The Influence of Managerial Overconfidence and Goodwill Impairment Under Information Management Based on Stata Data Model

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Abstract—Information management provides a good development environment for the era of big data and is also the core of modern enterprise management. It has risen from the traditional technical information to the management strategic level of the enterprise and penetrated into all links of enterprise operation and operation. Managers use a more scientific and reasonable information management system to effectively control the future development of the enterprise, Information management plays an important role in management mode and business decision-making. This paper digitizes the management overconfidence using the enterprise data, analyzes its impact on the impairment of enterprise goodwill, verifies it through the methods of empirical tests such as logit test and Sobel test, constructs an intermediary model with Stata software, analyzes the influencing factors of them, and verifies that the management overconfidence has a positive impact on the impairment of enterprise goodwill, There is an intermediary effect between Manager Overconfidence and goodwill impairment. Based on the empirical test, this paper aims to analyze that the enterprise data in the information management system is more transparent, managers can refer to more information data in business decision-making, and scientific information management is conducive to the long-term development of enterprises.

Keywords-Information management; Business operation; Manager Overconfidence; Impairment of goodwill

1 INTRODUCTION

The advent of the big data era makes more people realize the importance of information digitization, and managers in enterprises are no exception. Enterprise information management has the initial information technology extended to the strategic level of future development. Enterprises are constantly changing and updating. Information management plays an indelible role in enterprise daily operation and tactical decision-making. Information management belongs to the advanced production mode of enterprises. Whether in financial reporting, human resources or internal control, making the information of all links of enterprises transparent will help managers understand the problems existing in the operation and management of enterprises, improve management efficiency and promote long-term development.

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The frequent occurrence of M & A leads to the huge goodwill formed in the process of M & A facing the risk of goodwill impairment. As an irrational factor, managers' overconfidence is easy to cause goodwill impairment due to over believing in the ability of the target company and overestimating the rate of return on investment in the process of M & A. Use enterprise data to process managers' overconfidence, so as to better test whether it can have an impact on enterprise goodwill; In the process of M & A, the unequal information between the two sides will also increase the risk, and the signing of performance commitment can reduce the risk of information asymmetry. We use Stata software to build an intermediary model to test whether there is an intermediary effect. Therefore, managers can use information management to make decisions more in line with the future development of enterprises, and use scientific and reasonable information management methods to improve the operation efficiency of enterprises.

2 RESEARCH HYPOTHESIS

2.1 Overconfidence of managers and impairment of goodwill

Zheng Ruikun (2006) studied the consequences of managers' overconfidence and found that if enterprise managers have overconfidence, enterprises will have a great impact on M & A decisions such as the selection of M & A target companies and financing channels. The results show that overconfident managers can not better control the risks in the process of M & A [1]. Gu F. and LEV B. (2011) found that the real reason for goodwill impairment is the irrational M & A behavior of enterprises [2]. Later, pan ailing (2018) found that the cognitive deviation of managers is an important factor in high goodwill M & A [3]. The more confident managers form higher goodwill in the process of M & A, which undoubtedly increases the risk of goodwill impairment.

Managers' overconfidence is characterized by overestimating their ability, believing that they have the ability to control the development direction of things, and maintaining an overly optimistic attitude towards the future; When making M & A decisions, increase the risk of goodwill impairment in the future. High goodwill is the direct source of goodwill impairment, and the psychology of managers' overconfidence affects the formation of goodwill in M & A. will the degree of managers' overconfidence affect the degree of goodwill impairment? Use enterprise data to make managers' overconfidence transparent, and test the relationship between them. This paper puts forward the hypothesis:

H1: Under the background of information management, managers' overconfidence is positively correlated with goodwill impairment.

2.2 Overconfidence of managers and performance commitment

Brian Cadman et al. (2014) believe that performance commitment plays an incentive role to a certain extent, but it is not conducive to the long-term sustainable development of enterprises [4]. Wang Jingda and fan Qingquan (2017) found that the compliance rate of performance commitment in the previous period is higher than that in the later period [5]. What is associated with high performance commitment is high valuation and high goodwill, which will bring losses to investors.

Rational managers will better weigh the pros and cons, and can better compare the risks and benefits when making M & A decisions. Overconfident managers are more conceited and optimistic about everything around them than rational managers. In the process of M & A, the signing of performance commitment can reduce information asymmetry and contribute to the effective development of M & A activities. However, whether the performance commitment can be completed should also be considered according to the actual situation to avoid that the commitment party is unable to realize due to too high commitment. Due to the overconfidence of managers, they believe that the target company is capable of fulfilling the performance commitment, resulting in the failure to realize the commitment; Whether the reason for the low completion rate of performance commitment is related to the irrational factors of managers during M & A. Manager Overconfidence, an irrational factor, can be measured in the environment of enterprise information scientific management, and performance commitment itself has the characteristics of informatization. This paper puts forward that:

H2: Manager Overconfidence is negatively correlated with the completion proportion of performance commitment.

2.3 Mediating effect of performance commitment

Christian (2012) believes that the gambling agreement can effectively reduce the uncertainty of information, and can also conduct valuation, determine the transaction price, and decide whether to conduct the transaction [6]. Yu Chengyong and Yu Jinjin (2017) found that performance commitment will increase the premium rate, resulting in high goodwill and goodwill impairment [7]. According to the information asymmetry theory and signal transmission theory, the acquirer can estimate according to the commitments made by the acquiree, predict the possibility of realization, and then decide whether to carry out M & A, which can reduce the risks and losses faced by M & A. In the previous analysis, the behavior of managers' overconfidence affects M & A decisions, and the increase of valuation premium rate leads to the impairment of huge goodwill. At the same time, the completion of the performance commitment agreement signed by M & A also shows a state of over trust. This paper conjectures that performance commitment is a bridge connecting the impairment of goodwill caused by managers' overconfidence. Manager Overconfidence makes the completion degree of performance commitment signed in the process of M & a not very good, resulting in goodwill impairment. This paper puts forward that:

H3: performance commitment has an intermediary effect in the relationship between Manager Overconfidence and goodwill impairment.

3 RESEARCH DESIGN

3.1 Sample selection and data sources

This paper selects the data of gem from 2010 to 2019 as the initial sample, and processes the data as follows: (1) eliminate the cases of transaction failure in M & A events; (2) Delete the M & A samples under the same control for the purpose of backdoor listing; (3) Delete financial and insurance events; (4) In order to facilitate the unification of statistics and data, delete the

samples of commitment items that are not net profits and are cumulative or total net profits. In order to ensure the integrity of the data, manually search and supplement the uncluttered and published data in the database; The tail of all continuous variables in this paper is reduced to avoid the influence of extreme values. The data processing is completed by Excel, and the model is constructed by Stata software for empirical analysis.

3.2 Variable definition

Using information management to define the overconfidence of managers, among which the relative proportion of salary and shareholding change are the most measured by scholars, as well as the frequency of M & A and whether the management can accurately predict future profits. According to the management method of enterprise informatization, the degree of transparency, the authenticity of data acquisition and the market situation, this paper selects the relative proportion of salary to measure, and uses the sum of the top three salaries of the management divided by the total salary of all the management to calculate the Manager Overconfidence (Overconf). As the third variable, "performance commitment" is used to explore the role of performance commitment in the impact of Manager Overconfidence on goodwill impairment. This paper sets a continuous variable "commitment completion ratio (VAM-C)", that is, the completion rate of performance commitment, which is measured by dividing the actual performance of the current year by the promised performance of the current year. The explanatory variable of this paper is goodwill impairment. According to the operation time, scale and industry foundation, in the data analysis, the "goodwill impairment degree" is used to represent the goodwill impairment, and the goodwill impairment degree (GW-C) is measured by the ratio of the amount of goodwill impairment to the total assets.

In order to increase the fitting degree of the model, selecting the company size (Size), total asset net profit margin (ROA), growth rate of operating revenue (Growth), asset liability ratio (LEV), cash flow from operating activities (Cash), Tobin Q value (Tobin Q) as a control variable, two dummy variables, industry (Ind) and year (Year), are added. The specific measurement methods of variables are shown in Table 1:

Table 1 Definition and Measurement of Variables

Variable type	Variable name	Symbol	computing method
Explanatory variable	Overconfidence of managers	Overconf	Sum of top three salaries of management / total salary of management
	Performance commitment	VAM-C	Actual performance in year t / committed performance in year t
Explained variable	Impairment of goodwill	GW-C	Goodwill impairment amount / total assets at the beginning of the year
control variable	Enterprise scale	Size	Natural logarithm of total assets
	Net profit margin of total assets	ROA	Net profit/ total assets
	Growth	Growth	Annual operating revenue - (t-1) annual operating revenue / (t-1) annual operating revenue

	Asset liability ratio	LEV	Total liabilities / total assets
	cash flow	Cash	Net cash flow from operating activities / total assets
	Tobin Q	Tobin Q	Total market value at the end of the period / total assets at the end of the period
	industry	Ind	Setting virtual variables by industry
	Year	Year	Setting virtual variables by Year

3.3 Model building

The following models are constructed: (1) test the relationship between managers' overconfidence and goodwill impairment; Model (2) tests the effect of managers' overconfidence on the proportion of commitment completion; Model (3) is an intermediary model to test the intermediary effect. It is set up according to the stepwise regression method of intermediary effect to test whether the commitment completion proportion has an intermediary effect in the relationship between Manager Overconfidence and goodwill impairment.

$$GW-C = b_0 + b_1 Overconf + b_2 Size + b_3 ROA + b_4 Growth + b_5 LEV + b_6 Cash + b_7 TobinQ + \sum Industry + \sum Year + \varepsilon_1$$

$$VAM-C = c_0 + c_1 Overconf + c_2 Size + c_3 ROA + c_4 Growth + c_5 LEV + c_6 Cash + c_7 TobinQ + \sum Industry + \sum Year + \varepsilon_2$$

$$GW-C = d_0 + d_1 Overconf + d_2 VAM-C + d_3 Size + d_4 ROA + d_5 Growth + d_6 LEV + d_7 Cash + d_8 TobinQ + \sum Industry + \sum Year + \varepsilon_3$$

4 EMPIRICAL ANALYSIS

4.1 Descriptive statistics

Table 2 is the descriptive statistics of related variables in this paper. The minimum value of is 0.276, and the maximum value is 0.615, which shows that there are great differences in overconfidence of managers in GEM listed companies in China. Most enterprises are in the middle position, and some enterprises have extreme situations beyond the average level. The average value of goodwill impairment (GW-C) is 0.039, the minimum value is 0.001, and the maximum value is 0.221, indicating that different companies have different degrees of goodwill impairment, and there is a large gap in the amount of goodwill impairment. The average value of performance commitment completion ratio (VAM-C) is 54.516, which indicates that only nearly half of the samples have fulfilled their commitments; the difference between the maximum and the minimum is 142.74, which indicates that the implementation of commitments after M & A is not optimistic. Some enterprises have overfulfilled their commitments while some enterprises have suffered losses. Among the control variables, the minimum values of ROA, Growth and Cash are negative, which indicates that the business status of enterprises with goodwill impairment is not very good; the average value of LEV is 0.036, which indicates that there is little difference in the assets and liabilities of enterprises; the standard deviation of Tobin Q is 0.934, which is the most volatile of the control variables, and there is a certain gap in the performance of enterprises.

Table 2 Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Overconf	1463	0.427	0.093	0.276	0.615
VAM-C	1463	54.516	49.752	-19.87	122.87
GW-C	1463	0.039	0.061	0.001	0.221
Size	1463	21.957	0.69	20.749	23.154
ROA	1463	-0.001	0.096	-0.299	0.085
Growth	1463	0.239	0.329	-0.299	1.035
LEV	1463	0.363	0.148	0.105	0.617
Cash	1463	0.025	0.046	-0.055	0.115
Tobin Q	1463	2.018	0.934	1.105	4.497

4.2 Correlation analysis

In order to test the correlation between variables, this paper makes a correlation analysis. The correlation coefficient between Manager Overconfidence and the degree of goodwill impairment is 0.1785, and the correlation coefficient with the completion proportion of performance commitment is -0.1594, which lays a logical foundation for studying the relationship between the three variables. In this paper, the Vif test of variables is carried out. The Vif value of each variable is about 1, and the average Vif value is 1.29, which proves that there is no multicollinearity.

Table 3 Correlation Analysis

	Overconf	VAM-C	GW-C	Size	ROA	Growth	LEV	Cash	Tobin Q
Overconf	1								
VAM-C	-0.1594***	1							
GW-C	0.1785***	-0.2672***	1						
Size	-0.1460***	0.2344**	-0.1270***	1					
ROA	-0.0841**	0.2483***	-0.8140***	0.0654	1				
Growth	0.0344**	0.2586***	-0.2132***	0.0964**	0.1986***	1			
LEV	-0.0041	0.0177	0.0622**	0.4447***	-0.1918***	0.0493	1		
Cash	0.1029***	0.0373	-0.0252	-0.0433	0.1735**	-0.2453***	-0.1445***	1	
Tobin Q	0.0305	-0.1142***	-0.1264***	-0.3748***	0.2590***	-0.1042***	-0.1380***	0.1168***	1

4.3 Regression analysis

Table 3 is the comprehensive results of multivariate regression. The model (1) tests the relationship between managerial overconfidence and goodwill impairment, the coefficient of overconf is 0.0699, the significant level is 0.1%, which verifies the correctness of hypothesis 1, that is, the higher the degree of managerial overconfidence, the greater the degree of goodwill impairment. In the control variables, the significance of ROA is the highest, and the coefficient is -0.515, which is significant at the level of 0.1%, indicating that ROA has a negative impact on goodwill impairment, that is, the higher the ratio of net profit margin of total assets, the smaller the extent of goodwill impairment; LEV has a negative correlation with goodwill impairment at the level of 1%, and Growth and Cash have a negative correlation with goodwill impairment.

The coefficient of overconf in model (2) is - 99.98, which is significant in the case of 0.1%. It proves that there is a negative correlation between managers' overconfidence and the proportion of commitment completion, which verifies the correctness of hypothesis 2, that is, the more overconfident managers are, the lower the proportion of commitment completion. The regression results also show that the growth of operating revenue (Growth) has a greater impact on the proportion of commitment completion, which is significant when the coefficient is 28.06 and 0.1%; the net profit margin of total assets (ROA) is positively correlated with the proportion of commitment completion at the level of 1%; Cash is positively correlated with the proportion of commitment completion, and the higher the cash flow of operating activities, the higher the proportion of commitment completion.

On the basis of the two regression models (1) and (2), this paper uses the idea of stepwise regression to test hypothesis 3 and test the mediating effect of performance commitment. On the basis of the previous test, the regression results of model (3) show that overconf and VAM-C are significant at the same time, which confirms that performance commitment has a mediating effect in the impact of managerial overconfidence and goodwill impairment. The coefficient of overconf is smaller than that of model (1), which further confirms the mediating effect of performance commitment. Among the control variables, ROA, LEV and Cash are relatively more significant in the regression. In the overall regression, the regression coefficient of ROA is -0.513, indicating that the lower the net profit margin of total assets, the higher the extent of goodwill impairment; LEV is also negatively correlated with goodwill impairment.

Table 4 Multiple Regression Results

	Model (1) **GW-C**	**Model (2)** **VAM-C**	**Model (3)** **GW-C**
Overconf	0.0699*** (3.68)	-99.98*** (-3.91)	0.0672*** (3.47)
VAM-C			-0.00272* (-0.75)
Size	0.0018 (0.53)	3.626 (0.79)	0.0019 (0.56)
ROA	-0.515*** (-25.19)	87.29** (3.17)	-0.513*** (-24.77)
Growth	-0.00363 (-0.63)	28.06*** (3.63)	-0.00287 (-0.49)

LEV	-0.0412** (-3.04)	-4.006 (-0.22)	-0.0413** (-3.04)
Cash	-0.0922* (-2.30)	67.88 (1.25)	-0.0940* (-2.34)
Tobin Q	0.00459 (1.52)	7.486 (1.83)	0.00439 (1.44)
_cons	-6.177 (-1.62)	-13.75 (-0.13)	-0.0655 (-0.84)
Ind	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	1463	1463	1463
R-sq	0.754	0.332	0.757
adj. R-sq	0.728	0.261	0.723

* p<0.05, ** p<0.01, *** p<0.001

4.4 Robustness check

In order to test the robustness of the results, the explained variable goodwill impairment is changed into 0-1 dummy variable, and logit regression test is used. The test results are shown in Table 4. In order to further test the mediating effect, the Sobel test is used to verify. The test results are shown in Table 5. The test conclusion is consistent with the previous paper, which verifies the robustness of the results in this paper.

Table 5 Logit Test

GWD	Coef.	St.Err.	t-value	p-value	[95%Conf	Interval]	Sig
Overconf	1.051	0.613	1.72	0.086	-0.150	2.252	*
Size	0.780	0.106	7.37	0.000	0.573	0.988	***
ROA	-26.123	2.229	-11.72	0.000	-30.492	-21.755	***
Growth	-1.648	0.187	-8.82	0.000	-2.015	-1.282	***
LEV	-0.012	0.463	-0.03	0.979	-0.919	0.895	
Cash	4.052	1.468	2.76	0.006	1.174	6.929	***
TobinQ	-0.107	0.067	-1.60	0.110	-0.238	0.024	
Constant	-16.947	2.337	-7.25	0.000	-21.528	-12.367	***
Mean dependent var		0.215	SD dependent var			0.411	
Pseudo r-squared		0.196	Number of obs			2154.000	
Chi-square		439.583	Prob > chi2			0.000	
Akaike crit. (AIC)		1818.474	Bayesian crit. (BIC)			1863.875	

Table 6 Sobel Test

	Coef	Std Err	Z	P>|Z|
Sobel	0.00343324	0.0027201	1.262	0.020688532
Goodman-1 (Aroian)	0.00343324	0.0028379	1.21	0.022636615
Goodman-2	0.00343324	0.0025969	1.322	0.018615523
	Coef	Std Err	Z	P>|Z|
a coefficient	-71.4026	23.315	-3.06252	0.002195
b coefficient	-0.000048	0.000035	-1.3853	0.0165961
Indirect effect	0.13433	0.00272	1.26218	0.00206885
Direct effect	0.59996	0.017439	3.44035	0.000581
Total effect	0.73429	0.017279	3.67082	0.000242
Proportion of total effect that is mediated:			0.1829386	
Ratio of indirect to direct effect:			0.2238983	
Ratio of total to direct effect:			1.2238983	

5 CONCLUSION AND SUGGESTION

Using Stata software, this paper empirically analyzes the positive relationship between managers' overconfidence and goodwill impairment in the environment of information science management, constructs an intermediary test model, and analyzes that there is an intermediary effect in the proportion of performance commitment. Information management quantifies the irrational factor of managers' overconfidence through enterprise data, which can further analyze its specific impact on enterprise production, operation and management, which is enough to prove the importance of scientific information management in improving the core competitiveness of enterprises.

In the future development strategy of enterprises, information management must be the premise of development. Information management optimizes the allocation of various resources of the enterprise, maximizes the benefits of the enterprise, quickly understands the development status of the enterprise through business data and financial information, and makes the best decision. Enterprise operation and information management complement each other. More data are needed to support enterprise operation decisions, and information management is more in line with the requirements of the big data era. Contemporary enterprises should build the thinking of enterprise information management, realize the timely sharing of data among various departments, and be able to use data for intelligent analysis after mastering each other's information; At the same time, the construction of information management is a long-term work, which affects the managers' business philosophy, thinking mode and strategic objectives. Enterprises actively improve the corresponding information management technology, so that information management can play a greater value in enterprise management.

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