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The Influence of Management Shareholding on M&A Performance - the Moderating Effect based on Managerial Overconfidence

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Abstract

The A-share listed information technology companies in Shanghai and Shenzhen from 2012 to 2016 were selected as the object of study to investigate the effect of management shareholding on M&A performance from a rational perspective. The mechanisms by which managerial overconfidence works on management shareholding and M&A performance were analyzed by integrating rationality and bounded rationality.

The results show that management shareholding is positively correlated with M&A performance, i.e. the growing level of managerial share ownership can improve M&A performance. Moreover, the positive impact of management shareholding on M&A performance will be weakened by managerial overconfidence, i.e. managerial overconfidence has a “weakening effect” on the influence of management shareholding on M&A performance. The findings can be used to guide corporate governance, incentive mechanism and manager appointment in M&A decisions. In addition, most of studies on M&A are based on either rationality assumption or bounded rationality assumption. Our study expands the current theory by integrating both rationality and bounded rationality to investigate the influence of managerial overconfidence on M&A.

Keywords: *Management shareholding, Managerial overconfidence, M&A performance, Weakening effect*

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Introduction

Since Berle and Means (1932) proposed the principal-agent theory, a great number of studies have been conducted to investigate how to coordinate the first type of agency problem between managers and shareholders. The principal-agent theory also becomes the mainstream of corporate governance theory. As argued by Denis and McConnell (2003), the relationship between management shareholding and business performance is an integral part of the current research on corporate governance. The relationship between management shareholding and business performance is mainly described by three hypotheses. The convergence-of-interest hypothesis, proposed by Jensen and Meckling (1976), suggests a continuous positive correlation between management shareholding and M&A performance, since management shareholding can lead to the convergence of the interests of managers and shareholders, reduce agency cost, and finally improve business performance. The entrenchment hypothesis, proposed by Demsetz (1983), argues that management shareholding does not always produce beneficial outcome, because the management who holds excessive shares may prefer the maximization of their own interests rather than the maximization of enterprise value when making decisions. Excessive shareholdings increase the management's right of control. As the management is less subject to external control and pressure, the agency cost will rise, causing damage to shareholders' interest. The range effect hypothesis, proposed by Morck, Shleifer and Vishny (1988), states that the convergence effect is greater than the entrenchment effect when the shareholding ratio of managers is 0-5% or more than 25%, and the convergence effect is less than the entrenchment effect when the shareholding ratio of managers is 5-25%. The findings above indicate that the relationship between management shareholding and business performance can be either linear or nonlinear.

The three hypotheses above are all based on the hypothesis of rational economic man, which suggests that economic entity is self-interested and tends to make economic decisions according to the theory of expectancy effect. However, as said by Procter and Gamble's CEO McDonald, the real world is volatile, uncertain, complex and ambiguous (VUCA). The decision-making theory based on rationality assumption cannot adequately account for the reality. As behavioral finance evolves, the bounded rationality of economic entity has been applied in many relevant fields. The related hypotheses with great explanatory power include the accessibility bias and anchoring bias proposed by Kahneman and Tversky (1974) and the winner's curse proposed by Stiglitz (1981). Managers often fall into the dilemma of accessibility bias, anchoring bias and winner's curse when confronting plenty of uncertain information. As a result, managers may act as "cognitive misers" when making decisions, leading to the managerial overconfidence bias characterized by underestimate

of risk and overestimate of return. If both rationality and bounded rationality of managers are taken into account, what impact will management shareholding have on M&A performance? In this sense, the present study expands and enriches the motivation theories of management shareholding in China by integrating the managers' rationality and bounded rationality. Moreover, the present study has led to a better understanding of M&A performance in complicated M&A process by introducing the interaction between managerial overconfidence and management shareholding to evaluate how managerial overconfidence affects the incentive mechanism based on management shareholding in China's information technology companies.

literature review and research hypothesis

(I) management shareholding and M&A performance

At present, scholars have proposed three theories on the study of management shareholding on M&A performance: Interest convergence effects hypothesis, Entrenchment effects hypothesis and interval effects hypothesis. Jensen & Meckling (1976) first proposed the Interest convergence effects hypothesis, believing that there is a continuous positive correlation between management shareholding and M&A performance. Demsetz (1983) proposed the Entrenchment effects hypothesis, believing that managers' shareholding is not necessarily beneficial, and that excessive shareholding ratio of the management will make the management maximize their own interests rather than enterprise value when making decisions. Because of holding too high proportion of stock, the control right of the management increases. At this time, they are seldom controlled and pressured by the outside world, which makes the agency cost rise and the interests of shareholders suffer. Morck, Shleifer & Vishny (1988) proposed Interval effects hypothesis, which believed that when the shareholding ratio of managers was 0-5% or more than 25%, the Interest convergence effects was greater than the Entrenchment effects, and when the shareholding ratio was within the range of 5%-25%, the Interest convergence effects was smaller than the Entrenchment effects. At present, the management shareholding ratio of Chinese information technology enterprises is relatively low. In the 373 research samples, the average management shareholding ratio is only 1.5%. According to the views of Morck, Shleifer and Vishny (1988), the current management shareholding of Chinese information technology enterprises is in the range of 0-5%, which is manifested as Interest convergence effects; In addition, Gorton et al. (2005) confirmed that there was indeed a positive correlation between management shareholding and M&A performance by summarizing previous empirical studies. Lam & Chong (2006) found in their study that the company has greatly improved the value of the company through management shareholding measures; Smith & Swan (2008) took ROA and Tobin Q as alternative variables of corporate performance, and took 1993-2002 as samples to empirically conclude that

management shareholding can enhance the effect of interest convergence; Smith& Swan(2008) took ROA and Tobin Q as alternative variables of corporate performance, and took 1993-2002 as samples to empirically conclude that management shareholding can enhance the effects of interest convergence;Kuang and Qin(2009) took British companies as samples to study the effect of management shareholding incentive. The results showed that management shareholding can make the interests of management and shareholders converge, which is conducive to the development of the company; Therefore, according to the current situation of foreign studies, most scholars support the positive correlation between management shareholding and corporate M&A performance. But in Chinese studies, scholars have not come to a consistent conclusion. Jianbo Song et al. (2008) found that management shareholding had no significant effect on the performance of mergers and acquisitions, which did not support the management shareholding hypothesis, which may be related to the characteristics of the research samples. However, Shanmin Li et al concluded that management shareholding can improve the mergers and acquisitions performance of enterprises to a certain extent. Therefore, hypothesis H1 was proposed in this paper:

H1: management shareholding is positively correlated with M&A performance.

(II) overconfidence of managers and M&A performance

Since Roll (1986) proposed the "arrogance hypothesis", the academic circle has conducted a lot of researches about the managerial overconfidence of managers. Believed that overconfident managers tend to overestimate the benefits of M&A, underestimate the risks, even believe that mergers and acquisitions can bring synergies, thus damaging the value of mergers and acquisitions. Whether the overconfidence of managers affect the M&A performance of enterprises or not? Malmendier and Tate(2008) found that overconfident managers did indeed carry out at least one M&A activity during their tenure, even would have a negative impact on M&A performance; Alexander(2004) et al found that, under the background of low level of investor protection, private gains from control rights are directly proportional to inefficient investment behaviors; Heaton and Odean (2000) found that overconfident and optimistic managers are more likely to choose risky projects than rational managers; Doukas and Petmezas(2010) found that the more overconfident managers were, the easier it was to carry out M&A, especially diversified mergers and acquisitions. At the same time, the return of M&A initiated by overconfident managers is lower than that of non-overconfident managers. It can be seen that increasing the control power of managers has benefits, which can reduce the decline in M&A performance caused by inefficient M&A behaviors of enterprises. However, the overconfidence of managers will lead to cognitive bias of managers and promote inefficient M&A, thus reducing M&A performance. Linghong Xie, Shancun Liu and

Wanhuaqiu (2012) found that managers of listed companies with mergers and acquisitions generally have overconfidence cognitive bias. Overconfidence of managers is negatively correlated with both short-term and long-term M&A performance. Therefore, hypothesis H2 is proposed in this paper:

H2: overconfidence of managers is negatively correlated with M&A performance.

(III) the interaction effect between management shareholding and managerial overconfidence

Roll (1986) argued that overconfident managers tend to overestimate the benefits of mergers and acquisitions, and believe that mergers and acquisitions can bring synergies, so that mergers and acquisitions that are not valuable in themselves will be take place; Doukas&Petmezas(2006) , Brown &Sarma(2006) all found that the more overconfident managers were, the more likely they were to carry out mergers and acquisitions, especially diversified ones, at the same time, the return of M&A initiated by overconfident managers is lower than that of non-overconfident managers. It can be seen that increasing management shareholding can reduce the decline in M&A performance then caused by inefficient M&A behaviors of enterprises. However, managerial overconfidence will lead to cognitive bias of managers to promote inefficient mergers and acquisitions, thus reducing M&A performance. Managers tend to make prudent M&A decisions based on information related to Managers tend to make prudent M&A decisions based on information related to M&A and the theory of expected effect. Management shareholding will promote the alignment of interests between managers and shareholders, thereby reducing managers' moral hazard, and thereby improving the performance of mergers and acquisitions. But as Procter & gamble CEO McDonald says, this is a VUCA world , It's hard for managers to make rational decisions in such a world, On the contrary, managers will be get caught in the traps of availability bias, anchoring bias, and the Winner's Curse. At this point, although the original intention of managers is to create wealth for shareholders, the cognitive bias of managers leads to overestimation of returns and underestimation of risks, and then makes merger decisions that damage the interests of shareholders. Therefore, hypothesis H3 is proposed in this paper:

H3: managerial overconfidence will weaken the positive impact of management shareholding on M&A performance.

Research design

(I) sample selection and source

In this paper, a share listed companies in China's information technology industry from January 1, 2012 to December 31, 2016 are selected as the research objects. To eliminate the impact of IPO, only samples that

were listed before December 31, 2011 are selected. Data results are processed by SPSS24.0 and EXCEL, and filter the data according to the following principles.

(1) In this paper, only the M&A events in which the acquisition object is the equity object even the listed company is the acquirer company are retained.

(2) Does not include M&A events that belong to related transactions, because the related transactions of M&A may not be the carried out of the need of operation and management and that not in accordance with the principles of market transaction, even the performance of M&A is easily affected by related parties, so related M&A transactions are not representative and comparable;

(3) Delete some M&A cases that do not disclose financial data and have outliers in the disclose financial data.

Finally, this paper get 372 samples observed value as the overall research sample, and that the sample data is basically stable, only 2016 decrease more, the main reason is that according to the above condition selection, Gaoshenkonggu, morning xin science and technology caused by abnormal data.

(II) Definition and measurement of variables

(1) dependent variable

At present, the research methods of M&A performance are mainly divided into four categories: financial index method, event method, questionnaire method and case study method. The evaluation indexes of M&A performance adopted by different research methods are different, so the results obtained are also different. According to the agency cost theory, the management has a greater information advantage than the owners. They can use this information advantage to obtain additional benefits for themselves, but this may harm the interests of shareholders. As a way to solve the principal-agent problem, management shareholding should adopt the index that can measure the loss degree of shareholders. Return on equity (ROE) can measure the operating efficiency of an enterprise and reflect the income level of shareholders' equity, so it can be used to reflect changes in shareholders' wealth. Zhihua Xie, Haoming Dong and Huimei Wang (2017) et al believe that ROE can better measure shareholder wealth. Therefore, this paper selects the index of return on equity (ROE) to evaluate the performance of enterprise mergers and acquisitions, and the CSRC also takes it as the basic index to measure enterprise performance, and that studies it from the perspective of short-term and long-term.

(2) independent variable

At present, many scholars measure management shareholding mainly in two ways, one the ratio between the number of management shareholding and the total number of shares in an enterprise; The

second is based on the market value of management shareholding. In terms of these two approaches, The first is more stable than the second even does not change the with the market value, In addition, the first method can also eliminate the effect of enterprise scale effect, Therefore, this paper adopts the views of Shanmin Li, Tao Zhu (2005), bai Liu, Chao Liang (2017)etc., defines management shareholding as the ratio of the total number of all management shareholding, including directors, supervisors and senior managers to the Total equity.

(3)moderator variable

There are many ways to measure overconfidence, including Hayward and Hambrick (1997) used the relative compensation of managers; Malmendier& Tate (2005); Tienan Wang and Yu Wang (2017) used the management shareholding; hribar and Yang's (2010) used the mainstream media evaluation; Lin's (2005) used the corporate profitability bias; Hayward &Hambrick (1997) used the historical performance of company; Doukas&peetmezas (2010) used the frequency of mergers and acquisitions. As one of the investment behaviors of company, M&A has the characteristics of high risk. When a company makes a mergers and acquisitions, it often takes a period of resource integration before the next mergers and acquisitions. if the company can make two or more mergers and acquisitions in two years, it shows that the manager has enough confidence in himself to control the operation and management of the company and realize it Effective integration of resources, better play to synergies. In view of the needs of this study and the availability of data, this paper adopts the views of Doukas&peetmezas (2010) and Lin He (2014). If two or more Mergers and acquisitions transactions are initiated within a year, it was deemed that the manager is overconfident and the value is 1, otherwise the value is 0.

(4)Control variable

The existing research shows that the size, asset attributes, growth, ownership structure and governance structure of the company have an important impact on management ownership, managerial overconfidence and M & a performance. Research by Fuxiu Jiang (2009) and others shows that factors such as enterprise scale, type of actual controller, asset attribute, growth, debt ratio and so on will affect the company's investment and M & A. See Table 1 for the selection and specific meaning of relevant variables in this paper.

Table 1 summary table of variable measurements

variable	Variable name	Variable symbol	Variable definition
dependent variable	Mergers and acquisitions performance	ROE0	ROE in the year of the merger - ROE in the year prior to the merger
		ROE1	ROE for the year after the merger - ROE for the year prior to the merger
independent variable	management shareholding	MSH	Total management shareholding in the year prior to the merger/total number of shares of the company
moderator variable	overconfidence	OCD	If two or more M&A transactions are initiated within a year, the value is 1; otherwise, the value is 0
Control variable	Category of control	FCR	Represented by dummy variables, state-owned holding enterprises are assigned 1, otherwise 0
	Asset-liability ratio	Lever	Total liabilities/total assets of the company in the year prior to the M&A
	Company size	Size	The natural logarithm of total assets in the year before the M&A
	Board characteristics	Ind	The ratio of the number of independent directors to the number of total directors in the year prior to the M&A
	Growth rate	Growth	The average growth rate of net assets in the three years before the M&A
	Year	Year	Using 2012 as the base year, with a value of 0; 2013 as 1; 2014 as 2; 2015 as 3; 2016 as 4

Source: the author sorted out the literature

III.model construction

This paper establishes model 1 to test the influence of management shareholding on M&A performance, model 2 to test the influence of overconfidence of managers on M&A performance, and model 3 to test the moderating effect of managerial overconfidence.

Model 1:

$$\begin{cases} ROE_1 = \alpha_0 + \alpha_1 MSH + \sum_{i=1}^6 \alpha_{i+1} controls_i + \varepsilon_2 \\ ROE_0 = \alpha_0 + \alpha_1 MSH + \sum_{i=1}^6 \alpha_{i+1} controls_i + \varepsilon_1 \end{cases}$$

Model 2:

$$\begin{cases} ROE_1 = \alpha_0 + \alpha_1 MSH + \alpha_2 OCD + \sum_{i=1}^6 \alpha_{i+2} controls_i + \varepsilon_2 \\ ROE_0 = \alpha_0 + \alpha_1 MSH + \alpha_2 OCD + \sum_{i=1}^6 \alpha_{i+2} controls_i + \varepsilon_1 \end{cases}$$

Model 3:

$$\begin{cases} ROE_0 = \alpha_0 + \alpha_1 MSH + \alpha_2 OCD + \alpha_3 MSH * OCD + \sum_{i=1}^6 \alpha_{i+3} controls_i + \varepsilon_2 \\ ROE_1 = \alpha_0 + \alpha_1 MSH + \alpha_2 OCD + \alpha_3 MSH * OCD + \sum_{i=1}^6 \alpha_{i+3} controls_i + \varepsilon_1 \end{cases}$$

(I)empirical analysis

(1) descriptive statistics

This paper based on the Information technology industry of China 2012-2016 Shanghai and shenzhen A share listed companies as the research object, and descriptive statistical analysis was conducted through SPSS24.0, as shown in table 2, which mainly included the distribution of the maximum, minimum, mean and standard deviation of each variable. The mean value of management shareholding is 0.0155, the minimum value is 0.000, and the maximum value is 0.167, indicating that the management shareholding ratio of Chinese Information technology enterprises is relatively low, which should have the effect of convergence of interests.

Table 2 descriptive statistical analysis table of variables

	N	minimum	The maximum	The mean	The standard deviation
ROE0	372	- 107.	011.	- 012.	005.
ROE1	372	- 140.	049.	- 023.	018.
MSH	372	000.	167.	0155.	281.
OCD	372	000.	1.000	312.	464.
FCR	372	000.	1.000	212.	410.
Lever	372	001.	996.	294.	187.
Size	372	18.674	24.153	21.171	889.
Ind	372	250.	667.	371.	058.
Growth	372	- 392.	14.575	366.	1.218

Source: according to SPSS24.0 statistics

(2) regression analysis

1. Regression analysis of management shareholding and M&A performance

Table 3 regression analysis results of the relationship between management shareholding and m&a performance

variable	ROE0		ROE0		ROE1		ROE1	
	Regression coefficient	P	Regression coefficient	P	Regression coefficient	P	Regression coefficient	P
FCR	028.	617.	012.	820.	- 003.	952.	- 030.	571.
Lever	- 079 *	046.	- 055 *	032.	- 079 *	048.	- 036 * *	001.
Size	- 027 *	029.	- 015 *	027.	- 070 *	033.	- 049 *	036.
Ind	107 *.	040.	119 *.	021.	- 076.	146.	- 096.	054.
Growth	008 * *	008	006 *.	028.	023 *.	04	021 *.	03

		.				6.		6.
Year	143 **	008	110 *.	043.	118 *.	03	059.	26
		.				0.		3.
MSH			182 **	001.			317 ***	00
								0.
R square	036.		067.		028.		123.	
Adjust the R square	020.		049.		012.		106.	
F value	2.253 *	038	3.726 ***	000.	1.721 *	01	7.261 ***	00
						5.		0.

Note: standardized regression coefficients of Beta, "***", "**", "*" respectively in 1%, 5% and 10% significance level.

Source: according to SPSS24.0 statistics

From the regression results in Table 3, it can be seen that with management shareholding as the independent variable and short-term M & A performance (ROE0) as the dependent variable. The control variables were first regression, and then management shareholdings were added for regression. The R-square of the model increased from 0.036 to 0.67, and F increased from 2.253 ($P < 0.05$) to 3.726 ($P < 0.01$). Both passed the F test, indicating that the model's fitting degree be improved, and the explanatory power of the model become more well. In addition, the regression coefficient of management shareholding is 0.182, and $P < 0.01$, indicating that management shareholding has a significant positive influence on short-term M & A performance. When the long-term M & A performance (ROE1) was used as the dependent variable, the R-square of the model increased from 0.028 to 0.123, indicating that the explanatory power of the model was improved, and F increased from 1.721 ($P < 0.05$) to 7.261 ($P < 0.001$), indicating that the model's fitting degree be improved, and the explanatory power of the model become more well. In addition, the regression coefficient of the management shareholding ratio is 0.317($P < 0.001$), indicating that management shareholding has a significant positive influence on the long-term M & A performance.

2. Analysis on the weakening effect of managerial overconfidence on management shareholding and M&A performance

Table 4 regression results of the weakening effect of managerial overconfidence on private gainsof control and M&A performance

variable	Model 2		Model 3	
	ROE0	ROE1	ROE0	ROE1
Lever	- 87 * (042).	-. 68 (036).	- 94 * (026).	- 76 * (25).
Size	52 * (. 032).	42 *. (035).	31 *. (024).	28 * (. 036).
Ind	- 013 * (0.047)	- 015 * (0.029)	-. 012 ** (003).	- 014 ** (0.008)
Growth	- 153 * (043).	49-206 * (.)	- 143 * (033).	- 212 * (048).
MSH	15.14 *** (42.32)	12.38 *** (38.28)	13.54 *** (40.85)	10.63 *** (36.71)
OCD	5.66 *** (56.83)	7.63 *** (60.26)	4.86 *** (52.60)	6.28 *** (56.64)
MSH* OCD			16.87 *** (24.63)	15.84 *** (26.58)
R square	032.	046.	036.	052.
Adjust the R square	018.	037.	021.	043.
F value	1.854 *	2.428 **	2.025 ***	1.754 ***

Note: standardized regression coefficients of Beta, " * * ", " * ", " * " respectively in 1%, 5% and 10% significance level.

Source: according to SPSS24.0 statistics

From the regression results of Model 2 in Table 4, it can be seen that management shareholding has a both significant positive correlation with short-term performance (ROE0) and long-term performance (ROE1). managerial overconfidence is significantly negatively related to M&A performance. Therefore, management shareholding is significantly positively related to M & A performance, and managerial overconfidence is significantly negatively related to M & A performance, which is consistent with the research conclusions of ZhihuaXie (2017) et al. Tested the research hypothesis H2.

From the regression results of Model 3 in Table 4, it can be seen that the interaction between managerial overconfidence and management shareholding is significantly negatively related to M & A performance, managerial overconfidence is significantly negatively related to M & A performance; management shareholding is significantly positively related to M & A performance. Therefore, managerial overconfidence has a significantly negative regulating effect on management shareholding and M & A performance. That is,

managerial overconfidence has a "weakening effect" on management shareholding and M & A performance. Tested the research hypothesis H3.

Conclusion

This paper adopts Shanghai and Shenzhen A share listed companies in China's information technology industry from 2012 to 2016 as samples. The results show:(1) management shareholding is significantly positively correlated with M&A performance. From the mean value of management shareholding, it can be seen that the management shareholding ratio of Chinese information technology enterprises is relatively low, belonging to 0-5% of the range effect. The results of this study to some extent support the hypothesis of interest convergence proposed by Jensen (1976). Because of interest convergence, managers tend to reduce on-the-job consumption, avoid excessive investment, reduce moral hazard, adverse selection and other opportunities that harm shareholders' interests, reduce agency problems, and thus improve the performance of mergers and acquisitions. Overconfidence of managers will weaken the positive impact of management shareholding on M&A performance, that is, the higher the overconfidence of managers, the lower the M&A performance of enterprises. This shows that although managers can be motivated by managerial shareholding and then their incentive to create wealth for shareholders can be enhanced, However, because of managerial overconfidence, they will often have cognitive bias when making decisions, so they are blindly confident when making M&A decisions, overestimating returns and underestimating risks, leading to the failure of M&A and damaging the wealth of shareholders. Therefore, the operation and management of company should not only implement incentive measures for managers from a rational perspective, but also prevent the harm of cognitive deviation caused by overconfidence of managers.

Based on the hypothesis of rational economic man, this paper studied the impact of management shareholding on M&A performance with Chinese information technology enterprises as the research object. Considering the limited rationality of people, this paper further discusses the weakening effect of managerial overconfidence on management shareholding and M&A performance by combining rationality with limited rationality. It not only enriches the research of behavioral finance in mergers and acquisitions to a certain extent, but also provides a new theoretical basis and guiding significance for the impact of managers' limited rationality on mergers and acquisitions.

Research limitations and future research prospects of this paper

This paper mainly studies the first type of agency problem, and the theoretical premise for the first type of agency problem is: information asymmetry, separation of management right and ownership, and dispersion

of equity. Therefore, this research conclusion may have a certain explanatory power for the listed companies with dispersed equity; while for the second kind of agency problem, there is no further study on the "tunneling behavior" of the major shareholders against the minority shareholders. Therefore, in the future research, it is necessary to further expand the research field and consider the impact of the second type of agency problem on the performance of M&A.

In addition, although this paper combines rationality with limited rationality to study the influence of managerial overconfidence and management shareholding on M&A a performance, the internal mechanism behind it has not been further studied. Therefore, the internal mechanism behind the influence of management shareholding on M&A performance needs further exploration and research.

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