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Study on the relationship between corporate governance and investment efficiency----based on the analysis of tsingtao brewery group in China

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ABSTRACT

The agency problems in modern corporate governance can lead to conflicts among shareholders, managers, large shareholders and small shareholders, which will affect the company's selection and the scale of investment in the investment project namely investment efficiency. This paper selects two indicators to study the relationship between corporate governance and investment efficiency, establishing multiple linear regression models by the least squares method. Conclusions are drawn: the relationship between the proportion of independent directors and investment efficiency is positively correlated as well as the relationship between equity restriction and investment efficiency.

KEYWORDS

The proportion of independent directors; Equity restriction; Investment efficiency; Corporate governance; Empirical analysis.

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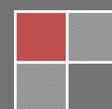
INTRODUCTION

With increasing competition in the market, the enterprise must increase its value in order to be in an impregnable position. As effective investment behavior can promote enterprise growth, make the enterprise a higher value, and make the future cash flows grow, the research on investment efficiency has practical significance for value-added enterprises[1-3].

Corporate governance originates from the separation of ownership and management and its essence is to solve the agency problem of the separation of ownership and control rights[4,5]. The purpose of corporate governance is to reduce the agent cost and realize the maximization of value while it is introduced to solve the problem of an inefficiency of investment caused by the factors such as the principal-agent theory and information asymmetry[6]. It is reported that effective corporate governance can prevent and constrain inefficient investment behavior[7,8].

Corporate governance theory is becoming more and more closely related to modern finance, with the result that the role of corporate governance in economic activities has become the focus of study in recent years. Now, under-investment and over-investment are widespread in the investment activity, which seriously hinders the development of the company. To curb this phenomenon, and improve the efficiency of investment through the role of corporate governance, enhancing the value of the company is urgently needed.

LITERATURE REVIEW

Gugler (2003) found the holding rate of the largest shareholder is higher, the more prone to generate benefit expropriation of controlling shareholders and this will exacerbate conflict of interest between controlling shareholders and the minority shareholders[9]. Therefore, large shareholder equity balance could weaken the controlling shareholder's ability of seeking personal benefits and it also can improve the value of the company that was found by Maury and Pajuste (2005)[10]. High corporate ownership concentration is more prone to generate shareholders for personal gain, which is more likely to occur in the family business, as a result, other large shareholders must be introduced to monitor the controlling shareholder, and weaken the ability of controlling shareholders to seek personal benefit. If the proportion of independent directors is high, the probability of generating fraud behavior and failing to comply with professional services will be low[11].

Yang Qingxiang etc. (2010) in the study of the impact of ownership structure on investment behavior found that: The share of the controlling shareholders was positively associated with the inefficiency investment while the ratio of external large shareholding negatively correlated with the inefficiency investment and the reason of inefficient investment is the two rights separation of ultimate controlling shareholder[12]. Guo Sheng and Zhang Daohong (2011) based on the data (2007-2009) of Chinese listed companies found that: Inefficient investment phenomenon in Chinese listed companies is much severe. As there is nonlinear relation between controlling shareholder and inefficient investment, the second largest shareholder can inhibit excessive investment behavior. At the same time, there is a positively relationship between ownership concentration and inefficient investment, so the collusion of chairman of the board and manager leads to inefficient investment. To solve the problem, we had better set up rules and regulations of mutual supervision[13]. Chen Deping, Chen Yongsheng (2011) in the study of the relationship among ownership concentration, equity restriction and efficient investment found that: there is a U-shaped relationship between ownership concentration and efficient investment and a higher equity restriction can improve investment efficiency[14].

All existing literature is based on section data, and few are directed at individual company studies. Meanwhile, conclusion based on the data of most companies is difficult to be applied in special companies for every enterprise has its own characteristics[15-22]. So the conclusion studied by the data (2003-2013) of Tsingtao Brewery Group can be applied to the company and can improve its investment efficiency to enhance the value of the company. Specific data is displayed in the appendix (Investment efficiency and indicators of corporate governance in Tsingtao Brewery Group).

Appendix : Investment efficiency and indicators of corporate governance in Tsingtao Brewery Group

year	ROE(y)	the proportion ofindependent directors(x_1)	equity restriction(x_2)
2003-12-31	0.0722	0.4000	0.8463
2004-12-31	0.0780	0.4444	0.8327
2005-12-31	0.0615	0.3636	0.5475
2006-12-31	0.0833	0.3636	0.5468
2007-12-31	0.1013	0.3636	0.5561
2008-12-31	0.1150	0.3636	0.5604
2009-12-31	0.1525	0.3636	0.5718
2010-12-31	0.1583	0.3636	0.5726
2011-12-31	0.1564	0.3636	0.5748
2012-12-31	0.1411	0.4000	0.5643
2013-12-31	0.1407	0.2222	0.5591

(Source of Data : CSMAR Database)

MODEL ESTABLISHMENT AND THE EMPIRICAL ANALYSIS

Research samples and data source

Tsingtao Brewery is the first in beer producers as well as in beer industry sectors in China. According to the ranking of Barth Report (global beer industry's most authoritative reports), Tsingtao brewery was the world's sixth largest beer manufacturer. This article chooses the data of Tsingtao Brewery from 2003 to 2013 for the empirical analysis, in order to study the relationship between corporate governance and investment efficiency, and improve the competitiveness of Tsingtao Brewery in the international market.

Variable definition and selection

Explained variable: Rate of Return on Common Stockholders' Equity (ROE)
Explaining variable: the proportion of independent directors; equity restriction

TABLE 1 : Variable definition table

	Variable name	Variable Description
Explained variable	ROE(y)	net profit/ownership interest
Explaining variable	the proportion of independent directors(x_1)	Independent director number/total number of directors
	equity restriction(x_2)	The first major shareholders holding shares/ The 2-10 shareholders holding shares

The ordinary least square method

The method of least squares assumes that the best-fit curve of a given type is the curve that has the minimal sum of the deviations squared (least square error) from a given set of data. Three characteristics of the least squares method are linear character, unbias and the smallest variance.

Model establishment

In this paper, we establish model by using the least squares method, choosing the ROE of Tsingtao Brewery as explained variable, the proportion of independent directors, equity restriction as explaining variables and the time variable t is also introduced. Through processing data by using Eviews 6.0 and Excel, including collecting data by Excel and building a model for regression analysis by the least square method. A model is constructed as follows:

$$y = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 + \beta_3 \chi_3 + \mu_t \tag{1}$$

β_0 as constant term; $\beta_1 - \beta_3$ as regression coefficient; μ_t as random error

Model solution and analysis of results

The data of Tsingtao Brewery is processed by Eviews 6.0 and Excel; the output result diagrams are listed as follows:

Dependent Variable: Y
Method: Least Squares
Date: 05/21/14　Time: 20:42
Sample: 2003 2013
Included observations: 11

	Coefficient	Std. Error	t-Statistic	Prob.
C	0.127621	0.018722	6.816761	0.0005
1/X1^4	-0.000896	0.000204	-4.389683	0.0046
EXP(1/X2)	-0.009596	0.003335	-2.877237	0.0282
T	0.076467	0.016161	4.731611	0.0032
T*X1	-0.164973	0.041878	-3.939387	0.0076

R-squared	0.963249	Mean dependent var		0.114573
Adjusted R-squared	0.938748	S.D. dependent var		0.036865
S.E. of regression	0.009124	Akaike info criterion		-6.252892
Sum squared resid	0.000499	Schwarz criterion		-6.072031
Log likelihood	39.39091	Hannan-Quinn criter.		-6.366900
F-statistic	39.31473	Durbin-Watson stat		2.160464
Prob(F-statistic)	0.000193			

Figure 1 : Estimates of the model

Model established in this paper is listed as follows:

$$y = 0.127621 - 0.000896 \frac{1}{x_1^4} - 0.009596 * e^{\frac{1}{x_2}} + t + t * x_1 \tag{2}$$

Using the least square method in Eviews 6.0 to establish the model, we can draw the following conclusion: Investment efficiency(y) is positively correlated with the proportion of independent directors(x1), as with the equity(x2). That is to say the more the independent directors in the company are, the more efficient the supervision of management is. When the equity restriction is larger in company, the interest of minority shareholders will be taken into account and the efficiency of investment is better.

R^2 is the measuring index of goodness of fit about the sample regression line and sample observation value. In this, $R^2 = 0.9632$ shows that the independent directors proportion and equity restriction have a stronger interpreting ability of ROE.

T test is used as the significance test of explaining variable. In this paper, the significance level is $\alpha = 0.05$, as long as the value of the column $Prob$ is less than 0.05, the explaining variable will be significant to the explained .Output figure shows that the explaining variable has a strong significance.

F test is used to test the significance of regression equation. The significance level is $\alpha = 0.05$ as well as $\Pr ob(F - statistic) = 0.000193$ shows the regression equation has significance.

MODEL TESTING

Heteroscedasticity test

The model established by the least squares method must under the condition of random error u_t homoscedasticity and white test is usually used to test the Heteroscedasticity. Using white test to test the model established in this paper, the results are shown in the following figure:

Heteroskedasticity Test: White

F-statistic	1.330950	Prob. F(4,6)	0.3586
Obs*R-squared	5.171568	Prob. Chi-Square(4)	0.2701
Scaled explained SS	2.623866	Prob. Chi-Square(4)	0.6226

Figure 2 : White test

In this paper Prob=0.2701> α (α=0.05), this indicates that the model established passes the white test.

Autocorrelation test

Only in this way that random error u_t does not meet the autocorrelation, can the model established by the least squares method be used. Therefore, we should test model established in the paper for autocorrelation test.

The methods of autocorrelation test usually include DW test and LM test. In this paper, we use the LM test. The result is shown in the following figure:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.089663	Prob. F(1,5)	0.7767
Obs*R-squared	0.193783	Prob. Chi-Square(1)	0.6598

Figure 3 : LM test

In this paper, Prob=0.6598>α (α=0.05) indicates that there is no autocorrelation in the model.

Multicollinearity test

As for the model established by least squares method, the existence of multicollinearity should be tested. Klein discriminant method is the most commonly used method of multicollinearity test. The result of multicollinearity test in this paper is shown in the following figure:

Correlation		
	X1	X2
X1	1.000000	0.526676
X2	0.526676	1.000000

Figure 4 : Multicollinearity test

In this paper, $R^2 = 0.9632$ indicates that explanatory variables do not have multicollinearity.

CONCLUSIONS

In this paper, considering the factors of investment efficiency from the proportion of independent directors and equity restriction, we can draw the following conclusions: The larger the proportion of independent directors is, the better the investment efficiency is and the higher the equity restriction is,

the better the investment efficiency is. As a result, by the application of this to the corporate governance of Tsingtao Brewery, the company can increase the number of independent directors and improve the equity restriction to solve the inefficient investment caused by information asymmetry and principle-agent. What is more, if the company has higher investment efficiency, the value of it will be improved and it also will be in an impregnable position in the intense market competition all the time.

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