An Empirical Study on M&A and Reorganization Performance of Listed Companies in Power Industry

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Abstract—Under the macro background of deepening supply side reform, the electric power industry takes promoting supply side reform as main line. The industry carries out structural optimization and industrial upgrading vigorously. However, the performance of M&A and restructuring of power companies remains to be studied. In order to study the performance on M&A and reorganization, this paper adopted the factor analysis method and financial index method. The study takes the power enterprises that have undergone M&A and reorganization during 2013-2016 as the research object. The result shows the performance of the sample companies before and after M & A has increased first and then decreased. And the paper puts forward policy suggestions from the perspectives of the listed companies of power enterprises and government regulatory agencies.

Keywords—Electric power enterprise; Merger and acquisition; Reorganization; Performance

I. INTRODUCTION

As one of the pillar industries of national economy, electric power industry is an important area of China's supply-side reform. In recent years, China's power enterprises have systematically carried out M&A and reorganization activities and promoted industrial reform vigorously. M&A and reorganization of electric power enterprises has become a means to improve the operation performance of electric power enterprises. Meanwhile, the electric power industry has acquired greater interspace for asset reorganization through M&A and reorganization. According to the industry classification of China Securities Regulatory Commission in 2012, there are 72 listed enterprises of power industry at present in China. From 2014 to 2016, there are 51, 52 and 55 listed companies of the industry carried out 227, 219 and 214 M&A and reorganization events. And the trading volume reached 41.126, 152.743 and 88.227 billion yuan respectively.

It remains to be studied how M&A and reorganization affects the performance of listed companies of power industry. The paper will make an empirical analysis on the performance of listed enterprises before and after M&A and reorganization by using financial index method. At the same time, the paper puts forward recommendations for the existing problems in M&A and reorganization.

II. RESEARCH DESIGN

A. Research Method

At present, the research methods of M&A and reorganization performance of listed companies mainly include event research method, financial index research method and case analysis method [1]. This paper adopts the financial index research method. Because the financial statements of listed companies have strong information content, it is reasonable and feasible to use financial data indicators to test and analyze the performance changes before and after the M&A. The methods of financial index research mainly include entropy method, proportion analysis method, comprehensive ordinal number method and factor analysis method [2]. This paper adopts the factor analysis method. The paper selects the representative public factors, constructs the performance evaluation system for the M&A of listed companies, compares and analysis the comprehensive performance scores of the companies before and after the M&A.

B. Indicators Selection

This article is based on the "Enterprise Performance Evaluation Operational Rules (Revised)" and selects financial indicators from four aspects: solvency, development ability, operational ability, and profitability [3]. The indicators for solvency include current ratio, quick ratio and asset-liability ratio. The indicators for development capacity include growth rate of total assets and total operating income growth rate. The indicators for operational capability include accounts receivable turnover ratio, inventory turnover rate and total asset turnover rate. The indicators for profitability are operating profit ratio, rate of return on total assets.

C. Sample Selection

This paper is based on Industry classification of CSRC 2012. It selects the power enterprises that have undergone mergers and acquisitions during 2013-2016 as the research object. It takes the year as a unit of time, and collects financial indicators of the period before M&A and reorganization, the period of M&A and reorganization, the period after the M&A and reorganization, and two periods after the M&A and reorganization.

III. EMPIRICAL ANALYSIS

A. Validity and Feasibility Test

In the paper, the factor analysis method is adopted, and its applicable condition is that there is a strong correlation between the original financial data, so that an effective public factor can be extracted. In the paper, the KMO test and Bartlett test are used. Table 1 shows the results of the KMO and Bartlett tests. T_{-1}, T_0, T_1 and T_2 represent the year prior to the M&A and reorganization, the year of the M&A and reorganization, the first year after the completion of the M&A and reorganization, and the second year after the completion of the M&A and reorganization.

As shown in the table 1, the KMO values of T_1, T_0, T_1 and T_2 are all over 0.5. The Bartlett spherice test has a p-value of 0.00 and a confidence of less than 1%. The test results show that the correlation between the original variables is strong and suitable for factor analysis.

B. Principal Components Extraction

The total variance interpretation table for each year shows that there are four factors with eigenvalues greater than one, and these four common factors are used to explain the original 10 financial indicators during the four years before and after the M&A and reorganization.

The cumulative variance contribution rates of the original variables are 72.771%, 74.068%, 71.060%, and 71.564% respectively, indicating that the four extracted factors are better than the original variables, which can explain the original 10 financial indicators to a large extent. Information, therefore, using factor analysis to build M&A and reorganization

performance evaluation system is feasible. The four common factors extracted are denoted by F_1, F_2, F_3 and F_4 respectively. It can be seen from Table 2.

C. Model Establishment

The contribution rate of variance represents the degree of influence of various public factors on performance. After the rotation, the weight of the common factor accounted for the cumulative variance contribution rate is multiplied by each factor score function to obtain the comprehensive score function for each year. The comprehensive performance scores from the year before the M&A and reorganization to two years after the M&A and reorganization are recorded as Y_{-1}, Y_0, Y_1, and Y_2 respectively [4]. The comprehensive score for each year is as follows:

The year before the M&A and reorganization:

$$Y_{-1} = (24.23\%F_1 + 18.14\%F_2 + 16.57\%F_3 + 13.83\%F_4) / 72.771\% \quad (1)$$

The year of the M & A:

$$Y_0 = (24.24\%F_1 + 19.63\%F_2 + 17.50\%F_3 + 12.71\%F_4) / 74.068\% \quad (2)$$

One year after the merger:

$$Y_1 = (24.81\%F_1 + 19.67\%F_2 + 13.64\%F_3 + 12.94\%F_4) / 71.060\% \quad (3)$$

Two years after the merger:

$$Y_2 = (23.55\%F_1 + 17.88\%F_2 + 17.01\%F_3 + 13.13\%F_4) / 71.564\% \quad (4)$$

According to the factor analysis, the above comprehensive score function is obtained, and then the four common factor scores of different years are brought into the above formula one by one.

TABLE I   KMO AND BARTLETT'S TEST

		T_{-1}	T_0	T_1	T_2
KMO Measure of Sampling Adequacy		.514	.548	.540	.503
Bartlett's Test of Sphericity	**Approx. Chi-Square**	303.624	299.207	330.320	365.465
	Df.	45	45	45	45
	Sig.	.000	.000	.000	.000

TABLE II   TOTAL VARIANCE EXPLAINED (%)

Year	Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	Variance	Cumulative	Total	Variance	Cumulative	Total	Variance	Cumulative
T_{-1}	1	2.684	26.842	26.842	2.684	26.842	26.842	2.423	24.231	24.231
	2	1.877	18.772	45.614	1.877	18.772	45.614	1.814	18.138	42.370
	3	1.460	14.602	60.216	1.460	14.602	60.216	1.657	16.572	58.942
	4	1.256	12.556	72.771	1.256	12.556	72.771	1.383	13.829	72.771
T_0	1	2.526	25.255	25.255	2.526	25.255	25.255	2.424	24.239	24.239
	2	1.960	19.602	44.857	1.960	19.602	44.857	1.962	19.625	43.864
	3	1.696	16.955	61.813	1.696	16.955	61.813	1.750	17.497	61.361
	4	1.226	12.256	74.068	1.226	12.256	74.068	1.271	12.707	74.068
T_1	1	2.728	27.277	27.277	2.728	27.277	27.277	2.481	24.808	24.808
	2	1.788	17.882	45.158	1.788	17.882	45.158	1.967	19.666	44.474
	3	1.426	14.264	59.422	1.426	14.264	59.422	1.364	13.642	58.116
	4	1.164	11.638	71.060	1.164	11.638	71.060	1.294	12.944	71.060
T_2	1	2.598	25.977	25.977	2.598	25.977	25.977	2.354	23.545	23.545
	2	1.712	17.121	43.099	1.712	17.121	43.099	1.788	17.880	41.425
	3	1.623	16.227	59.326	1.623	16.227	59.326	1.701	17.012	58.438
	4	1.224	12.238	71.564	1.224	12.238	71.564	1.313	13.126	71.564

The average comprehensive scores of company mergers and acquisitions in each year are respectively: $Y_{-1}= 3.92E-6$, $Y_0= 5.88E-6$, $Y_1 = 0$, $Y_2 = 3.92E-7$, as shown in Figure 1.
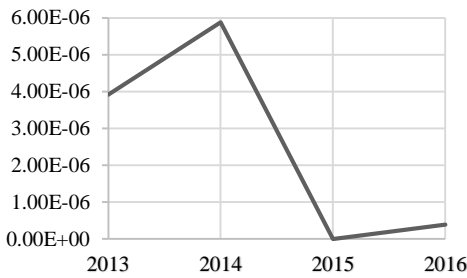

Fig. 1 Comprehensive Score

IV. RESULT

After obtaining the comprehensive scores of the performance for each year before and after the M&A and reorganization of the sample company, statistics of the composite score difference and positive ratio are performed on this basis [5]. Y_0-Y_{-1}, Y_1-Y_{-1}, and Y_2-Y_{-1} are used to reflect the comparison between M&A and reorganization performance and pre-merger, and Y_0-Y_{-1}, Y_1-Y_0, and Y_2-Y_1 are used to reflect the year-by-year changes in M&A and reorganization performance. Positive ratios are used to indicate the ratio of sample companies that have a positive composite score difference to all samples. A positive Y-difference indicates that business performance has improved, whereas a negative Y-difference indicates a worsening of performance, as shown in Table 3.

V. CONCLUSION

On the whole, the performance of the sample companies before and after M & A showed a trend of first rising and then decreasing. The mean values of Y_0-Y_{-1}, Y_1-Y_{-1} and Y_2-Y_{-1} were 1.9608E-12, - 3.9216E-12, - 3.5294E-12 respectively. It can be seen that the performance of the sample companies in the year of M&A has improved somewhat, but since the first year after the M&A, the performance has shown a significant downward trend. Although the second year after M & A has improved, it still cannot reach the performance level before M & A. According to the change of M & A performance year by year, the average values of Y_0-Y_{-1}, Y_1-Y_0 and Y_2-Y_1 are 1.9608E-12, - 5.88236E-12, 3.92148E-13 respectively. It can be found that although the performance of M & A in that year has improved to a certain extent compared with the previous year, the performance in the first year of M & A has declined substantially. The second year after the M&A performance has increased, but the rise is not large.

TABLE III   Y-DIFFERENCE

Y-difference	Y_0-Y_{-1}	Y_1-Y_{-1}	Y_2-Y_{-1}	Y_0-Y_{-1}	Y_1-Y_0	Y_2-Y_1
The mean	1.9608E-6	-3.9216E-6	-3.5294E-6	1.9608E-6	-5.88236E-6	3.92148E-7
Positive ratio	58.82%	54.90%	54.90%	58.82%	45.10%	31.37%

Looking at the positive ratio, the performance of 58.82% of the sample companies in the year of M & A was better than the year before. The ratio fell to 54.90% in the first year after the M&A and reorganization, and the sample ratio of improved results in the second year of the M&A and reorganization was the same as the positive ratio in the first year after the M&A and reorganization. Nearly half of the sample that did not improve their performance after the M&A and reorganization. Most of the power companies implementing M&A have not improved their performance as a result of M&A. It can be concluded that the performance of M & A of listed companies is not satisfactory. M & A activities cannot have a lasting positive impact on the business activities of most companies.

VI. RECOMMENDATIONS

M & A has always been a hot topic in the capital market. Due to the nature of the industry, M&A of the electricity market need to be improved in many aspects. Whereas M&A is an effective way for the industry to increase industry concentration and deepen supply-side reforms in the power industry. Based on the previous research results and the conclusions of the paper, the following recommendations are proposed combined with the actual situation of China's power enterprises.

A. For listed companies of the power industry

Listed companies of power industry should adhere to the supply-side reform and optimize the industrial layout. Electric power companies should carry out M&A integration work by formulating merger and reorganization plans, organization and business integration, human resources integration, and integration of management systems and culture. After M&A and reorganization, they ought to reduce the vertical ranks of management, as well as strengthen the integration. Significantly, the listed companies have to control the premium rate. The choice of payment method should be based on its own financial situation, choose an appropriate payment method, and avoid adopting a single cash payment method.

B. For government Supervision Department

Government Supervision Department should follow the laws of the market and change the role orientation. The government and relevant regulatory authorities shall promote the institutional infrastructure construction of mergers and acquisitions, establish a basic law on mergers and acquisitions, and standardize the conduct of all parties involved, clearly define the scope of application and related punishment mechanisms, and eliminate the uncertainty in mergers and acquisitions as soon as possible. And government should

figure as an intermediary service agency in the process of M&A and reorganization [6].

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