Empirical Research of Corporate Governance and Firm Performance of Chinese New Energy Vehicle Manufacturing Enterprises

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ABSTRACT
As an important part of China's carbon neutrality plan, the new energy vehicles industry has achieved rapid development in recent years, and several excellent new energy vehicle manufacturing enterprises have emerged, such as BYD. The corporate governance of such enterprises is a topic worthy of study. The purpose of this paper is to examine the relationship between corporate governance factors and corporate performance of Chinese new energy vehicle manufacturing enterprises using publicly traded companies as examples and to make some recommendations on how to improve their corporate governance performance. This research takes thirteen listed new energy vehicle manufacturing enterprises in China's main Board Market as examples, and the period is 2017-to 2021. Select four independent variables from the corporate governance aspect and three dependent variables to represent corporate performance, adopting descriptive analysis, Pearson correlation analysis, and multiple regression analysis to explore their relationships. The results indicate that board independence positively correlates with company performance, board size and CEO duality negatively correlate with company performance, and board activity has no correlation with company performance. As a result, it is recommended that Chinese new energy vehicle manufacturing businesses maintain a suitable board size, engage independent directors, and decouple the CEO and chairman roles, which will benefit corporate performance to some extent.

Keywords: *Corporate governance, Firm performance, New energy vehicle, Manufacturing enterprises.*

1. INTRODUCTION

1.1 Background

In the background of COVID-19 and major changes unfolding in the world, the new energy vehicle industry, characterized by electric power and low-carbon transformation, is actively embracing a new round of technological innovation. In 2022, the Report on the Work of the Chinese Government proposed to continue to support the consumption of new energy vehicles and accelerate the formation of green and low-carbon production and lifestyle. Nowadays, China's new energy vehicle industry has entered a new stage of large-scale and high-quality rapid development: in 2021, China's new energy vehicle sales completed 3.521 million units, a year-on-year increase of 1.6 times, ranking first in the world for seven consecutive years. The annual cumulative market penetration rate of new energy vehicles increased to 13.4%, compared with only 5.4% in 2020 [1].

There are both mature old brands and new forces in China's automobile industry. The famous car company BYD continues to maintain a leading position in the new energy vehicles industry. In 2021, the company's overall sales volume of new energy vehicles reached 603,800 units, accounting for 17.2% of China's sales volume of new energy vehicles, up 3.3% year on year; from March 2022, BYD officially stopped selling fuel cars, becoming the first traditional auto company to completely stop its fuel car business. Meanwhile, the market share of NIO, LiXiang, and XiaoPeng, the new forces in new energy car manufacturing, reached 8.4% in 2021.

However, behind the rapid development of the whole new energy industry, some new energy enterprises were exposed to financial fraud scandals, such as Sinovel Wind power and Training Technology. New energy vehicle manufacturing enterprises in recent years have

also seen a decline in profits. Compared with other industries, the new energy industry is prone to financial fraud due to its special policy, technology, capital, and other risks, and its motivation for fraud is special. Therefore, it is worth discussing how to improve corporate governance, reduce the risk of fraud and improve corporate performance for China's new energy enterprises.

1.2 Related Research

Guo and Kga's research took the all-listed firms on Colombo Stock Exchange (CSE) except financial enterprises in Sri Lanka as examples, to investigate the link between corporate governance structures and company performance. With the quantitative analysis method, this research used board size, the proportion of non-executive directors on a board, director's shareholdings and CEO duality as independent variables, ROA and Tobin's Q as the dependent variable, and firm size as a control variable. The results prove that the size of a company was positive on ROA, and the director shareholdings were negative to the value of the firm in Sri Lanka. However, only considering the financial data of 2010 made the results not very representative [2]. In Bhagat and Bolton's research, directors' shareholding is the most consistent and positively correlated with the company's future performance. Further, this research took the dynamics of the financial crisis, the Great Recession, Sarbanes-Oxley (2002), and Dodd-Frank (2010) into consideration. It is worth mentioning that this research also explored the relationship between corporate governance and performance of the 100 largest U.S. financial institutions around 2008, the results proved director stock ownership is positive to performance again [3]. According to Mashayekhi and Bazaz, the objectives of their research were listed companies on the Tehran Stock Exchange (TSE) for the years 2005-2006. As corporate governance indexes, the board size, board independence, board leadership, and institutional investors on the board were employed as independent variables, and EPS, ROA, and ROE were adopted as firm performance surrogates. Through the quantitative method, the outside director ratio was positively correlated while board size was negatively correlated with performance. However, there is no relationship between leadership structure and the presence of institutional investors on the board of directors and corporate performance. Due to Islamic culture and year of sample, this study had certain limitations [4].

Leung et al. looked at whether family ownership concentration affects the relationship between corporate board and board committee independence and business performance. Board independence is favorably connected with company performance in non-family firms but is not significantly correlated with firm performance in family firms, according to a study of Hong Kong corporations using the multiple regression method. The article's conclusion is instructive: the way regulators demand independent directors to be appointed to company boards may not always boost corporate performance, especially for family businesses [5]. After the Asian Financial Crisis in 1997, the Malaysian Code of Corporate Governance (MCCG) has been introduced as part of the Bursa Malaysia (BMB) listing rules. Zabria et al. sampled Malaysia's Top 100 public listed businesses and explored the link between corporate governance practices and company performance. The hypothesized association between corporate governance practices and business performance, as measured by return on asset (ROA) and return on equity (ROE), was tested using two corporate governance indicators (Board size and Board Independence) (ROE). The results of the quantitative technique revealed that board size has a weak negative link with ROA but is inconsequential in terms of ROE. Another conclusion was that there was no link between board independence and company performance [6].

Rostamia et al. researched the impact of corporate governance components on return on assets and stock return of firms listed on the Tehran stock exchange. Samples are 469 firm-year data during seven years. Corporate governance factors were as independent variables, including ownership concentration, institutional ownership, board independence, the board size, CEO duality, and CEO tenure. The firm's financial performance evaluation criteria adopted ROA and stock return. Based on the quantitative approach, ownership concentration, board independence, CEO duality, and CEO tenure are positively related to ROA. Institutional ownership showed a considerable negative association with ROA. Aside from that, institutional ownership, board independence, CEO duality, and CEO tenure all have a substantial positive link with stock performance [7]. Fuzia et al. only focused on one of the corporate governance factors- Board Independence. Their research assessing board independence and business performance was conducted in a few countries. The findings revealed a skewed relationship between independent director proportions and business performance. Although the corporations had the most independent directors, this did not guarantee improved company performance. As a result, the presence of independent members on the board of directors should be closely monitored to maximize shareholder value [8].

Yermack's research is based on the theory that the small board is more productive, and focused on the relationship between board structure and companies' performance. The sample data was from 452 American industrial companies from 1984 to 1991. By using the OLS regression analysis method, Yermack concluded that the board size was negatively correlated to companies' market value, and companies with smaller boards also perform better in terms of financial ratios [9].

The goal of Abdullah et al.' s was to examine the chairman's and members' perspectives on the motivations for appointing an independent director in Malaysian publicly traded companies. Twenty-one directors were interviewed in a semi-structured interview using the quality technique. According to the conclusions, independent directors were expected to carry out their monitoring duties, apply fair judgment in challenging decisions, and preserve a balance of power between the board and management. Furthermore, independent directors should apply their relevant knowledge, skills, and experience to address problems or threats and propose appropriate ideas at board meetings, according to the respondents [10]. Berardino's study looked into the link between the characteristics of the managerial board, ownership structure, and company performance of a specific sort of new technology venture. These were generally small and medium-sized firms that were focused on high technology, research, and innovation and had a mix of private and public ownership. Primary statistics reveal that business performance and corporate governance traits have important links, proving the inefficiency of the board of directors after the start-up. When there is overlap between academic-founder and manager, signaling more sensitivity to outside expertise [11].

1.3 Objective

At present, there are many types of research on corporate governance and corporate performance, but there are few types of research on the subdivision of Chinese new energy vehicle manufacturing enterprises. The objectives of this paper are to analyze the relationship between corporate governance factors and corporate performance of Chinese new energy vehicle manufacturing enterprises by taking listed companies as examples and try to put forward some suggestions to improve their performance from corporate governance aspects.

The structure of this paper is to introduce the research background firstly, then refer to previous related literature and make a summary. The next step is to state the methodology and introduce the research methods in detail. Then the presentation and interpretation of the results. The last part is to summarize the full research.

2. METHODS

2.1 Sample selection

In this research, the samples are Chinese new energy vehicle manufacturing enterprises listed on the Mainland China stock market, including Shanghai and Shenzhen, for years from 2017 to 2021. There is a total of thirteen companies. The type of data used is secondary data, which is gained directly and specifically from enterprises' annual reports.

2.2 Measurements of Variables

This research chooses four indicators as the independent variables, respectively Board Size, Board Independence, Board activities, and CEO duality, which represent the level of corporate governance. As for the firm performance, ROA, ROE, and EPS are chosen. Definition and measurement of all variables used in the research are provided in the following.

Table 1. Definitions And Measurements of All Variables

Variable groups	Symbol	Measurement
Governance Variables (Independent variables)		
Board size	BrdSize	Total number of board members
Board independence	BIndp	Number of independent members on the board / total number of board members
Board activity	BrdActivity	Number of board meetings conducted
CEO duality	CEOD	Takes YES= 1, NO=0
Performance Variables (Dependent Variables)		
Return on Asset	ROA	Net Income/ Total Assets
Return on Equity	ROE	Net Income/ Average Shareholders' Equity
Earnings per share	EPS	(Net Income-Preferred Dividends)/(End-of-Period Common Shares Outstanding)

2.3 Data Analysis

All of the original data will be analyzed descriptively using SPSS 23.0 to determine the minimum and maximum, mean, standard deviation, and variance. These statistics and tables aid in comprehending the

fundamental conditions, as well as the concentration and dispersion within each variable.

In this study, Pearson's correlation analysis is used to determine the degree of a linear association. The variables are next examined using multiple regression analysis through the OLS method, which investigates the relationship between a dependent variable and several independent factors. Three linear regression equations can be given based on the findings and they are as followed:

$$ROA = \alpha + \beta_1\ BrdSize + \beta_2\ BIndp + \beta_3\ BrdActivity + \beta_4\ CEOD + \varepsilon \quad (1)$$

$$ROE = \alpha + \beta_1\ BrdSize + \beta_2\ BIndp + \beta_3\ BrdActivity + \beta_4\ CEOD + \varepsilon \quad (2)$$

$$EPS = \alpha + \beta_1\ BrdSize + \beta_2\ BIndp + \beta_3\ BrdActivity + \beta_4\ CEOD + \varepsilon \quad (3)$$

3. RESULTS

3.1 Descriptive Analysis

According to the data of thirteen companies from 2017 to 2021, the smallest board is made up of six people, while the largest has twenty-one members. Eleven is the average level of sampling enterprises' board size. The variance of board size is 12.047, which indicates that the number of boards varies widely among different companies. The board independence ratios don't show much difference due to the variance being 0.008, and the range of it is 0.21 to 0.58. As for the board activity, these enterprises held 14 board meetings on average every year, whose range is 5 to 31.

Among three dependent variables, the ROE fluctuates the most while EPS fluctuates the least due to variances. The ranges of ROA, ROE, and EPS are -12.60% to 10.73%, -59.36% to 20.19%, and -1.86 to 3.08 respectively.

Table 2. Descriptive statistics for all variables

		N	Minimum	Maximum	Mean	Std. Deviation	Variance
Independent Variables	BrdSize	65	6.00	21.00	10.7231	3.47090	12.047
	BIndp	65	0.21	0.58	0.3919	0.09076	0.008
	productivity	65	5.00	31.00	14.2308	7.01064	49.149
	CEOD	65	0.00	1.00	0.1538	.36361	0.132
Dependent Variables	ROA	65	-12.60	10.73	1.8772	4.20997	17.724
	ROE	65	-59.36	20.19	2.4940	14.36586	206.378
	EPS	65	-1.86	3.08	0.4829	0.87965	0.774

3.2 Pearson Correlation Analysis

The correlation results show that board size is significantly negatively correlated to ROA, ROE, and EPS at the 0.01 level; Board independence is positively correlated to EPS at the 0.05 level but is insignificant to ROA and ROE. Board activity and CEO duality are not significantly correlated to 3 dependent variables.

Table 3. Correlations Results

		ROA (DV1)	ROE (DV2)	EPS (DV3)
BrdSize (IV1)	Pearson Correlation	-.437**	-.469**	-.493**
	Sig. (2-tailed)	.000	.000	.000
	N	65	65	65
Bindp (IV2)	Pearson Correlation	.213	.242	.295*
	Sig. (2-tailed)	.089	.052	.017
	N	65	65	65
BrdActivity (IV3)	Pearson Correlation	.037	.029	-.066
	Sig. (2-tailed)	.771	.819	.600
	N	65	65	65

CEOD (IV4)	Pearson Correlation	-.057	-.078	.050
	Sig. (2-tailed)	.652	.537	.693
	N	65	65	65

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

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

3.3 Multiple Regression Analyses

3.3.1 Multiple Regression Results of ROA Model

Table 4 shows the R^2 for this model is 0.226, which indicates that 22.6% of the variation in the ROA can be explained by these four independent variables. The fitting effect is not very good, because ROA is not only determined by corporate governance-related factors. The board size and CEO duality are negatively related to ROA, while board independence and board activity are not significant to ROA. Therefore, the ROA model can be determined as the Equation (4)

$$ROA = 4.642 - 0.604\ BrdSize + 8.697\ BIndp + 0.053\ BrdActivity - 2.888\ CEOD \quad (4)$$

Table 4. Multiple Regression Results of ROA Model

ROA Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.642	2.784		1.667	.101
	BrdSize	-.604	.142	-.498	-4.244	.000
	BIndp	8.697	5.264	.187	1.652	.104
	BrdActivity	.053	.067	.088	.787	.434
	CEOD	-2.888	1.364	-.249	-2.117	.038
	R Square	.275	Adjusted R Square			.226

3.3.2 Multiple Regression Results of ROE Model

According to Table 5, the R^2 for the ROE model is 0.286, which indicates that 28.6% of the variation in the ROE can be explained by these four independent variables. The fitting effect is not very good, because similar to ROA, ROE is not only determined by corporate governance-related factors. The board independence is positively correlated to ROE, and the board size and CEO duality are negatively related to ROE, while board activity is still insignificant. Therefore, the ROE model can be determined as the equation:

$$ROE = 12.065 - 2.224\ BrdSize + 34.834\ BIndp + 0.168\ BrdActivity - 11.466\ CEOD \quad (5)$$

Table 5. Multiple Regression Results of ROE Model

ROE Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	12.065	9.130		1.322	.191
	BrdSize	-2.224	.467	-.537	-4.763	.000
	BIndp	34.834	17.263	.220	2.018	.048
	BrdActivity	.168	.219	.082	.765	.447
	CEOD	-11.466	4.473	-.290	-2.563	.013
	R Square	.330	Adjusted R Square			.286

3.3.3 Multiple Regression Results of EPS Model

Table 6 shows that the R2 for the EPS model is 0.270, indicating that these four independent variables can explain 27.0 percent of the variation in the EPS. Because EPS can be determined by other factors, the fitting effect is not very good. The board independence is positively correlated to EPS, the board size is negatively related to EPS. In this model, the board activity and CEO duality are not significant to EPS. Therefore, the EPS model can be determined as the equation:

$$EPS = 0.968 - 0.127\ BrdSize + 2.464\ BIndp - 0.002\ BrdActivity - 0.398\ CEOD \quad (6)$$

Table 6. Multiple Regression Results of EPS Model

EPS Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
3	(Constant)	0.968	0.565		1.712	.092
	BrdSize	-.127	.029	-.503	-4.411	.000
	BIndp	2.464	1.069	.254	2.305	.025
	BrdActivity	-.002	.014	-.012	-.114	.910
	CEOD	-0.398	0.277	-.165	-1.438	.156
	R Square	.316	Adjusted R Square			.270

4. DISCUSSIONS

4.1 Discussions of Descriptive Analysis Results

In the past five years, the proportion of independent directors and the duality of CEO of the 13 listed new energy vehicle manufacturers did not change much, indicating that these companies have maintained a stable board structure. Moreover, reviews of companies' annual reports also found that the chairmen and CEOs generally remained the same, which is consistent with the low turnover rate of CEOs and chairmen of Chinese companies. While a new CEO or chairman can inject new vitality into companies, Chinese companies tend to be more stable and risk-averse. The fluctuations in board size and board activities are because the company needs to adjust personnel appointments, dismissal, and company policy according to different market environments and company operation situations.

From the perspectives of performance indicators, ROA, ROE, and EPS all include negative numbers, indicating that the situation of net profits less than zero appeared in the past five years. At the same time, the large fluctuation of ROA and ROE shows that even in a prosperous macro-environment, new energy vehicle manufacturing enterprises may still suffer losses due to the prices of raw materials increase, poor sales, poor management, and other reasons.

4.2 Discussions of Pearson Correlation Analysis Results

Board size is negatively related to all three performance indicators. A preliminary conclusion can be drawn that the larger the size of the board of directors, will lead to the decline in corporate governance efficiency, corporate redundancy increases the burden on the company, leading to the decline in corporate performance.

Board independence only has a positive relationship with EPS significantly. Therefore, a preliminary conclusion can also be drawn that the performance of new energy vehicle enterprises can be improved by increasing the proportion of independent directors on the board of directors. Board activities and CEO duality are not significantly correlated to ROA, ROE, and EPS in Pearson correlation analysis.

4.3 Discussions of Multiple Regression Analyses Results

The board size all shows negative relationships with ROA, ROE, and EPS significantly. The reasons can be discussed as followed: One of the main functions of a board is oversight to ensure that managers make decisions that maximize shareholder wealth. A bigger board would be more expensive. This is because larger boards require more agency costs, and as the board size increases, coordination and communication costs will also increase. This will lead to a decline in the governance efficiency of China's new energy manufacturing vehicle enterprises, resulting in a decline in performance. Therefore, it is suggested that such enterprises control the board size within a reasonable range, to ensure administrative efficiency and save costs.

The board independence has a positive relationship with ROE and EPS significantly. This result is in line with expectations. The reasons can be discussed as followed: To begin with, independent directors can provide beneficial suggestions for enterprise decision-making. For example, independent directors can not only participate in the decision-making process of selecting and hiring the company's management, but they can also propose plans for the management's compensation and reward procedures. Because independent directors are not involved in the day-to-day operations of the company, they can deal with a variety of issues objectively. As a result of the presence of independent directors, conflicts of interest between managers and shareholders can be reduced, and the company's overall interests can be improved. Second, in general, the higher the proportion of independent directors, the greater their voice, and thus the stronger their supervisory role. Third, the "independence" of independent directors can improve the company's information transparency and information quality, reduce management moral hazard, help the company operate and manage, and improve the company's overall interests. However, in Chinese companies, there are some cases where independent directors have low moral standards and are not diligent and responsible. It can be concluded that the independent directors play a positive role in improving the performance of new energy vehicle manufacturers, but there should also be supervision of them.

Board activity is the only independent variable that is not significant to any dependent variables. The following reasons can be interpreted: The frequency of board meetings is largely determined by emergencies, which are both unpredictable and controllable. Board meetings may be held in addition to the number of meetings specified in the articles of incorporation whenever a major event occurs. As a result, there is no significant relationship between board activity and enterprise performance in this study.

CEO duality is negatively related to ROA and ROE. The reasons can be broken down into two categories: To begin with, human rationality is limited but not infinite. Corporate management typically ignores shareholder demands to satisfy their interests, which may harm shareholders' interests. Second, the excessive power of a single executive will promote the consolidation of management's position and weaken the board of directors' oversight of management, which will ultimately harm the enterprise's value. Therefore, for Chinese new energy vehicle manufacturers, it is recommended to separate the CEO and chairman to ensure the efficient operation of the company.

5. CONCLUSION

From the standpoint of corporate governance, this paper investigates the factors influencing the performance of Chinese new energy vehicle manufacturing enterprises. As samples, data from 13 listed Chinese new energy vehicle manufacturers were collected from 2017 to 2021. Four independent corporate governance variables are chosen: board size, board independence, board activities, and CEO duality. The ROA, ROE, and EPS models are built using multiple regression.

This paper explores that board independence has a positive relationship with company performance, board size and CEO duality have a negative relationship with company performance, and board activity has no effect on company performance. Therefore, it is suggested that Chinese new energy vehicle manufacturing enterprises control the board size within a reasonable range, hire independent directors, and separate the duties of the CEO and chairman, which is beneficial to corporate performance to some extent.

In conclusion, in the multilateral macro-environment, China's new energy vehicle manufacturing enterprises should have a more comprehensive corporate governance system, reduce the risk of fraud, improve governance efficiency, and strive to maximize shareholder interests and continuously improve corporate performance.

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