Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2015, 7(3):604-609

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Analysis on the governance efficiency of forestry listed corporate and the impact on company performance

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ABSTRACT

This article selected the forestry listed company as a research object from 2004 to 2012 in China, using DEA-Malmquist method measured the efficiency governance of forestry listed companies, and the use of Panel Data model to analyze the impact of governance efficiency on company performance. The results show that: the governance efficiency of forestry corporate were quite different, governance was uneven level, the impact of corporate governance efficiency on firm performance has a positive role in promoting.

Key words: Forestry listed company; DEA-Malmquist index; Panal data; Company performance

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INTRODUCTION

Forestry industry is an important part of the basis for national economic development, and it can not be replaced by other industries. The forestry listed companies is the leader of forestry industry, an important carrier to achieve a modern enterprise management, increase national income, its specificity determines its important role in China's economic development. Since the early 2000s, the forestry companies have tended to market, hoping to get better financing effect. Although in recent years governance structure of China forestry listed companies has been continuously improved through hard work, its development has been constrained by the objective environment and the traditional state-owned planned economy, resulting in its still exists some problems. Based on this, this paper's object is forestry listed companies, cut from the perspective of corporate governance of listed forestry, researches effectiveness of governance of forestry corporate in China, and then analyzes the relationship between corporate governance efficiency and its performance, and to a certain contributions of forestry economy development.

EVALUATION AND ANALYSIS OF GOVERNANCE EFFICIENCY OF FORESTRY LISTED CORPORATE

In the study of the efficiency of governance of listed companies, the domestic scholars generally made the financial performance or market performance (Tobin's Q) as the measure of the efficiency of corporate governance, or by building the corporate governance index to measure the efficiency of corporate governance. However, in addition to financial performance or market performance by the outside influence of corporate governance efficiency is also affected by many other factors, it is difficult to objectively reflect the level of corporate governance; at the same time, due to the different selected indicators and methods in corporate governance index constructing, will make the results a big difference.

Lauterbach, Vaninsky and Eriketal respectively used DEA methods to measure the efficiency of corporate governance. Because DEA method is particularly applicable to research frontier production function for measuring the same decision making unit with more input and more output, can not require pre-set ratio of input and output, to avoid the human subjective factors, and is widely used. The calculated results by this method can be objectively and effectively evaluate corporate governance.

Although some scholars researched the efficiency of forestry corporate governance, these studies were mostly on the specific forestry or comparative analysis of forestry listed companies in cross-section data in a given year, the comparative analysis of longitudinal historical data have significant deficiencies, and no digging out the dynamic characteristics of governance efficiency of forestry corporate. Based on DEA-Malmquist index method, not only has the advantage of panel data analysis, but also can analyze efficiency of industry with more input and output under the unknown production function, no information about the price and governance inefficient distribution assumptions.

1. Research Methods

DEA-Malmquist index was proposed by Malmquist, after further study by Caves et al., and combined data envelopment analysis (DEA) method the Malmquist index was only applied to the analysis of a wide range of fields. DEA-Malmquist index is estimated based on distance function and used the linear optimization method to define the frontier production function for each decision making unit (DMU), and therefore it's the efficiency method for measuring the efficiency of dynamic changes of each DMU's efficiency and technological progress. If (X_t, Y_t) and (X_{t+1}, Y_{t+1}) represents the investment, output vector to t , $t+1$ period , $D_0^t(X_t, Y_t)$ and $D_0^{t+1}(X_{t+1}, Y_{t+1})$ respectively represents output function for input, output vectors in t , $t+1$ period, the Malmquist under technical conditions index in period t is:

$$M_0^t(X^{t+1}, Y^{t+1}, X^t, Y^t) = \frac{D_0^t(X^{t+1}, Y^{t+1})}{D_0^t(X^t, Y^t)} \tag{1}$$

\Similarly, Malmquist index under technical conditions in $t+1$ period can be expressed as:

$$M_0^{t+1}(X^{t+1}, Y^{t+1}, X^t, Y^t) = \frac{D_0^{t+1}(X^{t+1}, Y^{t+1})}{D_0^{t+1}(X^t, Y^t)} \tag{2}$$

To avoid different results under technical conditions or at different times, it can be established ideal index according to Fisher, used the geometric mean of the above two equations to measure the efficiency change Malmquist index from t period to $t+1$ period, namely:

$$M_0(X^{t+1}, Y^{t+1}, X^t, Y^t) = \left[\frac{D_0^t(X^{t+1}, Y^{t+1})}{D_0^t(X^t, Y^t)} \times \frac{D_0^{t+1}(X^{t+1}, Y^{t+1})}{D_0^{t+1}(X^t, Y^t)} \right] \tag{3}$$

If the result of formula (3) is greater than(1), it indicates the efficiency growing, On the contrary, indicates efficiency reducing.

2. Samples and data

This article selected the sample from period 2004-2012, while according to CSRC industry classification, finding and analyzing possibly involved in the industry classification system in the company as the study object, and selected all sub-sectors in agriculture, forestry, animal husbandry and fishery, the timber, paper and furniture industries in manufacturing's sub-sectors select and social services in the tourism sub-sectors. In these samples, in order to avoid the influence by the extreme values, excluding ST, PT company, then the article received a total of 22 listed companies[1]. The required data is from the annual reports of listed companies, listed companies' annual reports from the financial sector (http://www.jrj.com.cn), the annual report of incomplete data from Sina Financial Network (http: //money.finance.sina. com.cn) corresponding data supplement.

3. Selection of input and output indicators

In this paper, when building the index system of corporate governance of listed forestry, not only draws on Allen Gale, Bai, Bai and Lius' existing research and analytical framework, but also take into account the specificity of the listed companies in China's environmental management, especially the characteristics of forestry industry, namely the dominance and state-owned holding , from the equity, board structure, management incentives, debt financing,

[1] This 22 companies are: Jilinsengong, Dunhuang Seed Co., Guodong Construction, Hengfeng Paper, Guanhao high, Jielong Industry, Kazakh vote shares, Markor, Huangshan, Tunhe, Yihua wood industry, Thailand shares, Yueyang Forest & Paper, Bo paper, Shanyingzhiye, Fujian Nanping Paper, Yingetouzi, Qingshan, Minfengtezhi, the Great Northern Wilderness, Ya Sheng collective Xinnongkaifa

corporate control and Chinese specialties, such as six levels selectes indicators, contains a total of 10 indicators (including input and output), see Table 1.

Table 1.Forestry index system of governance of listed companies

	Index	Symbol	Indicator Definition
Input Items	Ratio of the largest shareholder	X_1	Largest shareholder holding share capital of the total amount
	Degree of shares concentration	X_2	Proportion of the second to the fifth largest shareholding ratio to the largest shareholder
	Proportion of independent directors	X_3	Ratio of number of independent directors to total Board number
	Board size	X_4	Ln (the total number of Board of Directors)
	Whether two jobs in one	X_5	Chairman, who served as general manager for 1, otherwise 0
	Whether establishing the audit committee	X_6	Establishment of an audit committee for 1, otherwise 0
	Management incentive	X_7	Proportion of the executives' number of shares of total share capital
	Asset-liability ratio	X_8	Ratio of total debt to total assets
Output Items	Tangible asset growth ratio	Y_1	Ratio of the annual increasing in the amount of tangible assets and average total assets
	Company's growth	Y_2	Ratio of annual increase in the amount of main business income to main business income last period

1.1 Corporate Governance input indicators.

The first largest shareholder often play a leading role in China's listed companies, the degree of shares concentration can inhibit the equity the controlling shareholder's shares, limiting his occupation to other small shareholders, making the effectiveness of the regulation improved, so this article will have the Shareholders' equity ratio of first largest shareholder and the degree of shares centralization with China characteristics into input items. The Board is the business executive organ of the shareholders or corporate shareholders' meeting, responsible for directing and managing the company or companies and business activities, and reporting to shareholders or corporate shareholders' meeting. Independent director system in China has risen to the legal level, at least one-third of board members should be independent directors, the board of directors and audit committee size is an important factor affecting the efficiency of corporate governance. The Board can make scientific decisions, can play a positive role, by the chairman and general manager of the representation of influence to a large extent; and establish an audit committee can issue a certain extent, caused due to information asymmetry. Therefore, this paper makes board size, proportion of independent directors, whether two jobs in one, whether establishing an audit committee into input items. The higher the proportion of shares held by senior management, the more consistent with the interests of the shareholders of the company, the more to reduce agency costs, the more it can improve the efficiency of corporate governance, this article make the proportion of executives holding into input items. At the same time, due to the debt financing has some impact on corporate governance, for which it will be make into the asset-liability ratio of input items.

1.2 Corporate Governance output indicators.

Companies can obtain the expected future returns of the main driving force comes from the growing tangible assets and the company continues to grow, these two indicators can effectively reflect the company's efficiency, so these two indicators as output term corporate governance. Due to the presence of these two indicators are negative growth possible, in order to meet the DEA-Malmquist index model calculations required them Min-Max normalization process.

Table 2. Descriptive statistics

	Sample Size	Min	Max	Mean	Standard deviation
Ratio of the largest shareholder	198	5.	79.6	36.8	15.5
Degree of shares concentration	198	0.0	3.0	0.5	0.6
Proportion of independent directors	198	18.2	60.0	36.0	5.5
Board size	198	1.9	2.9	2.3	0.2
Whether two jobs in one	198	0.0	1.0	0.1	0.2
Whether establishing the audit committee	198	0.0	1.0	0.0	0.2
Management incentive	198	0.0	0.0	0.6	0.5
Asset-liability ratio	198	20.1	93.7	51.0	14.5
Tangible asset growth ratio	198	-49.5	335.4	15.1	29.6
Company's growth	198	-51.1	131.0	15.9	25.1

Table 2 lists the descriptive statistics of inputs and outputs items. It shows that: the minimum of the proportion of the largest shareholder in China's forestry listed companies currently 5.020%, and the maximum is 79.590%, with an average of 36.769%, indicating that the phenomenon of dominance in the China forestry listed companies indeed exists; the minimum of equity balance degree is approximately zero, the average value is only 0.494, indicating that the political impact of other major shareholders to the largest shareholder is very limited; the minimum of proportion of independent directors is 18.182%, 36.041% is mean, showing the proportion of independent directors generally only reach minimum requirements, just over the pass line, and there is a big difference between the different companies; whether the chairman and general manager of one of the two jobs on average 5.1% of samples, chairman and general manager of the company's remaining two jobs separate sample ; the establishment of audit committees of listed companies, only 4.1%, the vast majority of companies have not set up an audit committee; the proportion of shares held by senior management is not high, an average is only 0.17%, it is difficult to give full play to the role of equity incentives; the lowest rates for assets and liabilities ratio is 20.050%, up to 93.720%, indicating that there is a difference between the use of financial leverage in terms of different companies; the average growth rate is 15.070% about tangible assets, and the company's growth average is 15.900 percent.

4. Evaluation and Analysis of Forestry Listed Companies Governance Efficiency

Table 3. Calculations of average efficiency of the governance of listed companies in the forestry

Year	2005	2006	2007	2008	2009	2010	2011	2012
Mean	0.9	1.0	1.1	1.1	1.1	1.1	0.9	0.9

Table 4. 2004-2012 average of governance efficiency of forestry listed companies

Company	Mean	Company	Mean	Company	Mean	Company	Mean
the Great Northern Wilderness	1.1	Kazakh vote shares	1.2	Markor	1.0	Ya Sheng collective	1.2
Bohui paper	1.0	Hengfeng Paper	0.9	Minfengtezhi	1.0	Yihua wood industry	1.0
Dunhuang Seed Co.	1.0	Thailand shares	0.9	Qingshan	0.8	Yingetouzi	0.9
Fujian Nanping Paper	0.8	Huangshan	0.9	Shanyingzhiye	1.2	Yueyang Forest & Paper	0.9
Guanhao high	1.0	Jilinsengong	0.9	Xinnongkaifa	0.6	Tunhe	1.2
Guodong Construction	1.1	Jielong Industry	1.0				

Using the DEA-Malmquist index separately calculates the governance efficiency of forestry listed companies by year and company, this article lists the average of governance in different years, only 22 listed in the 2005-2012 year average governance efficiency of according to research purposes. The results are shown in Table 3 and 4.

From Table 3, from different years, the efficiency of forestry governance in most listed companies in more than 1, ie 2005-2012, China's forestry corporate governance efficiency showed a rising trend, but there has been a certain degree of volatility during part of the year appear a downward trend, where in 2011 the largest decline, reaching 10%. As can be seen from Table 4, 2005-2012, Fujian Nanping Paper, Hengfeng Paper, Thailand shares, Huangshan, Jilinsengong, Qingshan, Xinnongkaifa, Yingetouzi and Yueyang Forest & Paper, etc. 9 Management Efficiency showing a declining trend, almost half of the sample companies, which Xinnongkaifa largest decline, 39.7%, the smallest decline Yingetouzi, only 1.7%; the remaining 13 companies are showing positive growth which Kazakhstan shares voted for the largest increase of 23.4%, and more than 60% decline compared with the magnitude of the biggest changes Xinnongkaifa governance efficiency. Visible, companies exist in corporate governance is a big difference in the uneven level of governance, to be further improved. This may be due to the special structure of property rights caused by forestry: a lack of minority shareholders controlling shareholder of checks and balances, even though they have established independent director system, but most companies in this regard only to meet the minimum requirements, the role of independent directors has not been effective play board structure is not yet complete and obtain compensation in the form of over a single, low proportion held by executives, as well as various professional committees, but this should have been established, and is not conducive to full equity incentive is too low proportion of debt financing limiting the effects of corporate governance play.

COMPANY GOVERNANCE EFFICIENCY AND COMPANY PERFORMANCE

1. Hypothesis

It is necessary to create a good corporate governance environment for the company stable performance continued growth, the efficient operation of the market system, because it can effectively reduce agency costs, enhance the company's core competitiveness and management efficiency, reduce investment risk. In the study of Black, Jang and Kim, the apparent positive correlation coefficient of corporate governance in Tobin's Q, domestic scholars also show the higher the level of corporate governance to actively promote their performance, a high level of control of their company's market value is high. In view of this paper presents the following assumptions: forestry performance of

listed companies will continue to improve as the governance and increasing efficiency.

2. Index selection and Modeling Establishment

In this paper, the market performance to measure the company's performance, Tobin's Q can be used to measure the company's market performance, Tobin's Q is defined as the market value of the asset replacement cost ratio. This article draws on Tobin's Q simplified calculation method, but this method is applied to the presence of Chinese forestry company listed some limitations, because the total share capital of listed companies in forestry have a certain percentage of non-tradable shares, which have no market price, obviously simply by outstanding shares at market prices instead is inappropriate because it would cause the company's stock market capitalization inflated. Therefore, learn methods such as Bai, non-tradable shares with a market value of 30% and 20% stock market price substitution, so the formation of two new explanatory variables: $Q_{70}$and Q_{80}.

To verify the research, the paper build the following model: $Q = C + \beta EF + \varepsilon$, Where EF is the efficiency of corporate governance.

3. Corporate Governance Efficiency and Corporate Performance

First, make the unit root test for DEA-Malmquist index, Tobin's Q, Tobin's Q80, Q70 Tobin of 22 companies during 2005-2012. To ensure the robustness of the results, we use two methods to make unit root tests, namely LLC and IPS ADF test testing methods, these two methods with simple time series, if LLC and IPS test rejects the unit root hypothesis, the panel data is smooth; on the contrary, the data may be non-stationary. Test results are shown in Table 5.

Table 5. Results of each variable unit root test

	DEA-Malmquist Index	Tobin's Q	Tobin's Q_{80}	Tobin's Q_{70}
LLC Statistic	-11.7	-12.9	-9.3	-8.8
Prob.	0.0	0.0	0.0	0.0
IPS Statistic	-3.3	-4.4	-3.2	-2.9
Prob.	0.0	0.0	0.0	0.0

As can be seen, LLC and IPS testes that the null hypothesis is rejected, can be identified, these four variables data are stationary.

Based on the limited number of samples, will result in a lower potential Johansen cointegration test, a single time series data Johansen cointegration test result is not reliable, in order to ensure a reliable conclusion, we use panel data cointegration method, using Pedroni statistics amount of inspection, table 6 shows the test results of the panel data cointegration test.

Table 6. the results of DEA-Malmquist Index and Tobin's Q、Tobin's Q_{80}、Tobin's Q_{70} cointegration test

	Tobin's Q	Tobin's Q_{80}	Tobin's Q_{70}
ADF-Statistic	-2.8	-2.4	-2.14
Prob.	0.0	0.0	0.0

Through table 6, the test results show reject the hypothesis of no cointegration, indicating that long-term, stable and balanced relations with the DEA-Malmquist index exists Tobin Q, Tobin Q_{80}, Q_{70}, respectively Tobin.

The choice in the form of panel data models, using F-test to decide to use which form: hybrid, variable coefficients or variable intercept model, if the statistic F_2 is less than the critical value under a significance level of the F distribution, it indicates that the hybrid model is used to fit the sample suitable. Otherwise, continue to test, if the statistic F_1 is less than the critical value under significance level of the F distribution, then the variable intercept model form is appropriate. Otherwise, the variable coefficient model, the test results are shown in Table 7. Then, determine whether the random effects or fixed effects model in variable coefficients and variable intercept model by Hausman test.

Table 7. Selection results in the form of each explanatory variable model

Explained variable	Statistics	Value	The critical value	Select the model form
Tobin's Q	F1	1.1	1.6	Hybrid Model
	F2	1.1	1.4	
Tobin's Q_{80}	F1	1.2	1.6	Variable intercept model
	F2	5.1	1.5	
Tobin's Q_{70}	F1	1.5	1.6	Variable intercept model
	F2	1.6	1.5	

Table 8. Hausman test results

	Statistics	DOF	Prob.
Tobin's Q_{80}	3.9	1	0.0
Tobin's Q_{70}	3.5	1	0.0

From Table 8, at the 5% significance level, this article rejects the null hypothesis, and therefore individual fixed effects model is appropriate. Use different forms of model fitting to estimate different explained variables, in order to avoid the cross-sectional heteroskedasticity phenomenon using Panel Corrected Standard Errors methods to estimate, the results are shown in Table 9.

Table 9. Regression results of governance efficiency and company performance

Explained variable	Variable	Coefficient	t	Prob.	Adjusted R^2	D.W.
Tobin's Q	C	0.9	10.3	0.0	0.0	1.6
	E	0.1	0.2	0.8		
Tobin's Q_{80}	C	2.2	9.7	0.0	0.2	2.3
	E	0.1	3.4	0.1		
Tobin's Q_{70}	C	0.8	10.2	0.0	0.2	1.9
	E	0.1	-3.0	0.1		

Note: Combined with the purpose of this study, this article does not list regression coefficients of Tobin and Tobin Q_{70} Q_{80} in variable intercept model.

Table 9, Tobin's Q as the dependent variable, E the coefficient is not significant, so give up this model; compare Tobin and Tobin Q70 Q80 is interpreted as a variable model, both through testing, combined with further analysis of Adjusted R2, Tobin Q80 highest degree of fit model is superior to Tobin Q70 models. Model efficiency of corporate governance and corporate performance are positively correlated, suggesting that the higher the efficiency of corporate governance, corporate performance will be higher when the forestry corporate governance efficiency by 1 unit, the company's performance will be a corresponding increase in 0.0769 units, which verifies the previous assumptions.

CONCLUSION

In this paper, 2004-2012 China's forestry listed companies as the study object, use DEA-Malmquist index method to evaluate the governance efficiency of forestry listed companies, and research the effects on the performance to the company's governance efficiency. The results indicate the presence of governance efficiency among forestry corporate are different, uneven governance, corporate governance structure needs to be further improved; using the individual fixed effect variable intercept model to analyze the relationship between corporate governance efficiency and performance of the company is appropriate, the results show corporate governance efficiency is positively related to company performance.

In order forestry listed companies play a leading role in the forestry develop, should optimize the ownership structure, change the dominance of the current situation, so that independent director system tend to be improved gradually, establish a variety of professional committees, increase executives moderate shareholding, so make the role of equity incentive full play, to create good conditions for corporate governance.

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