

Study on Factors Influencing the M&A Performance of Listed Agricultural Companies in China

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Abstract

The national people's congress held in March 15, 2025 focus on agriculture modernization development once again. The leading agricultural enterprises play an important role in driving this modernization process, with M&A events serving as a crucial pathway for their rapid growth. This paper takes the M&A events of A-share agricultural listed companies in China from 2013 to 2022 as the research sample, and takes 2012 to 2023 as the actual research cycle, and explores the impact of factors including changes in R&D investment (before and after mergers and acquisitions), board size, and the consistency of the place of registration between the two merging parties on three dimensions: the year of the merger and acquisition, the first year after the merger and acquisition, and the relative performance of the merger and acquisition. The study finds that the increase in post-M&A R&D investment does not enhance a firm's M&A performance, the expansion of board size inhibits the improvement of a firm's M&A performance, and the consistency of the place of registration between the two merging parties exerts a significant promotional effect on a firm's M&A performance in the early and middle phases of mergers and acquisitions (M&A). Corresponding recommendations are put forward based on the empirical findings.

Keywords

China; Agricultural Enterprises; M&A Performance; Influence Factor.

1. Introduction

"A country relies on agriculture as its foundation." Agriculture, as the primary industry, is the foundation of China's national economic construction and development and has always received great attention from the state and the government. The Rural Revitalization Plan in All Aspects issued by the State Council in 2024 points out that substantive progress in comprehensive rural revitalization and a new level of agricultural and rural modernization cannot be achieved without the high-quality development of rural industries. To build a modern rural industrial system, the key lies in cultivating leading agricultural industrialization enterprises, enabling them to play a leading role in agricultural product processing, circulation, and brand building. To support the development of leading agricultural enterprises, as early as 2021, the Ministry of Agriculture and Rural Affairs proposed in the Opinions on Promoting the Expansion and Strengthening of Leading Agricultural Industrialization Enterprises that leading enterprises should be encouraged to give full play to their advantages and adopt mergers and reorganizations to form large enterprise groups, thereby driving rural industrial revitalization. In September 2024, the China Securities Regulatory Commission issued the Opinions on Deepening the Reform of the Listed Company M&A and Restructuring Market, proposing to encourage and guide leading agricultural listed companies to focus on their main businesses, strengthen industrial integration, and improve industrial concentration. The March 2025 National Two Sessions once again focused on agricultural modernization and industrial transformation and upgrading, and M&A is one of the important ways to promote agricultural technological innovation collaboration and industrial chain integration. However, in actual

economic operations, the short-term operating performance of some agricultural listed companies after M&A and restructuring is not ideal. Therefore, exploring whether M&A can improve the performance of agricultural listed companies and which factors affect their M&A performance has important practical guiding significance for M&A activities of China's agricultural listed companies.

In the past 20 years, the number of agricultural enterprises in China has continued to grow, the pace of enterprise mergers and reorganizations has accelerated, and the trend of collectivization has become more obvious. Since 2013, M&A and restructuring events of agricultural companies have increased significantly. According to Wind statistics, from 2013 to 2022, the number of M&A cases and the amount of M&A of agricultural listed companies showed an overall upward trend. From 2013 to 2017, the number and amount of M&A of agricultural listed companies rose rapidly. Among them, the M&A amount of agricultural listed companies in 2013 increased by 712.54% year-on-year; in 2017, 81 M&A cases were disclosed, with the M&A amount reaching a peak of 15.44 billion yuan, an increase of 244.81% year-on-year. In 2018, affected by the financial deleveraging policy and severe agricultural disasters, the M&A amount declined slightly by 53.72% year-on-year, but rebounded in 2019. From 2020 to 2022, the M&A amount of China's agricultural listed companies fluctuated slightly. In 2020, affected by the epidemic, the M&A amount of agricultural listed companies decreased by 37.6% year-on-year; in 2021, benefiting from the internal integration of the agricultural industry and the promotion of state-owned enterprise reform, the M&A amount of agricultural listed companies rebounded with a year-on-year increase of 54.45%, and the number of M&A events was 144. In 2022, as central banks led by the Federal Reserve started an interest rate hike cycle, the global economy faced the risk of recession, and market M&A willingness weakened, leading to a slight decline in the M&A amount that year. In short, M&A has gradually become one of the main ways for agricultural listed companies to achieve economies of scale and improve operating performance.

2. Literature Review

After 2013, academic research on the influencing factors of the operating performance of agricultural listed companies gradually increased, with 35 directly relevant literatures on CNKI. From 2013 to 2019, scholars' research in this field was relatively scattered: First, starting from ownership structure and diversified operations to explore their impact on agricultural enterprise performance. For example, Zhang Yanyan et al. (2018)^[1] believed that the higher the ownership concentration of agricultural listed companies, the better their operating performance; Wang Min et al. (2018)^[2] found that ownership balance has a positive impact on agricultural enterprise performance; executive equity incentives improve the operating performance of agricultural companies by reducing the second type of agency cost (Zhang Qianqian et al., 2018)^[3]. Zhao Jingfen et al. (2013)^[4] and Li Lili et al. (2013)^[5] found that the degree of diversified operations is negatively correlated with the performance of agricultural listed companies, while when the company size exceeds the threshold, diversified operations have a significant positive impact on company performance (Li Xiaoyang et al., 2018)^[6]. Second, research from the perspective of enterprise and government innovation input (Ma Kexing et al., 2019)^[7] found that government innovation input can promote the improvement of enterprise performance. After 2020, scholars' research on the influencing factors of the operating performance of agricultural listed companies focused on two aspects: First, the impact of digital transformation: Zhang Xiu'e et al. (2024)^[8] proposed that digital transformation can significantly improve the sustainable performance of agricultural enterprises, and the positive impact path on performance mainly includes digital technology innovation capabilities and digital organizational structure (Qiu Haoran, 2021)^[9]. However, Song Wang et al. (2024)

[10]found that the higher the degree of digital transformation, the lower the enterprise performance. Second, analyzing the influencing factors of the operating performance of agricultural listed companies from the perspective of the external environment: Tian Xinjia et al. (2020)^[11] proposed that environmental information disclosure can promote the performance of agricultural enterprises through the signal transmission effect, but environmental regulations will weaken this promoting effect; Tan Kaiming et al. (2024)^[12] found that there is a significant positive correlation between government subsidies and the performance of China's agricultural listed companies, and financing constraints play an intermediary role; Liu Yuna et al. (2024)^[13]proposed that supply chain finance and supply chain concentration positively affect the operating performance of agricultural enterprises.

Scholars began to pay attention to the performance of agricultural listed companies after M&A only since 2015: Liu Qiaoying (2015)^[14]found that the performance of agricultural listed companies did not increase but decreased after M&A; Xie Hong et al. (2016)^[15]found that M&A activities improved the performance of agricultural listed companies in the short term, but the long-term performance was not effectively improved. In the past five years, some scholars have studied the factors affecting the M&A performance of agricultural listed companies through case qualitative analysis: Song Siyu et al. (2019)^[16]believed that the low performance of agricultural listed companies after M&A may be due to insufficient financial integration after M&A; Wang Yu (2023)^[17]concluded that M&A can improve enterprise performance, and enterprises should carefully plan overall operations and improve risk management levels to obtain long-term economic benefits (Li Weijia, 2021)^[18]. In addition, some scholars have qualitatively analyzed the risks (Li Jiarui, 2024)^[19] and dilemmas (Jia Haoyi, 2021)^[20] faced by agricultural enterprise M&A. However, there are certain differences in M&A among different agricultural enterprises, making the research conclusions based on "case" analysis lack universality. From the perspective of research methods, the conclusions obtained through quantitative analysis are more accurate, and the decisions made by decision-makers based on them are more scientific. Therefore, this paper takes M&A activities of A-share agricultural listed companies from 2013 to 2022 as research samples, with the actual research period from 2012 to 2023, and conducts an empirical analysis of the factors affecting the performance of agricultural listed companies. The conclusions enrich the research results in related fields and provide guidance and suggestions for decision-makers in practical management.

3. Theoretical Analysis and Research Hypotheses

In the process of analyzing the influencing factors of M&A performance of agricultural listed companies, to avoid the limitations of single indicator evaluation and make the analysis results more comprehensive and objective, this paper comprehensively selects three factors from the three dimensions of technological innovation, corporate governance, and external factors: changes in R&D investment before and after M&A, board size, and consistency of registered locations of both M&A parties, and evaluates their impact on performance in the year of M&A, performance in the first year after M&A, and relative performance respectively.

3.1. Impact of Changes in R&D Investment Before and After M&A on M&A Performance

Leading agricultural enterprises are the main body of agricultural industrialization. By increasing their own capital investment in R&D or realizing technological integration through M&A and restructuring, leading enterprises can improve their agricultural technological innovation capabilities and solve the "bottleneck" technical problems in the development of agricultural modernization. In enterprise operations, both M&A and R&D play important roles. M&A can help enterprises acquire innovation capabilities (Tong Yan, 2020)^[21], while R&D is an activity in which enterprises actively and continuously invest resources such as funds,

personnel, and equipment to obtain new technologies and achieve product innovation (Ren Shuming et al., 2017)^[22]. According to the synergy effect theory, the acquirer can obtain the R&D resources and technical achievements of the target company through acquisition, thereby realizing technology sharing and optimal allocation. However, M&A integration takes time, and M&A also increases the enterprise's organizational costs, reducing the efficiency of resource integration (Giudice and Maggioni, 2014)^[23]. In addition, M&A activities require a lot of labor and time input from enterprises, which will to a certain extent distract managers' attention (Zhu Xiaofang et al., 2023)^[24]. At this time, increased R&D investment will instead occupy the enterprise's cash flow and increase its financial burden, resulting in that the increase in R&D investment after M&A may not effectively improve the enterprise's performance in the short term. Moreover, R&D investment is restricted by technological innovation and time (Wang Zihao et al., 2022)^[25]. In the agricultural industry, R&D often faces problems such as limited resources and low technology conversion rates, and many R&D results often stay in the laboratory or small-scale trial stage, making it difficult to be quickly applied to actual production. However, although the increase in R&D investment in the short term after M&A is difficult to realize, M&A can encourage enterprises to increase R&D investment in the long term, promote more innovative R&D (Chou S C et al., 2022)^[26], thereby continuously promoting innovation output and improving enterprise performance (Zhu Xiaofang et al., 2023)^[24]. Therefore, in the early and middle stages of M&A, agricultural enterprises' increased R&D investment due to their own development strategies may not improve their M&A performance. Based on this, this paper proposes Hypothesis H1.

H1: In the early and middle stages of M&A, due to the time constraints of technological innovation, increased R&D investment is not conducive to improving the M&A performance of agricultural enterprises.

3.2. Impact of Board Size on M&A Performance

The board of directors is the core of corporate decision-making and plays an important role in strategic decision-making in corporate M&A activities, selection of senior managers, and establishment of restraint mechanisms (Liu Zhenjie et al., 2019)^[27]. The independence and professional ability of the board directly affect the quality of M&A decisions. The expansion of board size may lead to "process losses" in interactions between directors, thereby damaging the decision-making efficiency of the board in M&A (He Ying et al., 2021)^[28]. According to the principal-agent theory, incomplete contracts lead to moral hazard and adverse selection of management. To reduce agency costs, the board can supervise management through arranging a reasonable corporate governance structure and strengthening internal controls. However, the larger the board size, the more difficult team coordination becomes, and it is difficult for board members to reach a consensus, making them more likely to be controlled by the company's management (Zhuang Wanting, 2019)^[29]. A larger board size also increases the company's operating costs, reduces management efficiency, causes a "free-rider" phenomenon (Gu Yu et al., 2017)^[30], weakens supervision over management, and thus leads management to pursue personal interests in M&A, resulting in reduced M&A performance. Due to the particularity of the industry, more than 60% of China's agricultural listed companies are local state-owned enterprises or central enterprises. Considering industrial development and social stability, the government's policies often affect the board's decisions, and the board's power is also restricted to a certain extent, which weakens the board's functions to some extent. Therefore, for agricultural listed companies, the expansion of board size will instead reduce the enterprise's decision-making efficiency and affect its M&A performance. Based on this, this paper proposes Hypothesis H2.

H2: Board size is negatively correlated with M&A performance.

3.3. Impact of Consistency of Registered Locations on M&A Performance

Consistency of registered locations means that the registered provinces and cities of the acquirer and the acquired company are the same. According to the information advantage hypothesis, geographical distance between different regions increases the cost of obtaining information and restricts information flow. Investors can obtain local public information more timely and advantageously and make better investment decisions (Dyer, 2021)^[31]. Therefore, when enterprises conduct local M&A, the acquirer has an information advantage over the target, can obtain more information about the operating status of the relevant enterprise before M&A, which is conducive to evaluating the value and potential risks of the target enterprise, and thus making better decisions on M&A activities. In contrast, the geographical distance of cross-regional M&A also inhibits the cross-regional flow of technical resources, which is not conducive to improving enterprise performance (Pei Xudong et al., 2022)^[32]. In addition, cross-regional M&A involves differences in policy environments and administrative management in different regions. In contrast, local M&A is not affected by environmental uncertainty, and both enterprises face consistent transaction environments and government policies during M&A. Employees of both M&A parties have a higher sense of identity, which is conducive to improving M&A performance and post-M&A integration of enterprises. Affected by government intervention, enterprises are more inclined to local M&A than cross-regional M&A (Cheng Xiaotong, 2017)^[33], and policy uncertainty in the target location of cross-regional M&A will significantly reduce enterprise performance (Wu Qian et al., 2024)^[34]. Each province has different support for agriculture. During M&A and restructuring, listed companies supported by local government industrial policies are more likely to pass the administrative review of M&A and restructuring (Yuan Yehu et al., 2021)^[35]. Therefore, M&A and restructuring of agricultural listed companies in the same policy environment are more conducive to the implementation of M&A activities. Based on this, this paper proposes Hypothesis H3.

H3: The consistency of registered locations of both M&A parties is conducive to promoting M&A performance.

4. Research Design

4.1. Sample Selection and Data Sources

The research data in this paper are from the Wind database and CSMAR database, and data processing is mainly carried out using SPSS and STATA16 software. The agricultural listed companies referred to are selected from 6 sub-industries: agriculture, forestry, animal husbandry, fishery, agriculture, forestry, animal husbandry and fishery services, and agricultural and sideline food processing, based on the Guidelines for the Classification of Listed Companies' Industries revised in 2012. Due to the small number of agricultural listed companies in China, the initial research sample refers to non-failed M&A and restructuring events from 2013 to 2022. To study the changes in M&A performance before and after M&A, the actual research period of this paper is 2012-2023. Referring to the literature of Wang Yan (2020)^[36] and others, the samples are screened as follows: 1. For data availability, the selected agricultural listed companies are those listed on the Shanghai and Shenzhen A-shares; 2. ST and ST* companies are excluded to avoid the interference of sample particularity on empirical results; 3. Companies with incomplete financial data disclosure are excluded; 4. If a sample company has multiple M&A events during the period, the event with the largest M&A amount is selected; 5. The transaction status of the listed company is "buyer", and the research is carried out from the perspective of the listed company as the acquirer. According to the above criteria, 31 agricultural listed companies are finally obtained.

4.2. Variable Definition

The explained variable in this paper is the M&A performance of the acquiring company. Referring to the method of Liu Chang et al. (2017)^[37], a comprehensive performance evaluation system reflecting four aspects of enterprise profitability, solvency, operating capacity, and development capacity is constructed, and 12 accounting indicators are selected for calculation, including return on total assets, return on net assets, net profit margin on sales, current asset turnover rate, total asset turnover rate, inventory turnover rate, year-on-year growth rate of total assets, year-on-year growth rate of net profit, year-on-year growth rate of operating profit, asset-liability ratio, current ratio, and quick ratio. Finally, the performance in the year of M&A (F1), performance in the first year after M&A (F2), and relative changes in performance (Y1, Y2) are obtained.

Table 1. Main Variables of the Model

Variable Name	Variable Description	Variable Symbol
Performance in the year of M&A	Performance score in the year of M&A obtained by principal component analysis	F1
Performance in the first year after M&A	Performance score in the first year after M&A obtained by principal component analysis	F2
Relative performance change in the year of M&A compared to the year before M&A	Performance in the year of M&A-Performance in the year before M&A	Y1
Relative performance change in the first year after M&A compared to the year before M&A	Performance in the first year after M&A-Performance in the year before M&A	Y2
Changes in R&D investment before and after M&A	1 if the proportion of R&D investment in operating income in the year of M&A is higher than that in the year before M&A; 0 otherwise	R&D
Board size	Number of directors on the board in the year before M&A	Count
Consistency of registered locations	1 if the registered provinces of both parties are consistent; 0 otherwise	home
Enterprise size	Logarithm of total assets in the year before M&A	Scale
Enterprise age	Difference between the M&A year and the establishment year of the acquiring company	AGE
Enterprise nature	1 if the acquiring company is a state-owned enterprise; 0 otherwise	Nature
Industry relevance	1 if both parties belong to the same industry; 0 otherwise	Industry
Payment method	1 if cash payment is adopted; 0 otherwise	Cash pay
Related transactions	1 if it is a related transaction; 0 otherwise	RT

The core explanatory variables are changes in the company's R&D investment before and after M&A, board size, and consistency of registered locations. Changes in R&D investment are measured by the change in the proportion of R&D investment in operating income between the

year of M&A and the year before M&A; board size is measured by the number of directors on the company's board in the year before M&A; consistency of registered locations is measured by whether the registered provinces of the acquirer and the acquired party are consistent.

To control the impact of other factors, referring to the research of Hua Renhai et al. (2021)^[38] and Wang Siyao et al. (2021)^[39], the following control variables are selected: enterprise size, measured by the logarithm of total assets of the company in the year before M&A; industry relevance, measured by judging whether both M&A parties belong to the same industry; payment method, measured by whether cash payment is adopted; enterprise nature, measured by whether it is a state-owned enterprise; related transactions, measured by judging whether they are related transactions; enterprise age, measured by the difference between the M&A year and the establishment year of the acquiring company. The definition of each variable is shown in Table 1.

4.3. Model Construction

To measure the explained variable, a factor score model is constructed:

$$F_{it} = \sum_{i=1}^n W_{it} * Y_{it} \quad (1)$$

Among them, F_{it} is the comprehensive score of company i in year t , reflecting the M&A performance of company i in that year; Y_{it} is the score of the i – th factor in year t ; W_{it} is the weight, which is the variance contribution rate of the i – th; n is the number of extracted factors. To further study the influencing factors of M&A performance of agricultural listed companies, this paper constructs a multiple regression model:

$$F_t = \alpha + \beta_1 R\&D + \beta_2 Count + \beta_3 Company\ home + \beta_4 \varphi_t + \varepsilon \quad (2)$$

Among them, F_t is the explained variable, α is a constant, $\beta_1, \beta_2, \beta_3, \beta_4$ are parameters, $R\&D$ represents changes in the company's R&D investment before and after M&A, $Count$ represents the number of directors, $Company\ home$ represents the preference for registered locations, φ_t is the control variable, and ε represents the error term.

5. Empirical Tests

5.1. Evaluation of M&A Performance

This paper uses SPSS27.0 statistical software and applies principal component analysis to comprehensively evaluate the performance in the year before M&A, the year of M&A, and the first year after M&A. The specific process is as follows:

First, KMO and Bartlett's sphericity test are conducted on the financial indicator data of each period. It is found that the KMO values of each period are all greater than 0.5, which are 0.655, 0.619, and 0.574 respectively; the Sig values of Bartlett's sphericity test are all 0, indicating that the selected indicator data of each period have passed the KMO and Bartlett's sphericity test, and the selected samples are suitable for factor analysis.

Then, factor analysis is performed on the 12 financial indicator data of agricultural listed companies in each selected period, and the total variance explanation of factor analysis for each year is obtained (as shown in Table 2).

Table 2. Total Variance Explanation of Each Period

Year	Component	Initial Eigenvalues			Extracted Squared Loadings		
		Total (%)	Variance Percentage	Cumulative (%)	Total	Variance Percentage (%)	Cumulative (%)
The year before M&A	1	4.593	38.279	38.279	4.593	38.279	38.279
	2	3.324	27.697	65.976	3.324	27.697	65.976
	3	1.741	14.507	80.483	1.741	14.507	80.483
The year of M&A	1	3.697	30.806	30.806	3.697	30.806	30.806
	2	3.132	26.098	56.904	3.132	26.098	56.904
	3	1.943	16.188	73.092	1.943	16.188	73.092
	4	0.996	8.297	81.389	0.996	8.297	81.389
The first year after M&A	1	4.461	37.174	37.174	4.461	37.174	37.174
	2	3.337	27.808	64.983	3.337	27.808	64.983
	3	1.703	14.188	79.170	1.703	14.188	79.170

Extraction method: Principal component analysis

Finally, according to the component score coefficient matrix of factor analysis for each year, the factor score function for each year is obtained. Combined with the variance contribution rate, the comprehensive performance score of sample companies for each year can be calculated by formula (1), and thus the comprehensive performance score function for each year can be obtained:

$$\begin{aligned}
 F_0 &= 0.475616Y_{1i} + 0.344135Y_{2i} + 0.180249Y_{3i} \\
 F_1 &= 0.378503Y_{1i} + 0.320658Y_{2i} + 0.198897Y_{3i} + 0.101943Y_{4i} \\
 F_2 &= 0.469547Y_{1i} + 0.351244Y_{2i} + 0.179209Y_{3i}
 \end{aligned}$$

According to the comprehensive performance score function for each year, the performance scores of sample companies in the year before M&A, the year of M&A, and the first year after M&A can be obtained. To obtain the trend of performance scores in each year, the performance of each year is averaged, and the averages are $F_0=0.052903$, $F_1=-0.02$, $F_2=0.059677$ respectively. It can be seen that the performance of agricultural listed companies does not change significantly year by year. The performance in the year of M&A shows a downward trend, and rebounds to a level similar to that of the previous year in the first year after M&A. The difference between F_2-F_1 is greater than that between F_1-F_0 , indicating that the performance in the year of M&A is most affected, and the performance in the first year after M&A is relatively less affected. This may be because M&A requires a large amount of funds, and some enterprises carry out M&A through debt financing, which increases financial risks. The agricultural listed companies selected in this paper mostly use cash payment during M&A and restructuring, which affects the enterprise's cash flow and brings greater debt pressure, thus affecting the enterprise's M&A performance. After M&A, enterprises may achieve diversified development through mergers, enrich income sources, or expand production scale, reduce unit product costs, and improve market competitiveness, thus making the performance rebound in the first year after M&A.

5.2. Empirical Analysis of Factors Affecting M&A Performance of Agricultural Listed Companies

5.2.1. Descriptive Statistics

Table 3 shows the descriptive statistical results of main variables. It can be found that the mean value of changes in R&D investment before and after M&A is 0.613, the number of board directors is about 8.194, and the mean value of preference for registered locations is 0.419. In terms of basic enterprise information, the mean value of the logarithm of enterprise size is about 22.08, the average age of enterprises is about 19.65 years, and the mean value of enterprise nature is 32.3%, indicating that most acquiring companies are non-state-owned enterprises. In terms of M&A transactions, industry-related M&A accounts for about 48.4%, cash payment in M&A activities accounts for about 74.2%, and related transactions in M&A account for about 29%.

Table 3. Descriptive Statistics of Variables

Variable Name	Observations	Mean	Standard Deviation	Minimum	Maximum
R&D	31	0.613	0.495	0	1
Count	31	8.194	1.352	5	11
Company home	31	0.419	0.502	0	1
Scale	31	22.08	0.946	20.72	24.60
AGE	31	19.65	4.673	12	30
Nature	31	0.323	0.475	0	1
Industry	31	0.484	0.508	0	1
Cash pay	31	0.742	0.445	0	1
RT	31	0.290	0.461	0	1

5.2.2. Multicollinearity Test

To avoid "spurious regression" and the impact of multicollinearity in the model, this paper uses the variance inflation factor (VIF) to test the collinearity of each variable. When the VIF value of a single variable is greater than 10, it indicates that there is serious multicollinearity between variables; otherwise, it indicates that there is no serious multicollinearity between variables, and the selection of variables is reasonable. According to Table 4, the average VIF between variables is 1.51, which is less than 5, and the VIF of each variable is less than 10. Therefore, it can be determined that there is no multicollinearity between variables, and regression analysis can be carried out.

Table 4. Multicollinearity Analysis

Variable	VIF	1/VIF
R&D	1.960	0.509
Count	1.960	0.510
Company home	1.630	0.612
Scale	1.590	0.630
AGE	1.370	0.729
Nature	1.360	0.737
Industry	1.320	0.758
Cash pay	1.210	0.830
RT	1.200	0.835
Mean VIF	1.51	

5.2.3. Multiple Regression Analysis

Table 5 shows the regression results of the impact of changes in enterprise R&D investment before and after M&A, board size, and consistency of registered locations on M&A performance, with the following analysis:

Table 5. Multiple Regression Results of Factors Affecting M&A Performance of China's Agricultural Listed Companies

VARIABLES	F1	F2	Y1	Y2
R&D	-0.100 (-0.40)	0.085 (0.33)	-0.551** (-2.34)	-0.366** (-2.62)
Count	-0.134* (-1.76)	-0.073 (-0.93)	-0.097 (-1.35)	-0.036 (-0.84)
Company home	-0.100 (-0.52)	0.203 (1.02)	-0.043 (-0.24)	0.260** (2.42)
Scale	0.069 (0.67)	0.076 (0.72)	0.036 (0.37)	0.043 (0.76)
AGE	-0.025 (-1.13)	-0.008 (-0.36)	-0.019 (-0.93)	-0.003 (-0.20)
Nature	-0.127 (-0.54)	-0.639** (-2.65)	0.509** (2.32)	-0.003 (-0.02)
Industry	-0.201 (-0.83)	-0.118 (-0.47)	-0.440* (-1.92)	-0.356** (-2.62)
Cash pay	-0.444* (-1.95)	-0.228 (-0.97)	-0.377* (-1.76)	-0.161 (-1.26)
RT	0.234 (0.96)	-0.059 (-0.23)	0.185 (0.81)	-0.107 (-0.79)
Constant	0.552 (0.23)	-0.551 (-0.23)	0.935 (0.42)	-0.168 (-0.13)
Observations	31	31	31	31
R-squared	0.355	0.347	0.556	0.471
F test	0.301	0.323	0.0207	0.0809
F	1.286	1.242	2.917	2.074

Note:***, **and* represent significance levels of 1%, 5%, and 10% respectively.

(1) Impact of changes in enterprise R&D investment on M&A performance. It can be seen from the first row of Table 5 that the coefficient of R&D investment and performance in the year of M&A is negative, and the coefficient with performance in the first year after M&A is positive, but both are not significant ($\beta=-0.100$, $P>0.1$; $\beta=0.085$, $P>0.1$). From the change of the coefficient from negative to positive, the increase in R&D investment in the year of M&A is not conducive to the improvement of M&A performance. In addition, R&D investment has a significant negative impact on the relative changes in performance between the year of M&A and the year before M&A, and between the first year after M&A and the year before M&A($\beta=-0.551$, $P<0.05$; $\beta=-0.366$, $P<0.05$), indicating that enterprise R&D investment has a negative impact on M&A performance. The reason for this result may be that agricultural production is affected by seasonality and regionality, and the conversion cycle of agricultural scientific and technological achievements from R&D to application is long, generally taking 2-4 years to be converted into actual productivity, and usually facing high risks and uncertainties. Many scientific research achievements may stay in the laboratory or trial stage and are difficult to be

promoted and applied on a large scale. Increasing R&D investment after M&A will not only increase the burden on the enterprise's cash flow but also fail to bring expected economic benefits in the short term. Therefore, in the early and middle stages of M&A, the costs incurred by increased R&D investment will be greater than the benefits, which will have a negative impact on the M&A performance of agricultural enterprises. This verifies Hypothesis H1.

(2) Impact of enterprise board size on M&A performance. It can be found that the board size is significantly negative with the performance in the year of M&A at the 10% level ($\beta = -0.144$, $P < 0.1$), that is, the larger the board size, the worse the M&A performance of agricultural enterprises. Board size has a significant negative impact on the change in performance in the year of M&A ($\beta = -0.134$, $P < 0.1$), and the coefficients of the relative changes in performance between the year of M&A and the year before M&A, and between the first year after M&A and the year before M&A are both negative. The regression results verify Hypothesis H2. The reason for this result may be that as an important part of corporate governance, each vote in the board of directors regarding M&A activities is related to the performance after M&A. A larger board requires more time and resources to reach a consensus in the decision-making process, which will increase the enterprise's "negotiation costs" and reduce the decision-making efficiency of the board. When facing a complex market environment, it is difficult to make flexible decisions quickly. Therefore, the larger the board size, the worse the enterprise's M&A performance will be.

(3) Impact of consistency of registered locations on M&A performance. It can be seen that the coefficient of consistency of registered locations and performance in the year of M&A is negative but not significant ($\beta = -0.100$, $P > 0.1$); the coefficient with performance in the year of M&A is positive but not significant ($\beta = 0.203$, $P > 0.1$). The coefficient changes from negative to positive, indicating that the consistency of registered locations of both M&A parties is conducive to the improvement of performance after M&A. The coefficient of consistency of registered locations on the relative change in performance between the year of M&A and the year before M&A is negative, and the coefficient on the relative change in performance between the first year after M&A and the year before M&A is significantly positive ($\beta = 0.854$, $P < 0.1$), that is, the consistency of registered locations has a positive impact on the performance of enterprises in the first year after M&A. The reason for this result may be that both M&A parties are in the same region, so their market environment, government policies, and other external environments will be consistent, and they are often more likely to obtain local government support. Before M&A, it is conducive to the acquiring party to conduct due diligence, make more accurate evaluations, and pass the administrative review of M&A and restructuring more quickly. For example, Sunner Development acquired 100% equity of Sunner Food for 2.02 billion yuan and was unconditionally approved. In the middle stage of M&A, it is conducive to reducing the negotiation costs between the two parties. During the post-M&A integration period, due to the high similarity between the two parties in culture, management style, market environment, etc., there are fewer conflicts and frictions in the integration process, making it easier to achieve supply chain optimization and synergy, and reduce the human and material costs in the integration process. Therefore, if the acquiring enterprise and the acquired enterprise are in the same region, it will be more conducive to the improvement of performance after M&A. This verifies Hypothesis H3.

5.2.4. Robustness Test

To make the research conclusions more reliable, referring to the method of Lu Dong (2019)^[40], this paper replaces the indicator for measuring M&A performance. Based on the research period, the change in return on total assets (ΔROA) and the change in return on net assets (ΔROE) around the first announcement date of M&A are used to measure M&A performance. It can be found from Table 6 that the results of changes in R&D investment before and after M&A,

board size, and consistency of enterprise registered locations with M&A performance are all robust. Increased R&D investment after M&A is not conducive to the improvement of initial M&A performance; the larger the board size, the worse the M&A performance; and M&A between parties with the same registered location is conducive to the improvement of M&A performance.

Table 6. Robustness Test

VARIABLES	Δ ROA	Δ ROE
R&D	-5.130** (-2.14)	-8.278* (-1.82)
Count	-1.546** (-2.10)	-2.890** (-2.08)
Company home	4.255** (2.30)	8.330** (2.38)
Scale	2.150** (2.18)	3.803* (2.04)
AGE	-0.002 (-0.01)	-0.034 (-0.08)
Nature	-0.918 (-0.41)	-2.267 (-0.53)
Industry	-4.477* (-1.92)	-7.589 (-1.72)
Cash pay	-2.375 (-1.08)	-3.387 (-0.82)
RT	1.068 (0.45)	2.353 (0.53)
Constant	-31.061 (-1.37)	-54.408 (-1.27)
Observations	31	31
R-squared	0.530	0.499
F test	0.0328	0.0532
F	2.626	2.328

Note: ***, **, and * represent significance levels of 1%, 5%, and 10% respectively. Δ ROA refers to the change in return on total assets around the first announcement date of M&A, and Δ ROE refers to the change in return on net assets around the first announcement date of M&A.

6. Conclusion and Suggestions

6.1. Conclusion

This paper takes M&A events of China's A-share agricultural listed companies from 2013 to 2022 as research samples, with the actual research period from 2012 to 2023, and explores the impact of changes in R&D investment before and after M&A, board size, and consistency of registered locations of both M&A parties on M&A performance. The study shows that increased R&D investment after M&A has a significant impact on the relative changes in performance, which will reduce M&A performance; as an important part of the enterprise's formal system, the larger the board size, the worse the enterprise's performance after M&A, with the greatest impact in the year of M&A, and the degree of negative impact on M&A performance gradually decreases over time after M&A is completed; the consistency of registered locations of both

parties before and after M&A has no significant impact on performance in the year of M&A and the first year after M&A, but from the perspective of relative changes in performance, M&A in the same policy environment is conducive to the improvement of performance of agricultural listed companies after M&A.

6.2. Policy Suggestions

First, the development of agriculture is inseparable from policy support, and policy uniformity has a promoting effect on post-M&A performance. Therefore, in the process of growing through M&A, agricultural enterprises can effectively utilize the synergy effect of local agricultural support policies by merging local enterprises, and the government should also timely create a good policy environment for agricultural enterprise M&A. For example, Shandong Province issued the Shandong Province Agricultural Industrialization Leading Enterprises Promotion Action Plan in 2024, proposing "nine actions" to promote the high-quality development of agricultural industrialization leading enterprises, covering almost all aspects of the development of leading enterprises, especially policies for supporting leading enterprises' scientific and technological innovation projects, introducing and cultivating high-tech talents, tax incentives for newly established enterprises, and funding subsidies for encouraging leading enterprises to cooperate in building scientific and technological R&D and innovation platforms. This means that agricultural listed companies located in Shandong Province can better utilize policy subsidy resources and give play to the synergy effect of local policies when choosing local companies for M&A and restructuring. However, the focus of agricultural support policies issued by each province is different. Compared with the policy uncertainty risks of cross-regional M&A, it is suggested that China's agricultural enterprises should, under the condition of realizing their own M&A strategies, choose local enterprises as M&A targets as much as possible to achieve better economic benefits.

Second, China's agricultural enterprises should establish a board of directors with an appropriate number of members and a reasonable structure, and pay attention to improving the professionalism and independence of board members to enhance the decision-making efficiency of the board. Due to the particularity of the industry, most of China's leading agricultural enterprises are state-owned enterprises. In the process of promoting the mixed-ownership reform of state-owned enterprises, while introducing social capital to improve M&A efficiency, only increasing the number of shares held by social capital in form without giving full play to the role of the board of directors, we should essentially guarantee the right to speak of private directors, and the concentration of board power can improve the efficiency of state-owned enterprise M&A integration. However, too few directors will lead to a single perspective, making it difficult to cover multi-dimensional considerations such as finance, law, and industry involved in M&A; too many directors may reduce the enterprise's decision-making efficiency and miss the M&A window. Therefore, it is suggested that enterprises optimize the number and structure of directors according to their own development needs to give full play to the role of the board of directors.

Third, under the long-term goal of leading the industry to achieve major innovative breakthroughs, leading agricultural enterprises need to match corresponding short-term strategies. Agricultural production activities have a long cycle, and it generally takes 2-4 years for agricultural scientific and technological achievements from R&D to large-scale application, so the economic benefits of R&D investment are difficult to appear in the short term. Moreover, if agricultural enterprises increase R&D investment after M&A, it will often "occupy" the enterprise's cash flow and have a negative impact on enterprise performance. Therefore, it is suggested that enterprises can develop high-value-added agricultural and sideline products business in the short term to make up for the shortage of enterprise funds caused by increased R&D investment and reduce the negative impact of short-term increased R&D investment on

enterprise M&A performance; at the same time, cooperate with universities or research institutions to carry out short-term industry-university-research projects to solve specific problems such as soil improvement and variety selection, share results, shorten the R&D cycle, and improve short-term innovation performance. On the other hand, to achieve the long-term goal of improving China's agricultural science and technology innovation, agricultural enterprises should pay attention to the post-M&A integration process, timely and reasonably adjust the organizational structure of R&D teams, integrate technical resources brought by M&A as soon as possible, and give play to the synergy effect, thereby improving enterprise innovation capabilities and performance.

6.3. Research Prospects

Board size belongs to the formal system of enterprises and occupies an important position in major matters such as corporate M&A activities. However, there is also a close relationship between the informal system of enterprises and corporate governance. In the future, we can further explore the impact of informal systems such as corporate culture and social trust on the M&A performance of agricultural listed companies; the consistency of registered locations of both M&A parties means that both parties carry out M&A activities in the same region and the same policy environment, which is conducive to the implementation of M&A activities and post-M&A integration. However, the basic information of enterprise CEOs, such as their native places and birthplaces, may also be closely related to enterprise M&A activities. However, due to the protection of CEOs' privacy information, further research may need to manually collect and improve this part of data from public information released on the official websites of major enterprises in the future.

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