Introduction to theoretical foundations

3.2.1 Behavioral finance theory

After the formation of the rational man hypothesis, scholars put forward the Efficient-market hypothesis based on it, which together with the later capital asset pricing model established the foundation of the traditional corporate finance theory. Subsequently, scholars gradually put the company's financial practices into these three areas: investment and financial decision-making, dividend distribution and risk control research. In the research process, the framework of corporate financial theory has been gradually improved, and formed a complete discipline. However, with the development of economy, the traditional assumptions can not adapt to the increasingly complex financial practice. Therefore, the theory of psychology and behavior has been applied to the study of corporate finance theory, which gradually evolved into the current behavioral corporate finance theory system.

Behavioral corporate finance theory, which includes psychology and behavioral science, holds that managers and investors will be affected by mood, personality and other internal factors to make irrational decisions. In practice, managers may have a variety of cognitive differences, among which overconfidence is one of the biases of optimistic estimates of self-skill and knowledge reserve. In order to study the influence of managerial overconfidence on enterprises, many scholars have made detailed researches on corporate investment and financial activities, accounting conservatism and M & A activities. On this basis, this paper analyzes the impact of overconfidence of managers on financial flexibility, so as to enrich the research in related fields.

3.2.2 Resource dependency theory

The theory of resource dependence emerged around 1940, which emphasized the importance of the environment to the organization. It maintains that the survival and development of the organization can not be separated from the support of various resources, many of which must be obtained through the outside world. According to resource dependence theory, organizations can take subjective measures, such as cooperation with resource-owning groups, to obtain resources in the environment and reduce the constraints of the external environment on organizational development. Therefore, while the organization should pay attention to its own products and customers, it should also pay attention to other organizations that influence the access and flow of resources in the environments such as suppliers and government organizations.

The theory of resource dependence points out that, because of the different position of enterprises in the environment, the social relations they have are different, the competitiveness of enterprises and the demand for social resources are also different. The theory also says that when organizations want the government's resources for financing and marketing, they often take the form of participating in government organizations or hiring government connected employees, establish contact with the government.

At present, China's economy is in transition, and the government still plays an important role in resource allocation and Macroeconomic regulation and control. Therefore, in order to promote their own development, enterprises will usually focus on building political relations, in order to obtain more resources and such as tax, subsidies and other preferences. At present, most of the political relations, political resources on the impact of enterprises are based on "Rational economic man"hypothesis, and there is no unified conclusion. So does political resources have an impact on financial resilience? This issue will be discussed in this article.

3.2.3 Free cash flow theory

The theory shows that the free cash flow of a company is related to the capital structure and will change with it. Maintaining a reasonable proportion of financing and cash flow will help to enhance the ability of enterprises to face unplanned challenges and investment opportunities, that is, to improve the financial flexibility of enterprises.

Because of the agency cost and the influence of tax, managers will choose not to rely on internal cash flow, but to combine external financing to complete the financial decision. However, if the excessive dependence on external financing will increase the future financial risk, so enterprises will need to maintain a reasonable level of debt. For companies, the safer approach is to maintain a certain level of cash flow, lower debt levels and stable dividend payments, because lower debt levels allow companies to have better residual solvency, a stable dividend can lower agency costs and signal to investors that the company is in good shape, making it easier to raise money in the future. Therefore, the company must balance the cash reserve, the debt level and the dividend payment relations, in order to enable the company to maintain the good financial flexibility.

4. Research assumptions and design

4.1 Research assumptions

Cognitive bias leads managers to overestimate the probability of successful decision-making, believing that enterprises are unlikely to get into the deadlock of capital flow disruption. Overconfident decision-makers will have better expectations of investment returns and invest beyond the reasonable range, whereas over-investment depends on financing beyond the company's own funds. Under optimistic assumptions, managers prefer debt financing because it eliminates equity-sharing with shareholders. As a result, managers are overconfident that companies generally have higher debt levels. In previous studies, the debt ratio was used to quantify the financial elasticity, and the debt ratio was considered to be negatively correlated with the financial elasticity. Although this conclusion is one-sided, enterprises with low financial flexibility usually have high debt level. Therefore, it can be inferred that overconfident managers will maintain a low level of financial flexibility. At the same

time, under the objective conditions, the over-investment enterprises have lower ability to deploy resources to deal with the financial difficulties, such as shortage of funds, because they have advanced their own capital and financing ability Subjectively, managers underestimate the risks because of optimistic estimates of future operating investment, and will maintain lower financial flexibility to resist financial risks. Based on the above analysis, this paper proposes hypothesis 1:

Hypothesis 1: overconfidence is negatively correlated with financial flexibility.

Li Yunda (2011) believes that in the theory of property right economics, the property right system directly affects the production and management activities of enterprises, including investment and financing. Based on the property right system, Chinese enterprises can be divided into state-owned enterprises and non-state-owned enterprises. Zhang Dunli et al. (2012) point out that in China, state-owned enterprises have more political connections and can obtain larger or longer-term external financing loans at lower cost. In the meantime, sun Zheng et al (2005) and Justin Yifu Lin et al (2004) argue that political relations as a social resource can enable enterprises to obtain more government relief and preferential subsidies when they encounter financial difficulties. To sum up, state-owned enterprises have debt financing preference, financial subsidies, government relief and other resources can help improve their financial stability and ability to deal with financial risks. Presumably, in soes, political resources may mitigate the negative effects of overconfidence on financial resilience. Based on the above analysis, hypothesis 2 is proposed:

Hypothesis 2: all other things being equal, overconfidence of managers in non-state-owned enterprises has a more significant effect on financial flexibility than that in state-owned enterprises.

Financial flexibility is also related to the degree of market competition. When an enterprise is in a competitive industry, the price and market share of its products will be restricted by its competitors. When an enterprise borrows externally, the bank will assess its risk, taking into account the lower profitability of the competitive industry and the higher risk of payment, the scale and periodicity of bank lending to firms in competitive sectors is generally smaller than in non-competitive sectors. As a result, companies in competitive industries tend to have higher financing needs and costs, which in turn increases the likelihood of financial distress. This requires competitive industry enterprises to formulate reasonable financial policies, standardize the use of funds, so that the financial flexibility remains at a reasonable level. Yu Minggui et al. (2006) found that overconfidence will cause managers to overestimate the competitive advantage of enterprises in the market, thus forming a reasonable range of investment expansion efforts, fully use the existing funds to increase operating projects, expand production capacity, and even to increase the level of corporate debt, reduce corporate financial flexibility.

But for non-competitive industries, the enterprises have relatively high degree of monopoly, few competitors, small market constraints, and generally higher profitability and solvency, so it is easier to obtain the support of external funds. As a result, market advantages in non-competitive sectors, similar to those in state-owned enterprises, reduce the degree to which overconfidence negatively affects financial resilience. This leads to hypothesis 3:

Hypothesis 3: all other things being equal, the influence of overconfidence of managers in competitive industries on financial flexibility is more significant than that in non-competitive industries.

4.2 Research design

4.2.1 Sample selection and data sources

In this paper, a-share listed companies from 2015 to 2018 as a sample, data are taken from the Guotai' an database.

Firstly, the sample is processed as follows: (1) excluding financial listed companies; (2) excluding St and * ST companies; (3) excluding companies that have not published earnings forecast or distributed earnings forecast date after the date of the annual report; (4) excluding missing data; (5) eliminate extreme abnormal data; (6) eliminate companies whose managers change during the sample period because the new managers have no impact on the original earnings forecast. A sample of 2,101

head offices with earnings forecasts was eliminated, as shown in table.1. In this paper, STATA15.1 and Excel are used to screen and analyze the data.

Table.1. Annual distribution of sample data

	2015	2016	2017	2018	Total
Sample size	386	534	606	575	2101
Sample size of Managerial Overconfidence	41	79	81	90	291
Sample size of state owned enterprises	75	118	117	135	445
Sample size of competitive industries	350	495	554	511	1910

4.2.2 Explanatory variable: financial elasticity

Considering the financial elasticity is a comprehensive consideration of the financial ability of the enterprise, it is one-sided to quantify the financial elasticity only according to single index or Double Index. Therefore, this article refers to Ma Chunai (2010) proposed a multi-angle comprehensive quantitative financial flexibility index system.

Table.2. Comprehensive index system of financial flexibility

target	First indicators	Secondary indicators
Financial flexibility	Cash reserves	(cash + trading financial assets) / average total assets
	Refinancing capacity	Net cash flow from operating activities / average total assets
		1 - asset liability ratio
		According to the weighted average roe of the last three fiscal years, 1, 0.6, 0.3 and 0
	Financing environment	z-score
		Z=1.2X1+1.4X2+3.3X3+0.6X4+XS= 1.2 * working capital / total assets + 1.4 * retained earnings / total assets + 3.3 * profit before interest and tax / total assets + 0.6 * (current market value + net assets per share * number of non current shares) / Total Liabilities + operating income / total assets

The index system includes cash flow reserves, refinancing capacity and financing environment, and three secondary indicators under the second level index. Using the analytic hierarchy process (AHP) and referring to Ma Chunai (2014), the weights of the first-class indexes are 0.4353,0.4869,0.07780 respectively. The standard deviation and average value of each index are normalized by coefficient of variation method, and the weight of coefficient of variation of each index is obtained. The higher the Z score is, the lower the cost of external financing is, and the higher the financial flexibility is. According to the calculated weights of the first and second level indexes, the final comprehensive weights of the second level indexes are determined and multiplied by the statistical values of the second level indexes to obtain the comprehensive financial elasticity. The weights are shown in table.3.

Table.3. Weight of comprehensive index system of financial flexibility

target	First indicators	First indicator weight	Secondary indicators	Secondary indicator weight	Comprehensive weight
Financial flexibility	Cash reserves	0.4353	Cash holdings		0.435
	Refinancing capacity		Cumulative equity financing capacity	0.516	0.251
		0.4869	Unused borrowing capacity	0.099	0.049
			Investment equity financing capacity	0.385	0.187
	Financial security	0.0778	Safety level		0.078

4.2.3 Explanatory variable: overconfidence of managers

In the part of literature review, this paper has introduced four methods to measure the overconfidence of managers. Based on the past research and the actual situation of scholars, it is not difficult to find that the mainstream media evaluation is difficult to obtain in data, the measurement

method of executive stock ownership does not accord with the situation of our country, so it is not applicable in the practical research. However, earnings forecast can reflect managers' evaluation of their management effectiveness, reflect self-confidence effectively, and is easy to obtain data, so it is adopted by many scholars. This paper uses this method to set up virtual variables to quantify overconfidence. Variable 1 indicates that the predicted value is higher than the actual value, and 0 indicates that the predicted value is lower than the actual profit.

4.2.4 Regulatory variables: resource constraints, market constraints

The more political connections state owned enterprises have, the more government relief and preferential subsidies they can receive in times of financial distress. These resources can improve financial stability and the ability to cope with financial risks. Based on the property right nature, this paper divides the sample companies into state-owned enterprises and non-state-owned enterprises as a measure of resource constraints.

Enterprises in competitive industries generally have higher financing demand and cost, so the financial risk is higher. The non-competitive industries have a higher degree of monopoly, fewer competitors, less market constraints, and generally higher profitability and solvency, therefore, the market advantage of non-competitive industries can reduce the degree of overconfidence negative effect on financial flexibility. This paper divides the sample into competitive industry and non-competitive industry according to the industry classification of CSRC in 2012, and takes the degree of intra-industry competition as the measure of market constraint.

4.2.5 Control variables

Table.4. Variable definition table

type	Variable name	Symbol	Variable description
Explained variable	Financial flexibility	FFI	Adopting financial flexibility index system
Explanatory variable	Managers' overconfidence	Overcon	Managers' earnings forecast is higher than the actual level, which indicates the existence of managers' overconfidence. It is counted as 1, otherwise it is 0.
control variable	company size	Size	In(total assets)
	Growth ability	Tobinq	(current market value + non current shares * net assets per share + total liabilities) / total assets
	Dividend capacity	Div	Dividend per share
	Profitability	Earning	Net profit / average total assets
	Board size	BS	Number of directors
	independent directors	ID	Number of independent directors
	shares held by senior executives	SMS	In(Number of shares held by senior executives)
	Shareholding ratio of the board of directors	BSR	Number of shares held by the board of directors / total number of shares
	years	Year	
	industry	Industry	

In this paper, company Size (Size) , growth ability (Tobinq) , dividend ability (Div) , Earning ability (Earning ability) , board Size (BS) , number of independent directors (ID) , number of senior managers (SMS) and board of directors (BSR) are selected as control variables. The financial system will be improved with the increase of the company's scale, and the financing ability and the ability to deal with financial risks will also be enhanced. The ability to grow symbolizes the expectation of future development. The higher the ability to grow, the better the financial flexibility to seize investment opportunities to avoid financial difficulties. Enterprises use cash to pay dividends, if necessary, can also be suspended to save cash. Therefore, the ability to pay dividends is related to the stability of cash holdings and cash flows, which has an impact on financial flexibility. Highly profitable companies

generally have a stable and sufficient source of cash, can reduce the dependence on external funds, enhance the ability to deal with financial distress, so as to take it as one of the control variables. According to the theory of corporate governance, the increase of the size of the board of directors can alleviate the agency problem and enhance the effectiveness of decision-making, thus affecting the financial flexibility. As an important part of internal control, the independent director can supervise the decision-making of the manager, improve the rationality of the decision-making of the enterprise, and reduce the overconfidence of the manager. The empirical study shows that the number of top management shares negatively affects the cash flow of enterprises, so it is not conducive to maintaining financial flexibility. Increasing the proportion of shares held by the board of directors can improve the efficiency of corporate governance.

Specific definitions of the relevant variables involved in the model are shown in table.4.

4.2.6 Model design

According to the characteristics of listed companies, this paper explains the influence of overconfidence of managers on financial flexibility, and establishes a model (1).

$$\begin{aligned} FFI = {} & \alpha_0 + \alpha_1 Overcon + \alpha_2 Size + \alpha_3 Tobinq + \alpha_4 Div + \alpha_5 Earning \\ & + \alpha_6 BS + \alpha_7 ID + \alpha_8 SMS + \alpha_9 BSR + Industry + Year + \varepsilon \end{aligned} \quad (1)$$

5. Analysis of empirical results

5.1 A test of the influence of overconfidence of managers on financial flexibility

5.1.1 Descriptive statistics and correlation analysis

Table.5 shows a descriptive statistical analysis of the variables in the 2,101 sample.

Table.5. Variable descriptive statistics

	Mean	maximum	minimum	median	standard deviation
Financial flexibility	0.321	1.829	-1.244	0.325	0.187
Managers' overconfidence	0.139	1	0	0	0.346
Company Size	21.91	28.25	19.23	21.68	1.254
Growth ability	2.223	26.82	0.455	1.714	1.809
Dividend capacity	0.125	2.970	0	0.065	0.199
Profitability	0.065	0.466	-0.252	0.056	0.051
Number of directors	8.201	17	0	9	1.679
Number of independent directors	3.081	6	0	3	0.530
Number of shares held by senior executives	13.16	20.70	0	16.03	6.620
Shareholding ratio of the board of directors	0.201	0.767	0	0.130	0.207

It can be seen from the table that the average value of financial elasticity is 0.321, and the maximum and minimum value are 1.829 and-1.244 respectively. The median level of overconfidence was 0 and the mean was 0.139, indicating that most managers in the sample did not have overconfidence. Compared with other variables, the standard deviation of company size, growth ability, number of board of directors and logarithm of executive stock ownership is very large, which shows that these variables are quite different in the company, and the logarithm of executive stock ownership is the most obvious one. The average dividend paying ability is 0.125, the average earning ability is 0.0625, which indicates that these two indexes are not high in the sample companies. But the standard deviation of profitability is small, which indicates the relative convergence of profitability among enterprises. The maximum value of the Board of Directors' shareholding ratio is 0.767, and the minimum value is 0. It shows that the stock ownership system of listed companies has great difference according to different companies.

The Pearson correlation test and the VIF Multicollinearity for each variable are shown in table.6.

Table.6. Pearson correlation test and the VIF Multicollinearity for each variable

	FFI	Overcon	Size	Tobinq	Div	Earning	BS	ID	SMS	BSR
FFI	1	1.07	1.74	1.48	1.55	1.37	2.23	2.26	1.65	1.92
Overcon	-0.122***	1								
Size	-0.251***	0.028	1							
Tobinq	0.120***	-0.052**	-0.348***	1						
Div	0.253***	-0.117***	0.078***	-0.065***	1					
Earning	0.468***	-0.197***	-0.241***	0.166***	0.453***	1				
BS	-0.133***	-0.055**	0.262***	-0.092***	0.005	-0.067***	1			
ID	-0.126***	-0.046**	0.290***	-0.079***	0.019	-0.087***	0.733***	1		
SMS	0.246***	-0.000	-0.253***	0.014	0.050**	0.198***	-0.155***	-0.156***	1	
BSR	0.269***	-0.017	-0.428***	0.001	0.102***	0.267***	-0.209***	-0.207***	0.592***	1

It can be seen from the table that overconfidence has a negative correlation with financial elasticity, the significance level is 1%, which shows a strong negative correlation; in the control variables, the company size, the number of independent directors and the number of board members have a significant negative correlation with financial elasticity, we can see that the level of financial flexibility will decrease with the increase of these indicators. The profitability, the number of senior managers, the growth ability, the dividend ability, and the proportion of board shares are positively correlated with the financial elasticity, which indicates that the higher these indexes are, the higher the financial elasticity is.

In order to verify that the model does not have a Multicollinearity problem, the VIF values of each variable are calculated. The results are shown in the upper right corner of the table. The values are all in the range of 0-10, which can exclude the possibility that the model has Multicollinearity.

5.1.2 Empirical results and analysis

To test hypothesis 1, the following table.7. Regression results are obtained from 2101 sample data using the mixed OLS estimates for control industry and year based on the model (1).

Table.7. Regression results

Variable	Coefficient	t-value	P-value
Overcon	-0.021	-1.96	0.050**
Size	-0.017	-3.61	0.000***
Tobinq	0.001	0.15	0.883
Div	0.097	4.50	0.000***
Earning	1.238	9.49	0.000***
BS	-0.004	-1.26	0.209
ID	0.002	0.24	0.811
SMS	0.002	2.34	0.019**
BSR	0.038	1.32	0.185
_cons	0.486	4.39	0.000***
Year	YES		
Industry	YES		
R^2	0.312		

Note: *** p<0.01, ** p<0.05, * p<0.1

As shown in table.7, managerial overconfidence was correlated with financial flexibility at a 5% significance level, with a coefficient of-0.021 indicating a negative correlation. At the same time, the R of this regression is 0.312, which shows that the explanatory ability of the model is within the acceptable range. When the manager is overconfident, the financial flexibility of the enterprise will be lower than that of the non-overconfident enterprise, which proves the hypothesis 1.

The regression coefficient between company size and financial elasticity is-0.017, and it has passed the 1% significance test. The financial elasticity decreases with the increase of company size. The probable reason is that the big company's financial system is relatively perfect, the fund use is more reasonable, has the more mature management experience, therefore has the financial distress the probability to be less. At the same time, large companies have a significant advantage over small ones in bank loan financing, so they can invest more of their existing capital in operating investments rather than maintaining financial flexibility.

The index of dividend ability and profitability is positively related to the financial elasticity, and the significance level is 1%, which shows that the financial elasticity increases with the increase of dividend ability and profitability. The increase of dividend-paying ability indicates that the enterprise needs more sufficient funds for dividend distribution, the enterprise's current fund is in good condition, and the enterprise can suspend dividend to alleviate the financial situation when it is in financial distress. Therefore, dividend-paying ability is positively correlated with financial elasticity. When the profitability of an enterprise increases, the profit that the enterprise obtains from the product market increases, and the capital accumulation ability of the enterprise increases, so the demand for external financing can be reduced in the face of financial difficulties such as capital shortage, to increase their ability to cope with risk. The coefficient of growth ability and financial elasticity is 0.001, and the P value is large, which indicates that the correlation between growth ability and financial elasticity is weak, the relationship between the two is influenced by more factors. Corporate Governance Index and financial flexibility index are not significant, among which the number of senior managers is the most significant, the coefficient is 0.002, which shows that when the number of senior managers increases, corporate governance efficiency and financial flexibility increase. However, the number of board members, the number of independent directors and the proportion of shares held by the board of directors have a weaker relationship with financial flexibility, it is difficult to explain the relationship between the agency problem and the financial elasticity of the enterprise because only the number of people and the proportion of holding shares are involved in the model.

5.2 Grouping test on the influence of overconfidence of managers on financial flexibility

5.2.1 Grouping tests based on the nature of different property rights

There were 445 state-owned enterprises and 1,656 non-state-owned enterprises in the 2,101 sample. Table.8 and table.9 are descriptive statistics for each of the two sets of enterprise variables.

Table.8. State-owned enterprise variable descriptive statistics

	State-owned enterprises				
Variable	Mean	Maximum	Minimum	Median	Standard deviation
FFI	0.241	1.180	-0.393	0.205	0.177
Overcon	0.106	1	0	0	0.308
Size	22.87	28.25	20.06	22.75	1.486
Tobinq	1.783	10.05	0.494	1.372	1.160
Div	0.113	2.970	0	0.040	0.259
Earning	0.0435	0.283	-0.029	0.030	0.0437
BS	9.049	17	0	9	1.996
ID	3.364	6	0	3	0.702
SMS	6.519	18.87	0	8.221	6.482
BSR	0.007	0.319	0	1.60e-06	0.028

Table.9. Non-state-owned companies variable descriptive statistics

	Non-state-owned companies				
Variable	Mean	Maximum	Minimum	Median	Standard deviation
FFI	0.342	1.829	-1.244	0.348	0.184
Overcon	0.147	1	0	0	0.355
Size	21.65	26.30	19.23	21.53	1.043
Tobinq	2.341	26.82	0.455	1.805	1.930
Div	0.128	2	0	0.080	0.180
Earning	0.071	0.466	-0.252	0.063	0.051
BS	7.973	15	4	8	1.504
ID	3.005	5	0	3	0.443
SMS	14.94	20.70	0	16.75	5.412
BSR	0.253	0.767	0	0.258	0.203

From the results of the table, we can see that there are significant differences between the two groups in the level of financial flexibility and managerial overconfidence, indicating that non-state-owned enterprises are more willing to maintain a certain degree of financial flexibility and are also relatively more prone to managerial overconfidence, this is consistent with previous theoretical analysis. The dividend-paying ability, growth ability, profitability and the proportion of shares held by the board of directors are also slightly stronger than those of the state-owned enterprises, while the size of the company, the number of the board of directors and the number of independent directors are slightly lower than those of the state-owned enterprises, the number of shares held by senior executives is significantly higher than that of state-owned enterprises.

To test hypothesis 2, the data were grouped and mixed with OLS regression, and the results were given in table.10.

Table.10. Property-based quality test results

	State-owned enterprises			Non-state-owned companies		
Variable	Coefficient	t-value	P-value	Coefficient	t-value	P-value
Overcon	-0.009	-0.28	0.778	-0.024	-2.14	0.032
Size	-0.020	-2.47	0.014**	-0.018	-3.78	0.000***
Tobinq	0.011	0.89	0.377	0.003	0.49	0.623
Div	0.136	2.99	0.003***	0.113	4.99	0.000***
Earning	1.415	5.72	0.000***	1.174	8.78	0.000***
BS	-0.011	-1.70	0.090 *	-0.005	-1.33	0.182
ID	0.020	1.09	0.275	0.001	0.12	0.902
SMS	0.002	1.55	0.123	0.002	2.84	0.005***
BSR	0.286	1.08	0.283	0.031	1.05	0.294
_cons	0.550	2.90	0.004***	0.514	4.44	0.000***
year	YES			YES		
industry	YES			YES		
R^2	0.355			0.267		

Note: *** p<0.01, ** p<0.05, * p<0.1

According to the group regression results in the table above, we can see that the regression results of managers' overconfidence to financial elasticity are-0.009 and-0.024 respectively, which shows that the relationship between managers' overconfidence and financial elasticity is negative correlation under different property right systems, the results further verify the hypothesis 1. The P value of state-owned enterprise group is 0.778, the correlation is not strong, but the negative correlation is under 5% level in non-state-owned enterprise group. It is proved that state-owned enterprises, because of their

political resources, can obtain external financing more easily, so they can deal with financial risks effectively without maintaining high financial flexibility.

For the control variables, the regression sign of firm size is negative in both cases, which shows that with the expansion of firm size, the financial system is more perfect and the financing constraints are smaller, so it is not necessary to maintain high financial flexibility. The regression results of profitability and dividend ability are similar to those in the previous section, showing that the stronger the ability to obtain funds from the product market, and the more stable the cash flow, the better the enterprise's ability to deal with risks. In the non-state-owned enterprises, the number of executive shares has a more significant positive correlation with financial flexibility, while the number of board members has a more significant relationship with financial flexibility. The proportion of shares held by the board of directors and the number of independent directors were not significant in both groups. It shows that the relationship between the corresponding index of governance and financial flexibility is complicated and needs further study. The fitting degree of both regression equations is more than 0.25, which shows that the explanatory power of each variable is within the acceptable range.

5.2.2 Grouping tests based on industry competitiveness

Of the 2,101 sample, 1,910 were in competitive industries and 191 were in non-competitive industries. The descriptive statistics for each set of variables are shown in tables.11 and 12.

Table.11. Competitive industry variable descriptive statistics

			Competitive industry		
Variable	Mean	Maximum	Minimum	Median	Standard deviation
FFI	0.331	0.182	-1.066	1.829	0.331
Overcon	0.138	0.345	0	1	0
Size	21.85	1.224	19.23	28.25	21.63
Tobinq	2.252	1.829	0.455	26.82	1.748
Div	0.127	0.193	0	2.100	0.070
Earning	0.067	0.051	-0.252	0.466	0.058
BS	8.127	1.597	0	16	9
ID	3.058	0.501	0	6	3
SMS	13.49	6.424	0	20.70	16.19
BSR	0.208	0.209	0	0.767	0.156

Table.12. Non-Competitive industry variable descriptive statistics

			Non-Competitive industry		
Variable	Mean	Maximum	Minimum	Median	Standard deviation
FFI	0.225	0.614	-1.244	0.221	0.208
Overcon	0.147	1	0	0	0.355
Size	22.49	27.07	19.78	22.18	1.392
Tobinq	1.926	13.49	0.494	1.405	1.570
Div	0.102	2.970	0	0.050	0.252
Earning	0.053	0.335	-0.019	0.046	0.045
BS	8.937	17	5	9	2.221
ID	3.314	6	2	3	0.722
SMS	9.893	19.49	0	11.78	7.617
BSR	0.123	0.639	0	0.0004	0.171

From the results of the table, we can see that the average value of financial flexibility of enterprises in competitive industries is higher than that of enterprises in non-competitive industries, which shows that enterprises in competitive industries are more willing to set aside a certain amount of funds to maintain their financial flexibility, the enterprise has a high repayment risk, so it is facing more

external financing pressure and needs to improve its financial flexibility. The phenomenon of overconfidence of managers in non-competitive industries is more common than that in competitive industries, but the difference is not significant. The growth ability of competitive industries is slightly higher than that of non-competitive industries, and the number of senior executives holding shares is significantly higher than that of non-competitive industries.

To test hypothesis 3, the data were grouped and mixed with OLS regression, and the following table.13 was obtained.

Table.13. Inspection results based on industry competition

	Competitive industry			Non-Competitive industry		
Variable	Coefficient	t-value	P-value	Coefficient	t-value	P-value
Overcon	-0.024	-2.14	0.032**	0.025	0.69	0.493
Size	-0.018	-3.78	0.000***	-0.012	-1.07	0.286
Tobinq	0.003	0.49	0.623	-0.045	-1.28	0.202
Div	0.113	4.99	0.000***	0.007	0.19	0.850
Earning	1.174	8.78	0.000***	1.616	2.51	0.013**
BS	-0.005	-1.33	0.182	-0.012	-1.29	0.199
ID	0.001	0.12	0.902	0.028	1.04	0.298
SMS	0.003	2.84	0.005***	-0.003	-0.98	0.327
BSR	0.031	1.05	0.294	0.039	0.28	0.779
_cons	0.514	4.44	0.000***	0.562	1.78	0.077 *
Year	YES			YES		
Industry	YES			YES		
R^2	0.298			0.378		

Note: *** p<0.01, ** p<0.05, * p<0.1

As can be seen from the table above, the results of the coefficient of the two enterprises in competitive industries are negative correlation at-0.024, 5% level. In contrast, the correlation coefficient was 0.025, and the correlation was not strong. It shows that non-competitive industries, because of their low market binding force, high degree of monopoly and less difficulty in obtaining funds from outside, have relaxed the requirement for enterprises to maintain financial flexibility and weakened the negative correlation of managers' self-confidence to financial flexibility, therefore, the correlation is less significant than that of competitive industries, which proves hypothesis 3.

For the control variables, the regression coefficient of firm size was negative in both groups, but it was more significant in competitive industries, perhaps because the financing convenience brought by firm size played a greater role in competitive industries. The regression results of profitability and dividend-paying ability are similar to the basic test, and both of them have significant positive correlation with financial elasticity. The relationship between growth ability and financial flexibility is opposite and not significant under the two groups, which indicates that enterprises with better growth ability in competitive industries have better development prospects, and therefore are more likely to gain external trust in financing, and this phenomenon is not obvious in non-competitive industries. For governance-related indicators, only the number of top management shares has a good correlation with financial flexibility in competitive industries, which may be related to the increase of top management shares is more effective to improve agency efficiency under this condition. The regression fitting degree of the two groups of data is more than 0.25, which shows that the regression equation can better explain the explained variables.

6. Robustness test

In order to verify the reliability of the regression conclusion, this paper will use another index to measure the degree of overconfidence of managers, and test the robustness of the results. This paper refers to another method proposed by Chinese scholar Jiang Fuxiu (2009), which has been adopted

more frequently in previous studies, namely the ratio of top three salary/total executive salary, as another indicator of overconfidence. The other variable measures and sample data selection are the same as before. The substitution index is still set to 0,1 dummy variable, and the data of the top three salary/total salary of the top three executives of the sample company is obtained in the database, and the median is calculated, then the virtual variable meter is 1, which is considered to be overconfident, otherwise 0. The results in table.14 were obtained by using mixed OLS regression with control years and industries.

Table.14. Robustness test

variable	coefficient	T-value	P-value
Overcon	-0.013	-1.86	0.063*
Size	-0.019	-5.32	0.000***
Tobinq	-0.003	-0.71	0.481
Div	0.077	4.65	0.000***
Earning	1.528	14.67	0.000***
BS	-0.005	-1.52	0.129
ID	0.006	0.59	0.554
SMS	0.002	3.57	0.000***
BSR	0.023	0.94	0.347
_cons	0 .536	6.57	0.000***
Year	YES		
Industry	YES		
R^2	0.382		

Note: *** p<0.01, ** p<0.05, * p<0.1

From the table, we can see that overconfidence is negatively correlated with financial flexibility, and the conclusion is significant, which is consistent with the basic test conclusion. Except the growth ability, the regression coefficients of all the indexes and the financial elasticity are the same as above, which shows that the relationship between these variables and the financial elasticity is stable. However, contrary to the results in the previous section, the logarithm of executive stock ownership and the level of financial elasticity significantly decreased. In this section, the 1% significance test was passed, it shows that the relationship between growth ability and the logarithm of executive stock ownership and financial elasticity is unstable and needs further research. On the whole, the robust results prove that the empirical results of this paper are stable.

7. Conclusions and prospects

In the actual management process, the managers are often affected by various factors and not “Rational”, so it is worth introducing the psychological characteristics of managers into the study of corporate governance. Financial flexibility reflects the ability of enterprises to adjust the capital structure, obtain external financing to cope with financial difficulties and grasp development opportunities when they face financial difficulties or investment opportunities. From the angle of manager’s irrationality, this paper studies the effect of manager’s overconfidence on corporate financial elasticity by using earnings forecast deviation and financial elasticity index. At the same time, the sample data is grouped and regressed according to property right and intensity of industry, and the moderating effect of resource and market constraints is tested. The results are as follows: (1) there is a significant negative correlation between managerial overconfidence and financial flexibility; (2) there is a significant negative correlation between non-state-owned enterprises and state-owned enterprises; and (3) there is a significant negative correlation between competitive industries and non-competitive industries. At the same time, this paper uses the relative salary ratio of senior managers as a measure of overconfidence in the robustness test, carries on the regression analysis to the same

sample, obtains the conclusion consistent with the basic test, which shows that the conclusion of this paper has a certain robustness.

Overconfidence of managers is negatively correlated with financial flexibility, which shows that the ability of enterprises to deal with financial crisis and grasp investment opportunities will decrease when there are overconfident managers, therefore, it is necessary for managers to work out and practice measures to improve their ability to deal with risks in order to weaken the risks brought by their irrationality. At the same time, resource and market constraints will increase the significance of the relationship between them, which means the decision-makers in the adverse operating environment should pay more attention to whether they have overconfidence and prevent the enterprises from falling into financial bottleneck.

Due to the lack of research on the effect of overconfidence on financial flexibility and the author's limited ability, there are still some deficiencies in this paper:

(1) In this paper, managers are overconfident in choosing the earnings forecast and the relative proportion of executive compensation as the substitute indicators, which is a widely used method at present. However, overconfidence is a psychological characteristic, which is difficult to quantify, so there is still room for future research on the accuracy and objectivity of indicators. The financial flexibility index system of Ma Chunai was chosen as the financial flexibility index system, in determining the first-class index, the weight determined by the author was directly used for reference, but whether the weight should be re-determined according to the development of time is worth further study.

(2) In this model, the variables of corporate governance have not passed the test of significance in the regression results, which may be caused by the lack of mathematical and physical treatment and the lack of representation of the variables.

(3) This paper only discusses the linear relationship between managerial overconfidence and financial flexibility, but the relationship between them is complicated in the real business environment, for example, recent studies have found that overconfident managers may use their funds to invest rather than distribute dividends, which increases agency costs and therefore complicates the relationship between the two.

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