An empirical study on China listing corporation industrial-financial combination based on the regression method

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Abstract

This paper takes Chinese listing corporation as research samples to find the best combination area or point about the industry-finance combination on enterprise operating performance. Research on the combination of behaviour impact is carried out through EPS, RPE, ROE, Tobin Q four indicators. The paper is mainly using the nonlinear regression method based on steel listing corporation annual data from 2005 to 2008. Experiments show that the relation by EPS, RPE and Tobin Q meeting the cubic function curve is significant; the relation by ROE meeting the curve function is not significant. In a certain stage of development of the enterprise the appropriate industry-finance combination area or ratio exists, but the ratio of each index is different.

Keywords: industrial-financial combination, the nonlinear regression, the cubic curve, China steel listing corporation, the best combination point

1 Introduction

The combination of industry and finance is the industrial economy and the financial sector in the development process of the mutual penetration and influence process. It is that the market economy develops to a certain stage of the inevitable trend [1, 2].

Practice of the developed countries shows that industrial capital and financial capital will have a fusion process to distribute the social resources more effective to meet the objective requirements. This kind of fusion is conducive to the national financial policy at the macro level and fast flowing to industrial capital at the micro level, and can ultimately improve the efficiency of capital allocation. Industry and finance how to combine effectively became one of the research foci of the theory. Many scholars have studied the problem and the concept of the integration essence, mechanism, motivation and the effective conditions [3, 4].

In recent years, Baosteel Group, Shougang Group, Wuhan Iron and Steel Group, China steel enterprises listed company have carried out the exploration and the practice of the industry and finance combination accumulated certain experience. These practice and explorations as we stand on the corporate perspective of the Combination of behaviour provide realistic materials.

This article takes Chinese listing corporation as research samples to find the best combination area or point about the industry-finance combination on enterprise operating performance, making an empirical test of different proportion of share of the combination of industry with finance behaviour influence on the management performance and the value of the enterprise. Research on the combination of behaviour impact is carried out through EPS, RPE, ROE, Tobin Q four indexes. In order to obtain a smooth curve fitting for scattered data to find the best combination points or area is the research focus and difficulty of microscopic study. This paper is mainly using the nonlinear regression method based on China's steel listing corporation annual data from 2005 to 2008. Experiments show that the relation by EPS, RPE and Tobin Q meeting the cubic function curve is significant; the relation by ROE meeting the curve function is not significant. This text fully shows that the combination optimum ratio do exist in a certain stage of development of companies.

2 Literature review

The existing literature about the combination effect of listing Corporation empirical research mainly concentrated in two observation aspects. One is based on financial enterprises shares of non-financial listing corporation perspective, using cross section data in quantitative analysis of finance enterprise shareholding proportion of listing corporation performance and other aspects of the impact effect of listing Corporation empirical research.

Another is based on non-financial listing corporation shares of financial institutions, contrast before and after financial listing corporation accounting index to analyse the impact of combination of industry with finance. This study is based on the first one [5, 6].

We have found that the enterprise in a certain stage of development has the most appropriate industry-finance combination ratio or area to make the impacts on the

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performance and the value by using Loess regression method in 2013.

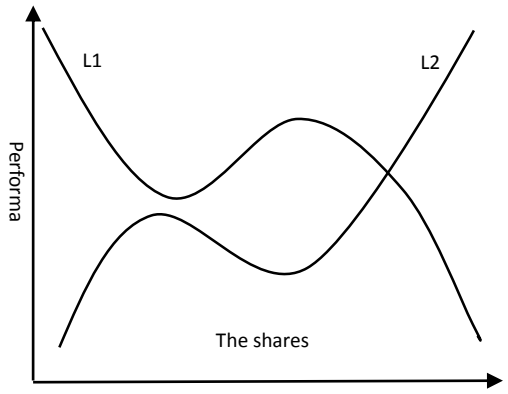

FIGURE 1 The Cubic curve of the relation between the performance and the shares

Further documents showed, the study is essentially research on the relationship between firm performances and the larger shareholders holdings based on the viewing angle. Existing literatures found that the largest shareholder of the company effect on the value may not only bring the potential incentive effects, but also bring defensive effects. The impact is with a clear section feature. There is the Cubic regression relationship between corporate value and the first shareholder ownership. But the change trend of the curve of the first major shareholders is opposite to that of the second largest shareholder. As Figure 1, curve L1 shows the relationship between corporate performance and the proportion of the first largest shareholder, curve L2 shows the relations between corporate performance and the proportion of the second largest shareholder [7, 8].

3 Data and methodology

3.1 VARIABLES AND DATA

With reference to the relevant literature we selected RPE, EPS, ROE, Tobin Q to represent the enterprise performance.

The Scale variable, used to describe the degree of industry-finance combination, is the total of the proportion held by shareholders with financial background from the 10 larger shareholders by our collection and arrangement.

This paper studied Chinese Shanghai and Shenzhen Stock Markets Sample steel listing Corporation (C6), with the time interval from 2005 to 2008. In this paper, data from Shanghai and Shenzhen stock market listing Corporations released annual report of listing Corporation *.pdf file or bulletin. The main data are from RESSET database, CHINF sites, China Securities Regulatory Commission and China listing Corporation information network and other related sites.

Considering the effectiveness and availability of data, financial shareholder equity ratio of the top ten shareholders is selected as the explanatory variable.

Those heterogeneous samples are eliminated. For example, the same company's stock has been listed in Hong Kong stock market, or EPS is negative or more than 100, or ROE is negative, or the stock symbol is ST.

Through screening and analysis, we derive conditions consistent with the sample of 95 listing Corporation. The data used variables are defined as shown in Table 1. Results are analysed and calculated by using SPSS 18.

As shown in Table 2, RPE, EPS and ROE of the average of 18.03, 0.376, 0.184 and Tobin Q value of mean 1.376, mean that iron and steel enterprises are still in rapid development, and benefits is good, and market prospect is valued and recognized from 2005 to 2008. In fact, China steel industry is in the best period of its history.

3.2 The nonlinear regression method

Firstly we study variables Pearson correlation analysis. Then according to the degree of correlation coefficient, the regression models are established. Finally, the function models are utilized to analyse the relevant data.

In the light of the previous literature, we put the proportion of shares of financial companies as an explanatory variable, and selected RPE, EPS, ROE and Tobin Q value as the explained variables. So four regression models are established [5, 6].

According to the trend of correlation analysis and plot, we use the SPSS software regression analysis, curve estimation, regression analysis of data using the linear, logarithmic, countdown, two times, three times, compound, power, S, growth, index, Logistic function model.

TABLE 1 The definition of variables

Variable	Symbol	Data type	Definition
Order	no	Numeric(N)	The order
Company code	code	Character(C)	Steel listed companies code
Company name	company	Character(C)	Steel listed companies name
Data date	date	Date(D)	The date of the data
The shareholding ratio	scale	Numeric(N)	The total of the proportion held by shareholders with financial background from the 10 larger shareholders
P/ e ratio	rpe	Numeric(N)	The annual price-earnings ratio
Earnings per share	eps	Numeric(N)	Diluted earnings per share
The net assets returns ratio	roe	Numeric(N)	Diluted net assets returns ratio
Tobin Q	qval	Numeric(N)	The Tobin's value
Remark	bj	Character(C)	Notes and instructions

TABLE 2 The descriptive statistics of variables

Symbol	N	Min	Max	Mean	Std. Deviation
Date	95	2005/12/31	2008/12/31		
Scale	95	0.15	39.28	6.2767	7.0096
Rpe	95	**3.9332**	**90.6077**	18.0323	16.71
Eps	95	0.0061	1.2356	0.3756	0.3027
Roe	95	0.0033	0.88	0.184	0.1815
Qval	95	0.7936	3.0421	1.3257	0.554

TABLE 3 The Pearson correlations of variables

		Scale	RPE	EPS	ROE	Qval
Scale	Pearson Correlation	1	.240*	.285**	-.029	.316**
	Sig. (2-tailed)		.019	.005	.779	.002
	N	95	95	95	95	95

* Correlation is significant at the 0.05 level (2-tailed) **. Correlation is significant at the 0.01 level (2-tailed)

As can be seen from Table 3, between EPS and scale, the Pearson correlation coefficient was 0.285, and at the 0.01 level significantly. So there is an obvious positive correlation between the two variables. The function of curve fitting regression analysis by SPSS software, the results in Table 4 and Figure 2.

TABLE 4 The model summary and parameter estimates of EPS

Equation	Model Summary					Parameter Estimates			
	R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
Linear	.081	8.252	1	93	.005	.298	.012		
Logarithmic	.092	9.464	1	93	.003	.271	.080		
Inverse	.026	2.531	1	93	.115	.403	-.045		
Quadratic	.146	7.836	2	92	.001	.197	.041	-.001	
Cubic	.147	5.217	3	91	.002	.210	.034	.000	-1.456E-5
Compound	.072	7.269	1	93	.008	.192	1.041		
Power	.104	10.840	1	93	.001	.169	.292		
S	.053	5.182	1	93	.025	-1.265	-.217		
Growth	.072	7.269	1	93	.008	-1.648	.040		
Exponential	.072	7.269	1	93	.008	.192	.040		
Logistic	.072	7.269	1	93	.008	5.197	.961		

The dependent variable is EPS, and the independent variable is scale.

Table 4 shows the three function model (Cubic) fitting degree is higher, and the overall model fit is higher. We can get the equation model as follows. The *h* in Equation (1) represents the scale variable.

$$EPS = c + \beta_1 h + \beta_2 h^2 + \beta_3 h^3 . \quad (1)$$

The curve of EPS is as Figure 2.

TABLE 5 The cubic model summary of RPE, ROE and Qval

Dependent Variable	Model Summary					Parameter Estimates			
	R Square	*F*	*df1*	*df2*	*Sig.*	*Constant*	*b1*	*b2*	*b3*
RPE	.066	2.149	3	91	.099	14.820	.066	.073	-.002
ROE	.021	.656	3	91	.581	.235	-.021	.002	-3.145E-5
Qval	.145	5.130	3	91	.003	.972	.093	-.004	5.428E-5

Seen from Table 5, RPE and Qval (Tobin Q) reach statistical significant criteria. ROE does not reach the significant requirements. The *h* in equations represents the scale variable.

$$RPE = c + \beta_1 h + \beta_2 h^2 + \beta_3 h^3 , \quad (2)$$

$$Tobin Q = C + \beta_1 h + \beta_2 h^2 + \beta_3 h^2 . \quad (3)$$

The Cubic curve of the variables is as follows figures.

In order to observe the overall change trend, we will coordinate axes appropriately extended. It is no practical significance that some coordinate is negative. For example, *x* is negative of no significance

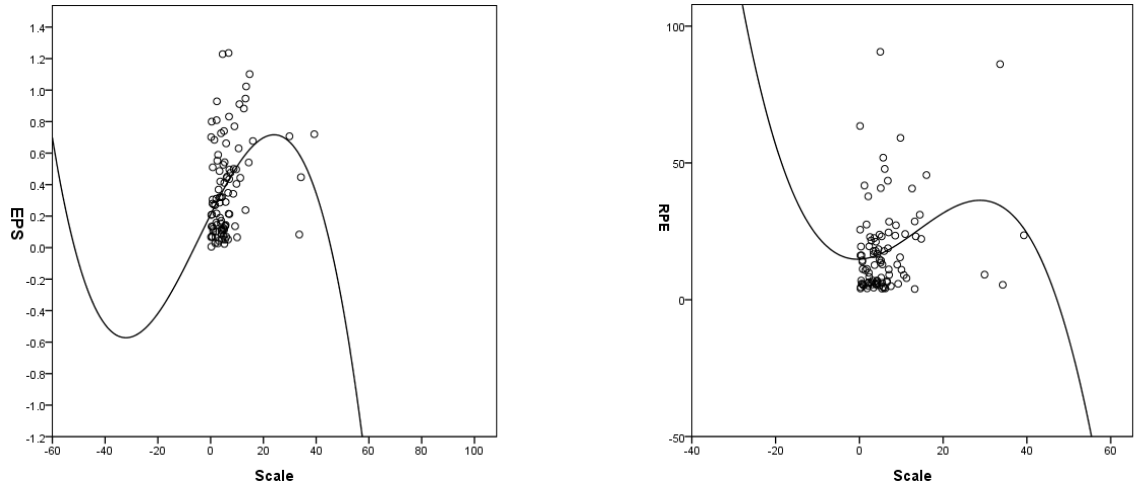

FIGURE 2 The Cubic curve of EPS and RPE

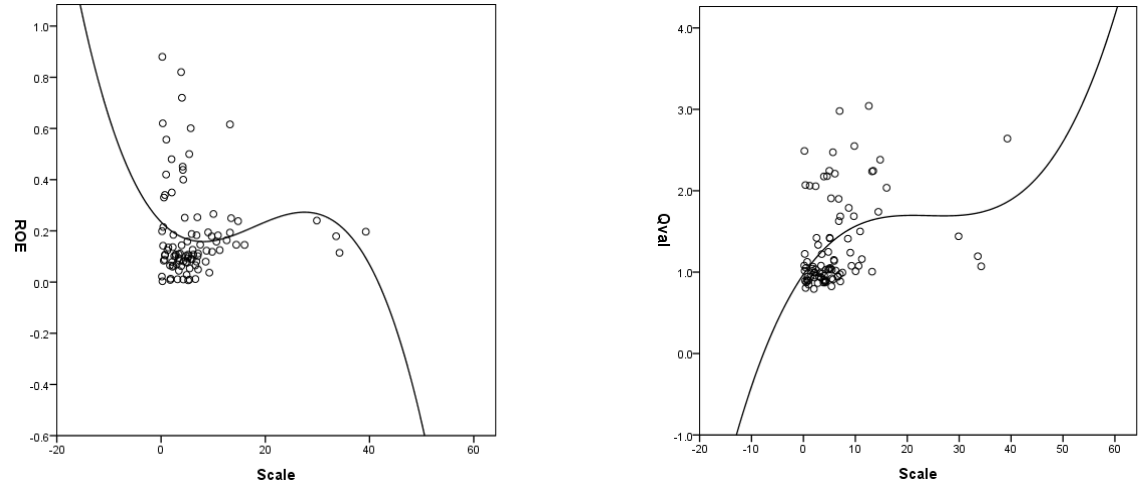

FIGURE 3 The Cubic curve of ROE and Tobin Q

4 Empirical Results

Combined with the above, we can see the following phenomena as follows:

First, from Figure 2 to Figure 3 can be seen, the curve is a "S" type, and exists the extreme values in certain interval. According to the equation each variable can calculate *x* coordinates of each variable in the range of the maximum or minimum value. For example, when *x* value is 27.9, EPS reaches the maximum value in the right interval. When *x* value is 24.8, RPE reaches the maximum value in its right interval. And when *x* value is 6.1 or 36.3, ROE can reach the maximum value in its interval. And when *x* value is 18.9 or 30.2, Tobin Q can reach the maximum value in its interval. EPS and RPE have one value, but ROE and Tobin Q have two values. This is consistent with the figures as Figure 2 and Figure 3.

Second, RPE, EPS, ROE and Tobin Q can reach the maximum value or the minimum value from the Cubic curves, but the ratio of each index is different.

In the end, from 2005 to 2008 by our calculation, the means of the combination of ownership is increased gradually, and the maximum value is 8.41 in 2007. Because of 2008 financial crisis consequences, the ownership began to decline significantly in 2008.

5 Conclusions and prospect

Three important conclusions can be drawn from the above results.

Firstly, EPS, RPE and Tobin Q could obey the rules of shareholding ratio and operating performance. But the law obeyed by EPS and RPE is different from the one obeyed by Tobin Q. ROE does not reach statistical significance criterion.

Secondly, the combination optimum ratio about the relation between the performance and the shares do exist, but the ratio of each index is different. The combination has different effects on each index of the iron and steel enterprises. RPE, EPS and Tobin Q can reach the maximum value or the minimum value when the proportion is appropriate, but the value of each index is different.

Finally, as the ratio is far from the optimal proportion for the maximum value of the mean scale is only 8.41, the industry-finance combination of Chinese iron and steel listing Corporation is still relatively junior.

Chinese iron and steel enterprises should consider the combination of industry and finance as the priority direction of development as the steel industry is a typical capital-intensive, resource-intensive and technology-intensive industry. It is necessary for companies to suit their measures to local conditions to carry out the combination practice. Only when certain conditions would be met, production and finance can be effectively combined [9]. To speed up the upgrading of the industrial structure adjustment, the combination provides a new way and an idea for China iron and steel industry and other traditional industries. It can promote China's iron and steel enterprises to get out of the current predicament of production and management as soon as possible [10, 11].

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