

Research on Financial Risk Factors under the Perspective of Cross-border Mergers and Acquisitions of Chinese Enterprises

Tianyu Luo*

School of Statistics & Mathematics, Zhongnan University of Economics and Law, Wuhan, Hubei, 4300073 China

*Corresponding author's e-mail: Codty1@outlook.com

Abstract: Chinese enterprises are increasingly participating in cross-border mergers and acquisitions (M&A). However, due to the complexity of the M&A process, poor decision-making often leads to financial risks after the completion of the M&A. Therefore, this study aims to explore the influencing factors of financial risks in cross-border M&A. The research selected 67 listed companies that engaged in cross-border M&A transactions from 2018 to 2021 as the research sample. The Z-score model was utilized to measure financial risks, and a financial risk influencing factor index system was constructed based on literature research and factor analysis to assess the financial risk status and influencing factors before and after cross-border M&A transactions. The findings of this study reveal that cross-border M&A significantly increases financial risks for enterprises, and the payment and financing stages are key factors influencing the financial risks of cross-border M&A transactions.

Keywords: Cross-border M&A, Financial risks, Influencing factors.

1. Introduction

Under the tide of globalization, a large number of cross-border merger and acquisition transactions have taken place among enterprises around the world. At the same time, as China's opening up process is getting deeper and deeper, and its economic ties with the world are getting closer and tighter, many Chinese enterprises have started seeking cross-border M&A opportunities to explore markets and develop businesses. China currently has one of the world's largest sovereign wealth funds - China Investment Corporation, as well as the world's four largest banks, which gives Chinese enterprises strong confidence in mega-sized M&A deals. Meanwhile, the scale of M&A in China is also expanding rapidly. From 2010 to 2022, the scale of M&A in China has increased from \$49 billion to \$349.4 billion, although the number of M&A deals has stalled to some extent in recent years due to political instability and the pandemic. But it can be seen that China's outward investment is showing a positive trend.

At the same time, one of the characteristics of cross-border M&A deals is that they involve large amounts and there are many information asymmetry problems. There are also significant differences in the ways enterprises operate and their cultures between different economic entities, all of these risk factors will affect the efficiency and results of cross-border M&As, and most importantly the post-M&A operation of the enterprises[1]. At the same time, financial risks are the major concern of enterprises during M&As, because financial risks often relate to the life and death of enterprises and are crucially important to the healthy development and stability of enterprises. Therefore, it is necessary to study the financial risk factors in M&As in order to provide reference for enterprises' control over financial risks during M&As.

2. Literature Review

Scholars have mainly carried out research on the sources of

financial risks, risk assessment methods and financial risk control in the field of M&A. Wei studied that the financial risks in the M&A process included decision-making risks, implementation risks and integration risks[2]. Mantecon studied the uncertain factors of transnational M&As, and separately analyzed the potential operating mechanisms of contingent payments, joint ventures and trust investments in reducing uncertainties in transnational M&As[3]. Lulian and Liviu assessed the cultural factors that need special attention in M&As, emphasizing that significant cultural differences between companies can lead to financial risks[4]. Joshi used Altman's Z-Score model and multiple regression to analyze the financial performance of selected public sector banks in India[5]. Koi-Akrofi found that enterprise financial integration plays a decisive role in M&A results, and factors such as political, policy and cultural differences will affect the effectiveness of communication between the acquirers during the M&A integration stage. Currently, research on transnational M&As in academia still focuses mainly on drawing conclusions through case studies, but due to large differences in individual M&A cases, most research results are not applicable to overall M&A risk control, and more samples are needed to provide support[6].

3. Method

3.1. Sample Selection and Data Sources

This paper selects 65 M&A deals conducted by 63 Chinese listed companies between 2018 and 2021 as the research sample. The screening criteria are as follows:

Exclude samples where the acquirer is not an A-share listed company in China.

Exclude samples without disclosed cross-border transaction amounts.

Exclude samples of companies that have just gone public and have incomplete financial disclosure data.

The sample enterprises did not face risks of operational bankruptcy before conducting cross-border M&As.

Finally, 63 Chinese listed companies and their 65 M&A deals are screened. The event window is set as [-1, +2]. T represents the M&A year, and the financial conditions of T-1, T, T+1, T+2 are analyzed and compared.

3.2. Dependent Variable

3.2.1. Z-Score

The Z-score model was first proposed by Altman and is commonly used to evaluate a company's financial condition and predict financial distress. The Z-score model calculates an overall risk score for the company by assigning different weightings to various financial ratios.

The calculated Z-score is negatively correlated with the financial risks facing the enterprise, meaning the smaller the Z-score, the greater the financial risks, and the larger the Z-score, the better the company's financial situation.

The specific formula for calculating the revised Z-score is:

$$Z=0.717X_1+0.847X_2+3.107X_3+0.420X_4+0.998X_5 \quad (1)$$

Table 1. Descriptive statistics of Z-values for each year

Z	Mean	Variance	Max	Min
T-1	2.50620	13.9085	20.0626	-0.79944
T	2.59637	3.07001	29.5897	0.214645
T+1	2.27729	2.75471	9.75759	-0.28983
T+2	2.10821	8.56485	9.94015	0.425429

The calculation results show that the average Z-score of enterprises was about 2.5 in the year before the M&A occurred. The Z-score rose slightly to about 2.59 in the year of the M&A. However, the level of enterprise Z-scores declined year by year in the two years after the M&A, indicating that the financial risks of enterprises after M&A will gradually increase over time.

3.3. Explanatory Variables

The main sources of financial risks in M&As are pricing

risks, financing risks, payment risks, and integration risks. Where X_1 = working capital/total assets, reflecting the liquidity and scale of assets; X_2 = retained earnings/total assets, reflecting the accumulation of profitability; X_3 = earnings before interest and taxes/total assets, reflecting the level of asset utilization; X_4 = the total market value of shareholders' equity/total liabilities, measuring the stability of the financial structure; X_5 =sales/total assets, reflecting the efficiency and profitability of asset utilization.

According to the Z-score calculation formula, X_1 can reflect the scale of assets and short-term solvency of the enterprise; X_3 and X_5 can measure the utilization efficiency and level of corporate assets; X_2 and X_5 reflect the profitability of the enterprise; X_4 reflects the stability of the enterprise's financial structure. The above 5 financial ratios comprehensively reflect the financial position of the enterprise. The Z-score model can well quantify the financial risks faced by the enterprise.

However, due to the existence of information asymmetry in pricing factors and the complexity of enterprise value evaluation, this paper mainly selects explanatory variables from three aspects: payment factors, financing factors and financial integration factors. An index system of factors affecting financial risks is constructed as follows:

Table 2. Influencing factor indicators

Cash Payment Factors	X_1 : Liquidity Ratio	Current Assets/Current Liabilities
	X_2 : Quick Ratio	Liquid Assets/Current Liabilities
	X_3 : Cash Ratio	Cash and Cash Equivalents at Period End/Current Liabilities
	X_4 : Earnings per Share	Net Profit/Total Shares
Equity Financing Factors	X_5 : Net Cash Flow from Operating Activities per Share	Net Cash Flow from Operating Activities/Total Shares
	X_6 : Return on Equity	Net Profit/Average Shareholders' Equity
	X_7 : Net Profit Margin	Net Profit/Operating Revenue
Financial Integration Factors	X_8 : Return on Total Assets	Net Profit/Average Total Assets
	X_9 : Growth Rate of Net Profit	(Net Profit for the Current Period - Initial Net Profit)/Initial Net Profit

4. Factor Analysis

Factor analysis was proposed by the British scholar C.E. Spearman. It is a method of extracting common factors from variables that can simplify multiple variables. This study aims to extract common factors from the 9 influencing factors as explanatory variables to analyze the impact factors of financial risks in cross-border mergers and acquisitions (M&As).

This study extracted factors through Stata software by

accumulating the variance contribution rate exceeding 85%. After factor rotation, the 9 indicators were compressed and integrated into three major risk indicators. According to the rotated factor loading matrix, the characteristic represented by each factor can be clearly demonstrated, and the types of the three major risk indicators can also be defined through data.

Table 3. Rotated factor loading matrix

	T			T+1			T+2		
	1	2	3	1	2	3	1	2	3
X ₁	0.976	0.12	0.038	0.121	0.982	0.038	0.1	0.951	0.038
X ₂	0.972	0.163	0.003	0.13	0.968	0.025	0.092	0.959	0.029
X ₃	0.949	0.205	-0.038	0.153	0.961	-0.019	0.19	0.949	-0.023
X ₄	0.317	-0.368	0.781	0.9	0.127	0.6763	0.701	0.373	0.228
X ₅	0.167	0.765	0.855	0.822	0.164	0.8832	0.218	0.582	0.435
X ₆	0.011	0.816	0.464	0.932	-0.01	0.113	0.941	-0.059	-0.013
X ₇	0.62	0.626	0.134	0.815	0.413	0.185	0.687	0.514	0.155
X ₈	0.254	0.864	0.266	0.931	0.176	0.097	0.933	0.206	0.135
X ₉	0.018	0.834	-0.223	0.078	0.023	0.983	-0.31	-0.001	0.923

According to the table, in the M&A occurrence year, the loadings of X₁ liquidity ratio, X₂ quick ratio and X₃ cash ratio on the first common factor are 97.6%, 97.2% and 94.9% respectively. Therefore, the first common factor can be considered as the representative of these three influencing factors, and can be used to explain the risks in the payment link during M&As. It can be defined as the payment factor.

The loadings of X₄ earnings per share and X₅ net cash flow from operating activities per share on the third common factor can reach 78.1% and 85.5% respectively. Therefore, it can be considered that the third factor can explain the financing risks

in cross-border M&As, and it can be defined as the financing factor.

The loadings of X₆, X₇, X₈, X₉ on the second common factor are 81.6%, 62.6%, 86.4%, 83.4% respectively. Therefore, it can be considered that the second factor reflects the profitability level of enterprises and can explain the financial integration risks after M&As. It can be defined as the integration factor. Therefore, we obtained three main influencing factors: payment factor, integration factor and financing factor.

Based on the rotated factor loadings, the factor score matrix is calculated as follows:

Table 4. Factor score matrix

Variable	T			T+1			T+2		
	Factor1	Factor2	Factor3	Factor1	Factor2	Factor3	Factor1	Factor2	Factor3
X1	0.34455	-0.13295	0.0611	0.342	-0.068	0.011	0.304	-0.095	0.009
X2	0.33499	-0.10754	0.02087	0.341	-0.065	-0.002	0.308	-0.1	-0.0323
X3	0.31525	-0.07691	-0.02543	0.332	-0.053	-0.047	0.291	-0.059	-0.051
X4	-0.03448	0.30077	-0.11023	-0.045	0.251	-0.126	0.025	0.229	-0.131
X5	-0.09522	0.36888	-0.47311	-0.024	0.226	-0.145	0.164	0.005	-0.352
X6	-0.12018	0.25795	0.2637	-0.101	0.262	0.046	-0.154	0.388	0.031
X7	0.1249	0.1301	0.03159	0.063	0.18	0.118	0.074	0.204	0.112
X8	-0.04832	0.27289	0.08691	-0.034	0.243	0.027	-0.064	0.347	0.01287
X9	0.01838	-0.09547	0.7667	-0.017	-0.049	0.966	0.044	-0.125	0.8322

This study obtains the scoring function of each factor for the three years based on the factor score matrix, and calculates the scores of each factor for individual sample listed companies to obtain the data. The obtained data will be applied in subsequent data analysis

5. Result

To study the impact of Chinese enterprises' cross-border M&As on financial risks, this study takes the payment factor, integration factor and financing factor as the main risk influencing factors, while introducing relevant control variables to establish a regression model:

$$Z = \alpha + TYPE1\beta_1 + TYPE2\beta_2 + TIME\beta_3 + PRO\beta_4 + OC\beta_5 + SCALE\beta_6 + AGE\beta_7 + PF\beta_8 + FF\beta_9 + IF\beta_{10} + \varepsilon \quad (2)$$

Where Z is the financial risk, ε is the disturbance term, PF is the payment factor, FF is the financing factor, IF is the integration factor. PF, IF, FF are respectively the common factors extracted by factor analysis. OC is the equity concentration degree, PRO is the nature of the enterprise,

AGE is the age of the enterprise, TYPE1 indicates whether it is a horizontal merger, TYPE2 indicates whether it is a vertical merger, TIME is the transaction time, SCALE is the transaction scale.

The results show that the P values of the regression results for the three observation periods are all 0.000, indicating that the model is significant. And the R values of the model within the three observation periods are all above 0.67, indicating that the model fit is high and the explanatory variables can to a large extent explain the explained variables.

According to the regression results, the payment factor significantly affected the financial risks of M&As in these three years after the M&A and was positively correlated with financial risks. This indicates that the payment ability of enterprises to some extent is a good signal of sound financial situation of enterprises. Using cash payments is based on its strong financial foundation. At the same time, it also sends positive signals to investors to enhance investors' confidence, thus exerting a positive impact on their performance. Enterprises with stronger liquidity as a means of payment can be considered to have better control over financial risks with more reliable current assets and a lower possibility of financial crises.

Table 5. Regression results

Z	T		T+1		T+2	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
TYPE1	0.06	0.09	0.023	0.1	-0.329	-1.22
TYPE2	0.729	0.91	0.716**	2.66	0.407	1.32
TIME	0.001	0.59	0.001	1.02	0.001	0.81
PRO	-0.705	-0.81	-0.445	-1.44	-0.529	-1.49
OC	0.969	0.54	0.298	0.4	1.478*	1.74
SCALE	15.508***	4.67	4.985***	7.22	5.022***	3.89
AGE	0.002	1.63	0.013	1.25	0.003**	2.58
PF	0.734***	3.99	0.563***	12.8	0.749***	5.76
FF	0.2	0.32	0.403***	3.07	0.933*	1.99
IF	-0.043	-0.57	0.031***	4.53	0.093	1.41
Constant	-2.1	-1.42	0.129	0.27	-0.884	-1.54
R ²	0.677		0.836		0.756	
F	11.304		27.592		16.716	
Sig	0.000		0.000		0.000	

The financing factor passed the significance test of 1% and 10% respectively in the first and second years after the M&A, and the equity financing factor was positively correlated with financial risks. It can be considered that equity financing can greatly alleviate the pressure on corporate liquidity and complete M&As in a more cost-effective and flexible way to ensure the normal operation and development of the acquirer itself. Therefore, compared with M&As with lower proportion of equity financing, acquirers with higher proportion of equity financing tend to have healthier financial conditions after M&As.

The integration factor had positive regression coefficients in the second year after M&A and passed the 1% significance test in the second year. The integration ability of enterprises is often linked to their own profitability, operational level and M&A experience. The stronger the integration ability, the more it can achieve a soft landing of M&A transactions and realize the designed expected effects after M&A to avoid financial risks brought by M&A frictions.

Some control variables showed extremely strong significance. The transaction scale factor had positive coefficients in the three regression years and passed the 1% significance test, indicating that the larger the scale of M&A transactions, the more resources the enterprises can integrate from the targets, which can greatly obtain value from the targets and is conducive to the financial health and self-development of enterprises.

6. Conclusion

This paper uses the Z-score model to quantify the level of financial risks for enterprises after M&As. From the statistical results, due to the extremely complex processes before and after M&As and the significant impacts on enterprises' business operations, the financial risks of Chinese enterprises will gradually increase after M&As.

In the M&A process, the financing and payment links have significant impacts on the financial health of enterprises. Cash payments and increased financing can reduce financial risks. Chinese enterprises with strong integration capabilities tend to better respond to and manage the subsequent development of enterprises after major transactions and achieve soft landings in financial conditions.

At the same time, when Chinese enterprises reach a

relatively mature stage of development and realize M&As of a certain scale, it is a relatively healthy time point and can optimize M&A returns.

Based on the research results, it is believed that enterprises should formulate corresponding plans in advance to address potential financial risks in M&As. In the payment link, appropriate payment methods need to be selected to avoid affecting the liquidity level of enterprises and neglecting other aspects. At the same time, financing channels should be actively expanded and financial instruments such as trust financing flexibly adopted to control M&A costs. The way and scale of enterprise financing will greatly affect its own financial conditions, which requires comprehensive consideration of demand and financial structure. Risks of debt repayment can be reduced through asset securitization and other measures during the M&A process to optimize the financial conditions. The integration process can be said to be the most important part of M&A transactions. Enterprises should seek a path of joint development with the acquired enterprises, reasonably complete the merger and integration of financial organizations and assets and liabilities after M&As, and ensure financial risk factors in the early development period to lay a foundation for sound finances.

References

- [1] Hopkins, H. D., Chaganti, R., Kotabe, M. & Co-editors. (1999). Cross-border mergers and acquisitions: global and regional perspectives. 5(3), 207-239.
- [2] Wei, N. (2010). Financial risk control in M&A. International conference on management science and safety engineering.
- [3] Mantecon, T. (2009). Mitigating risks in cross-border acquisitions. *Journal of Banking & Finance*, 33(4), 640-651.3
- [4] Warter, I. & Warter, L. (2017). Cultural due diligence in m&a. importance of soft risks factors. *Annals of Spiru Haret University, Economic Series*, 17(2), 38-61.
- [5] Joshi, M. K. (2020). Financial performance analysis of select indian public sector banks using altman's z-score model. *SMART Journal of Business Management Studies*, 16(2), 74.
- [6] Koi-Akrofi, G. (2016). Mergers and acquisitions failure rates and perspectives on why they fail. *International Journal of Innovation and Applied Studies*, 17(1), 150-158.