

Empirical Study on the Effects of Board Characteristics on Enterprise Value Based on Life Cycle Theory

Rui-Feng Bai and Xiao-Xu Wang

School of Business, Shandong University, Weihai, China, 264209

brf@sdu.edu.cn

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Abstract. Board structure is a vital part of corporate governance. Efficient board structure will contribute to the long-term development of the enterprises. Recent years, many researchers have studied the correlation between board characteristics and corporate value, but still haven't got consensus. In this article, we use theoretical analysis and empirical analysis to study whether life cycle stages have impacts on the correlation between board characteristics and corporate value. To do the empirical study, we use the data of A-share manufacturing listed companies of 2012-2017 and constructing life cycle variable according to industry method. The results indicate that life cycle stages have impacts on board characteristics, corporate value and the correlation between them. So when discussing how the board characteristics affect corporate value, it is necessary to clear and define which life cycle stage the enterprise belongs to.

1. Introduction

Researches that related to corporate governance have identified a variety of board characteristics that have impacts on corporate value, such as the board size, the proportion of independent directors, directors' compensation, etc. Researchers have also studied the direction of their influence but still haven't got consensus. Recently, many researchers take into consideration of the effects of firm life cycle. Earlier studies in accounting field recognized that life cycle stages can affect a company's financial characters (e.g. Jun-Rui ZhANG, Bin LI, 2009). Considering the complexity of corporate valuation, many researchers use accounting ratio to represent corporate value, related researches concentrated on two points: One of them is in different stages, which accounting ratio has representativeness? Another question is the variation trend of corporate value when life cycle stages changes.

Contingency Theory holds the view that the adaption of corporate governance and the corporate environment can affect the efficiency of corporate governance. Some researchers have verified that with the development of the enterprise, the board structure is making dynamic adjustments (e.g. Bing-Xiang LI, Man-Na LI, Ming-Min LI, 2017). When cleared that the board structure should adapt to the developing stage of the enterprise, it makes us think that at different stages, will the correlation between board characteristics and corporate value changes? The objective of this article is to examine whether the effects of board characteristics on enterprise value will be affected by life cycle stages. To do the research we use theoretical and empirical analysis. In the part of empirical analysis, we use data of A-share manufacturing listed companies of 2012-2017 and construct life cycle variable according to industry method. We use dummy variable to represent corporate life cycle stages. We use descriptive statistics, independent-samples t test and regression analysis to verify that value variables representing earnings, cash flows and condition of assets have different variation trends among different life cycle stages. Using the similar method, we can see that the referred six board characteristics are adjusted with the change of corporate life cycle. Next, we make regression analysis to examine the impacts of board characteristics on corporate value. It indicates that board characteristics have different influence on different value variables. To get more specific conclusions we use the models that contain interactions of the board characteristics with life cycle variables to analysis. This analysis shows that life cycle variables have regulating effects on some of the board characteristics variables.

Based on the theoretical and empirical analysis, we verify that how the board characteristics affect corporate value depend on specific situations. We recommend that when discussing how the board characteristics affect corporate value, we should first clear and define which life cycle stage the company belongs.

2. Theoretical Analysis on the Impact of Board Characteristics on Corporate Value

2.1. Life Cycle Theory

According to Gardner (1965), like human and other biology, enterprises have their own life cycle stages. Only when they achieve their operating goals at certain stages can they develop into next stage. Ichek Adizes (1989) wrote in his book that the relationship between flexibility and controllability can reflect the growth and development of an enterprise. Researchers think life cycle stage is an important internal environment factor that has impact on various aspects of the enterprise.

2.2. Corporate Valuation

In the financial research, there are different perspectives to do corporate valuation. Three perspectives are used often: based on the condition of assets, based on cash flows, based on the earnings. Those three perspectives show us three aspects of the development of a company. In the framework of agency theory, when enterprises at different life cycle stages, they have different operating goals. To achieve their targets they have to use different kinds of operating strategies. That is to say, the financial characteristics of the enterprises will change with their development. So, different financial characteristics may have different variation trends among different stages. When we study the correlation between board characteristics and corporate value, it will be more specific to consider corporate value from several different perspectives. In the part of empirical analysis, we will examine how the corporate value variables change with the change of life cycle stages.

2.3. Agency Theory

The agency theory holds the opinion that the principal-agency relation is a core content to study corporate governance. It concentrates on lower the agency costs of the company. This goal urges that the board structure should adapt to the management power structure and the severity of the agency problems. When a company is founded, it is usually the owner who exercises the right of supervision, management and control. With the company develop into growth stage and mature stage, the management and ownership will be separated, which will cause agency problems. The demand for supervision from board of directors is increasing. At the degenerating stage, the control of top management weakened, the enterprise needs more efficient supervision. Besides the supervisory function of the board of directors, the adjustment of operating goals and change of priority of work also demand the enterprise to adjust the board characteristics. In the empirical analysis, we will examine whether and how the board characteristics are adjusted among different life cycle stages.

2.4. Contingency Theory

The core idea of contingency theory is that the management of an enterprise will be adjusted with the change of internal and external conditions. This theory emphasizes the importance of environmental variables, using a dynamic research perspective to find the consistency between the organization and the environment. In the framework of contingency theory, the relationship between corporate governance and corporate value depend on the internal and external environmental factors. Thus, when we talk about how the board characteristics affect corporate value, life cycle stages should be regarded as a precondition.

3. Empirical Analysis of the Correlation between Board Characteristics and Corporate Value

3.1. Research Hypothesis

According to the theoretical analysis in section II, we can see that the change of life cycle stages will have impacts on different aspects of the enterprise, including the financial characteristics and board characteristics. And in the framework of contingency theory, the correlation between board characteristics and corporate value will be adapted to the environmental factors. This part will use sample data to examine those influence.

3.2. Samples and Data Selection

3.2.1. The Sample Selection

Choose the empirical data of A-share manufacturing listed companies of 2012-2017 and eliminate samples according to the following criteria:(1) to eliminate the influence of abnormal data, eliminate the data of ST and PT companies;(2) eliminate the companies who lack the data we need to classify the life cycle stages; (3) eliminate the companies that are classified into comprehensive industry;(4) eliminate the companies who lack the data of board characteristics and financial indexes. Finally, I got 1181sample companies and 7086 sample observations.

3.2.2. Data Source

The referred board characteristics, classification standards of industries and financial data are from the listed company research database of CSMAR.

3.3. The Variable Selection

Table 1. Variable definition table

Variable types	Variable symbol	Variable name	Definition
Corporate Value Variable	EPS	Earnings per share	Current net profit/Paid-in capital at the end of the period
	NCFO	Net cash flow from operating	Use the data from balance sheet
	TAGR	Total assets growth rate	Total assets growth this year/Total assets at the beginning of the year
Board Characteristics Variable	TP	Duality of CEO and chairman	1= Duality of CEO and chairman; 0= Separation of CEO and chairman
	Size	Board size	The board's total membership
	InR	Ratio of independent directors	Number of independent directors/Number of directors
	Meeting	The number of board meetings	The number of board meetings in a year
	Pay	Directors' compensation	The logarithm of the top three directors' compensation
	DBR	Shareholding ratio of the board	Number of shares held by directors/The total amount of equity
Life cycle stage variable	LC1, LC2	Life cycle stages	LC1=1, LC2=0 means growth stage; LC1=0, LC2=1 means mature stage; LC1=0, LC2=0 means degenerating stage
Control variable	Scale	Scale of company	The logarithm of the total assets of the company
	LEV	Capital structure	Asset-liability ratio

The variable selection is shown in table 1.

3.4. Model Set

We want to examine 3 kind impacts, and we build 4 models to do the research.

1). To examine the correlation of life cycle stages and corporate value

$$V_n = \alpha_{n0} + \alpha_{n1}LC1 + \alpha_{n1}LC2 + \alpha_{n3}Scale + \alpha_{n4}Lev + \varepsilon$$

$$V_1 = EPS, V_2 = NCFO, V_3 = TAGR$$

2). To examine the correlation of life cycle stages and board characteristics

$$B_n = \beta_{n0} + \beta_{n1}LC1 + \beta_{n2}LC2 + \beta_{n3}Scale + \beta_{n4}Lev + \varepsilon$$

$$B_1 = TP, B_2 = Size, B_3 = InR, B_4 = Pay, B_5 = Meeting, B_6 = DBR$$

3). To examine the correlation of board characteristics and corporate value

$$V_n = \gamma_{n0} + \gamma_{n1}Tp + \gamma_{n2}Size + \gamma_{n3}InR + \gamma_{n4}Pay + \gamma_{n5}Meeting + \gamma_{n6}DBR + \gamma_{n7}Scale + \gamma_{n8}Lev + \varepsilon$$

$$V_1 = EPS, V_2 = NCFO, V_3 = TAGR$$

4). Regarding life cycle stage as a moderator to examine the correlation of board characteristics and corporate value

$$V_n = \lambda_{n0} + \lambda_{n1}TP + \lambda_{n2}Size + \lambda_{n3}InR + \lambda_{n4}Pay + \lambda_{n5}Meeting + \lambda_{n6}DBR + \lambda_{n7}TP * LC2 + \lambda_{n8}Size * LC2 + \lambda_{n9}InR * LC2 + \lambda_{n10}Pay * LC2 + \lambda_{n11}Meeting * LC2 + \lambda_{n12}DBR * LC2 + \lambda_{n13}LC2 + \lambda_{n14}Scale + \lambda_{n15}Lev + \varepsilon$$

$$V_1 = EPS, V_2 = NCFO, V_3 = TAGR$$

3.5. The Empirical Analysis of the Correlation between Life Cycle Stages and Corporate Value

3.5.1. The Descriptive Statistical Analysis

Table 2. Descriptive statistics analysis table of main variables

Corporate value variable	Life cycle stage	N	Mean	Maximum	Minimum	Standard deviation
EPS	Growth stage	2286	0.3923	23.0907	-3.5038	0.9892
	Mature stage	1824	0.3717	4.7386	-5.9029	0.5749
	Degenerating stage	2976	0.02801	8.1118	-5.0190	0.5874
NCFO	Growth stage	2286	49385.66	3745125	-1185452	205281.9
	Mature stage	1824	51565.36	4437838	-376107.4	216861
	Degenerating stage	2976	41147.40	1765449	-972136.4	139228
TAGR	Growth stage	2286	0.2719	19.0954	-0.7933	0.8223
	Mature stage	1824	0.1809	10.2121	-0.7253	0.4005
	Degenerating stage	2976	0.0970	5.7789	-0.8208	0.2670

The descriptive statistical analysis offers us a preliminary cognition for the related variables, the results is shown in table 2.

We can see from the table 2 that the variation trend of average EPS is growth stage> mature stage> degenerating stage. For the NCFO, the variation trend of average is mature stage> growth stage> degenerating stage. As for the TAGR, it shows the variation trend of growth stage> mature stage> degenerating stage. But the average TAGR at all three stages are positive number, which indicates that the total assets are keep on increasing.

Through the descriptive statistical analysis, we can see that the three corporate value variables have different variation trend among life cycle stages, we will use regression analysis to see the correlation of life cycle and corporate value.

3.5.2. Analysis of Regression Results

Table 3. Regression analysis of the correlation between corporate value and life cycle

Corporate value variable	Explanatory variation	Coefficient	T-value	P-value
EPS	LC1	0.1133	5.08	0.000
	LC2	0.0870	5.20	0.000
	Scale	0.1773	7.23	0.000
	LEV	-0.5572	-2.61	0.009
	Constant	-3.3974	-7.23	0.000
NCFO	LC1	9606.717	2.14	0.032
	LC2	9775.137	1.94	0.052
	Scale	73419.28	13.37	0.000
	LEV	-39756.83	-1.72	0.086
	Constant	-1560937	-13.45	0.000
TAGR	LC1	0.1751	9.77	0.000
	LC2	0.0833	7.90	0.000
	Scale	0.0264	4.18	0.000
	LEV	-0.0676	-2.23	0.026
	Constant	-0.4566	-3.31	0.001

As table 3 shows, the coefficients of life cycle variable are significantly different from 0. That is to say, the averages of referred corporate value variables have significant difference among life cycle stages. Therefore, we can verify that different aspects of corporate value have different variation trend among life cycle stages.

3.6. The Regression Analysis of the Correlation between Life Cycle Stages and Board Characteristics

As we can see from table 4, for TP, the life cycle variables has a positive impact on it, and because of the coefficient of LC1 is bigger than that of LC2, we can infer that the average of TP is highest at growth stage and is lowest at degenerating sage. Because we use dummy variable to represent TP, so the variation trend shows that from growth stage to degenerating stage, more enterprises choose to separate CEO and chairman.

The life cycle variable has a significant negative impact on board size, and the coefficient of LC1 is smaller than that of LC2. This indicates that the board size of growth stage is smallest; the board size of degenerating is biggest.

For the ratio of independent directors, the regression result can verify that this board characteristic has significant difference between mature stage and degenerating stage.

For the number of board meeting, from growth stage to mature stage then to degenerating stage, the number of board meeting is decreasing and the coefficient s of LC1, LC2 is significant.

The board compensation and shareholding have similar variation trend: increasing from growth stage to mature stage; decreasing from mature stage to degenerating stage.

So, we can conclude that the board characteristics are not fixed to one model, they are adjusted with the change of life cycle stages and these adjustments can make the board of directors more

efficient.

Table 4. Regression analysis of the correlation between board characteristics and life cycle

Board characteristics	Explanatory variation	Coefficient	T-value	P-value
TP	LC1	0.0823	6.79	0.000
	LC2	0.0696	5.40	0.000
	Scale	-0.0394	-8.01	0.000
	LEV	-0.0510	-1.77	0.077
	Constant	1.1061	10.64	0.000
Size	LC1	-0.2052	-4.79	0.000
	LC2	-0.1161	-2.57	0.010
	Scale	-0.3419	17.12	0.000
	LEV	0.3517	5.01	0.000
	Constant	1.0293	2.40	0.017
InR	LC1	0.0019	1.27	0.203
	LC2	0.0044	2.67	0.008
	Scale	0.0002	0.43	0.670
	LEV	-0.0048	-2.55	0.011
	Constant	0.3665	26.40	0.000
Meeting	LC1	0.8295	8.28	0.000
	LC2	0.5398	5.05	0.000
	Scale	0.4983	8.07	0.000
	LEV	1.3510	2.65	0.008
	Constant	-2.5277	-2.08	0.037
Pay	LC1	-2913.09	-0.06	0.954
	LC2	99988.53	2.05	0.040
	Scale	524021.20	16.99	0.000
	LEV	-603723.50	-2.35	0.019
	Constant	-9601190	-14.78	0.000
DBR	LC1	0.0539	11.16	0.000
	LC2	0.0923	16.61	0.000
	Scale	-0.0384	-12.03	0.000
	LEV	-0.1148	-3.54	0.000
	Constant	0.9822	16.41	0.000

3.7. Empirical Analysis of the Correlation of Board Characteristics and Corporate Value

Table 5 are the results of regression analysis, table 6 shows the result of regression analysis that containing interactions of board characteristics and life cycle variable.

Combining the result of table 5 and table 6, we can see that duality of CEO and chairman has positive impact on corporate value, but the descriptive statistical analysis shows that with the development of enterprise, the company tend to separate CEO and chairman to avoid concentration of rights.

From the results of regression that contain interactions, board size has positive impact on EPS and NCFO, has negative impacts on TAGR. But the data of sample companies shows that from growth stage to degenerating stage, the board size is increasing. That will help the enterprises tackle with complex operating activities.

InR has a variation trend of increases first and then decreases. The increase from growth stage to mature stage can benefit to the promotion of NCFO; the decrease from mature stage to degenerating stage can benefit to promote TAGR. We can see from the table 7 that InR has regulating effects on EPS, has positive impact on NCFO and negative impact on TAGR, so it is necessary to weight the advantages and disadvantages of its impacts.

About Pay and DBR, they have similar trend of rise first then descend. But they both have positive impacts on different corporate value variables.

The average of number of board meeting is descending among the three stages. This may out of the consideration of saving the time paid on attending the meeting and enhancing the efficiency of board meeting.

4. The Main Conclusion

This paper chooses the data of A-share manufacturing listed companies of 2012-2017 as research samples, uses earnings per share, net cash flow from operating and total assets growth rate as the measure of corporate value, then uses industry method to divided the samples into growth stage, mature stage and degenerating stage.

Table 5. Regression analysis of the correlation between corporate value and board characteristics

Variable	EPS			NCFO			TAGR		
	Coefficient	T-value	P-value	Coefficient	T-value	P-value	Coefficient	T-value	P-value
TP	0.0375	2.46	0.014	9347.024	1.89	0.059	0.0388	2.71	0.007
Size	0.0002	0.03	0.975	-4533.486	-2.26	0.024	-0.0164	-2.99	0.003
InR	0.0378	0.13	0.893	65252.11	1.11	0.268	-0.2896	-2.41	0.016
Pay	0.0351	5.96	0.000	1859.655	1.47	0.141	0.0028	0.82	0.412
Meeting	-0.0148	-4.82	0.000	-4261.165	-4.72	0.000	0.0171	7.09	0.000
DBR	0.1213	2.65	0.008	-1547.525	-0.26	0.797	0.1902	6.04	0.000
Scale	0.1830	8.25	0.000	76976.28	13.37	0.000	0.0314	4.46	0.000
LEV	-0.5061	-2.48	0.013	-31099.1	-1.47	0.143	-0.0623	-1.95	0.051
Constant	-3.8751	-8.21	0.000	-1610479	-13.16	0.000	-0.4774	-3.45	0.001

Table 6. Research of the regulating effect of life cycle variable

Variable	EPS			NCFO			TAGR		
	Coefficient	T-value	P-value	Coefficient	T-value	P-value	Coefficient	T-value	P-value
Scale	0.1838	8.28	0.000	76543.2	13.48	0.000	0.0317	4.44	0.000
LEV	-0.5074	-2.50	0.012	-30788.33	-1.45	0.147	-0.0623	-1.94	0.052
Constant	-4.1434	-7.97	0.000	-1578222	-12.52	0.000	-0.4614	-3.06	0.002
TP	0.0391	2.21	0.027	4978.808	1.13	0.260	0.0406	2.25	0.024
Size	0.0100	1.31	0.190	-2303.435	1.03	0.305	-0.0210	-3.13	0.002
InR	0.3450	0.87	0.383	36799.72	0.54	0.592	-0.3378	-2.23	0.026
Pay	0.0394	6.00	0.000	-152.4368	-0.11	0.916	0.0038	0.92	0.357
Meeting	-0.0162	-4.60	0.000	-4813.929	-6.15	0.000	0.0194	6.70	0.000
DBR	0.1055	1.91	0.056	9706.443	1.12	0.264	0.2148	5.25	0.000
LC2	1.0661	3.24	0.001	-94031.4	-0.99	0.322	-0.0956	-0.71	0.476
TP*LC2	-0.0086	-0.25	0.805	13399.13	0.94	0.350	-0.0029	-0.11	0.911
Size*LC2	-0.0413	-3.37	0.001	-8418.903	-2.07	0.038	0.0189	2.45	0.014
InR*LC2	-1.1070	-2.23	0.026	85222.63	0.58	0.559	0.2032	0.96	0.335
Pay*LC2	-0.0221	-1.64	0.100	8901.046	2.21	0.027	-0.0047	-0.79	0.430
Meeting*LC2	0.0042	0.90	0.369	2086.138	0.98	0.327	-0.0082	-1.61	0.108
DBR*LC2	0.0220	0.32	0.750	-46163.8	-2.15	0.031	-0.0584	-1.17	0.244

Using these data, this paper first examines the variation trend of corporate value variables among different life cycle stage. The earnings per share is descending among the three stages, the net cash flow from operating shows a trend that increases first then decreases. As for the total assets growth rate, it has a trend of continuous declination and the slope is steeper than that of earnings per share. Using the similar analysis, this paper examines how the different board characteristics adjusted at the three stages.

To research the correlation of corporate value and board characteristics, this paper uses regression analysis and finds that a certain kind of board characteristics has different affects on

different corporate value variables. To see whether there exists the regulating effect of life cycle variables, we use model that containing interactions of board characteristics and life cycle variables to do regression analysis. The results indicates that board size, ratio of independent directors, directors' compensation and shareholding ratio of the board have regulating effect on the correlation of corporate value and board characteristics.

5. Policy Recommendations

Through the theoretical analysis and empirical analysis, this paper concludes that when discussing how to adjust board characteristics, it is necessary to clear and define which life cycle stage the enterprise belongs to. Enterprises should attach importance to the board characteristics. Nowadays our country has some regulations to help the enterprises construct their board structure, but still some companies only satisfied with conforming with the laws instead of exploring a mode that suit themselves. On the basis of meeting the legal requirements, companies should choose the model that suitable for current development requirements. This will also help the regulations work fully.

Companies should also construct perfect corporate valuation system to appraise the corporate value in different aspects. Companies at different stages have outstanding performance in different aspects; they also have different operating goals at different stages, so it is one-sided to ignore the differences in the development stage and appraise the company under the same standard.

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