Empirical Research on the Impact of Dividend Policy on Enterprise Value of Listed Companies

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***Abstract*—As one of the forms of the dividend payment, cash dividend has become the most common form of dividend payments in the listed companies of China. A proper dividend policy plays an important role in the unimpeded financing channels and the rational capital structure. In order to explore the influence of dividend policy on enterprise value, we used the dividend data and financial indicators of all A share listed companies in China in 2011-2016 as the samples of empirical analysis. With the regression model obtained after the analysis, we derived the influence mechanism of corporate value which can provide a reference for listed companies in making dividend policy.**

***Index Terms*—Dividend policy, empirical analysis, clustering analysis, regression analysis.**

I. Research Contents and Methods

Before the empirical research, we analyzed the dividend policy of Apple Inc. and Yonyou. Combining with the theory of dividend policy and enterprise value, we draw the following conclusions:

- To a certain extent, dividends will promote the listed company value.
- Both of cash dividends and stock dividends will promote the enterprise value, but in a different way.
- Enterprise value is positively correlated with the level of cash dividend payments.
- The continuity of dividend payments is conducive to the enterprise value promotion.

Then we collected the dividend data over the latest six years (2011-2016) of A share listed companies in China. Data processing by IBM SPSS Statistic 17.0 software showed the characteristics of dividend payment of Chinese listed companies.

Take Tobin Q as an indicator of enterprise value, we made regression analysis of the characteristics we derived from data processing so as to quantify the impact of cash dividend policy on the enterprise value of Chinese listed companies.

II. Data Preprocessing

We selected the dividend-related data of all A share companies listed on Shanghai Stock Exchange (SSE) in recent years (2011-2016) as the samples of empirical analysis. We processed the data as follows:

1) Selected companies listed on the Main Board of SSE and culled those on Growth Enterprises Market (GEM). Because of the high growth of the GEM which is mostly engaged in High-tech business, the company scale is mainly determined by its own characteristics and not significantly related to its dividend distribution policy.
2) To reduce the interaction between two capital markets, we removed those companies that simultaneously issued B share. The samples contain only the A share companies.
3) We took the Tobin's Q as an indicator of enterprise value which is calculated based on the closing price. Companies lack of relevant data were also excluded.
4) To make the regression more reliable, we used pauta criterion to reject outliers for each financial indicator.
5) For a single sample with less than three defaults, its defaults were replaced by the averages. Meanwhile, those with more than three defaults were excluded as well.
6) Standardized the data of each sample to obtain a relatively accurate regression equation.

III. Variable Setting

Considering that the enterprise value is determined by many factors, in order to avoid that the influence of some non-critical factors leads to the deviations of the result and improve the fit of the empirical analysis, we introduced four indicators as control variables which represent the enterprise profitability, debt-paying ability, operation ability and growth ability [1].

- Profitability: Profitability represents the ability of a company to make profits and in-crease wealth. Representative financial indicators include return on assets, earning per share, income from main operation, gross profit ratio, rate of return on common stockholders' equity, etc. We took earnings before interest and tax (EBIT) as a measure of profitability.
- Solvency: Solvency refers to the ability of a company to repay its debts. Enterprise solvency indicators include current ratio, quick ratio, debt asset ratio, etc. We took debt asset ratio (Dbassrt) as a measure of solvency.
- Operation Ability: Operational ability shows the performance of a company on production and operation with various assets. The relevant indicators include Current as-sets turnover, receivables turnover ratio and total asset turnover, etc. We took total asset turnover ratio (totassrat) as a measure of operational ability.

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- Growth Ability: Growth ability refers to the opportunities for value added and prospective earnings and that a company can expect to gain, which can be measured from different perspectives, such as increase rate of revenue, total assets growth rate, etc. We selected total asset turnover rate (totassrat) as a measure of growth ability [2].

TABLE I: VARIABLE DEFINITION TABLE

Variable Type	Variable Name	Variable Symbol	Variable Interpretation
Explanatory variable	Tobin Q	Qval	Enterprise market value /Asset replacement cost
Explained variables	Whether to Pay Dividends	X	X=0 : Non-payment of dividends, X=1 :Payment of dividends
	Dividend Payout Ratio	Divprt	Total dividend / Total net profit
	Cash Dividend Amount	Dividend	Amount of actual dividend paid
Control variables	Fixed Assets Ratio	Fixassrt	Fixed assets / Total assets
	Total Assets Turnover	Totassrat	Sales revenue / Total assets
	Debt Asset Ratio	Dbassrt	Total liabilities / Total assets
	Earnings Before Interest and Tax	EBIT	Net profit + Interest charges + Income tax

Table I is the definition table of explanatory variable, explained variables, and control variables.

IV. EMPIRICAL ANALYSES

A. Factor Analysis

We took 103 financial indices and ratios of Chinese listed companies from 2011 to 2016 as the original variables. In order to eliminate the impact of the correlation of variables on the results of regression, we first analyzed the 103 inner influencing variables by factor analysis and get common factors which are substituted for the original variables.

From the Communalities table we can see that the communalities of all variables are almost over 85%, which indicates that these common factors have contained most information of the original variables. The result of the factor extraction is reliable.

Factor analysis condensed 103 variables into 31 factors FAC1_1~FAC31_1. Then we saved the component scores in the SPSS data files, substituted common factors for original variables and replaced variable observations with component scores to make cluster analysis.

B. Clustering Analysis

After making a preliminary attempt and excluding some distractions, we used k-Means cluster to deal with the factors derived from factor analysis. The initial cluster center is shown in Table II. As the chart shows, the current iteration is 9. It clusters the listed companies into 12 groups. The number of companies in each category is as shown in Table III(It has excluded part of the interference data).

TABLE II: ITERATION HISTORY

Iteration	Change in Cluster Centers	
	1	2
1	64.367	63.588
2	.082	1.557
3	.022	.832
4	.019	.801
5	.020	.988
6	.020	1.159
7	.009	.569
8	.004	.223
9	.000	.000

From Table III (ANOVA table), each component score leads to that the cluster mean square is much larger than within-cluster error mean square. Besides, observed significance levels (P-value) are less than 0.01 and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal. It indicates that there are significant differences between clusters.

TABLE III: VARIABLE DEFINITION TABLE

Model	Variables Entered	Method
1	Dbassrt	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Fixassrt	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	Dividend	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
4	EBIT	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
5	Totassrat	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

C. Model Construction

Using the method of multivariate linear regression, we constructed the following model: [3]

$$QVal = \partial_0 + \partial_1 X + \partial_2 DivPrt + \partial_3 Dividend + \partial_4 Fixassrt + \partial_5 Totassrat + \partial_6 Dbassrt + \partial_7 EBIT \quad (1)$$

D. Model Solving

First, a multivariate linear regression analysis was performed on the overall data. Then we selected seven representative indicators to reflect the impact on enterprise value. These indicators are: fixed asset ratio, earnings before interest and tax, dividend payout ratio, total assets turnover, whether to pay dividends(X=0 or 1), cash dividend per share and debt asset ratio [4].

According to the Pearson correlation coefficient table, the selected variables are highly correlated with the Tobin Q value of the company, which means the selected variables are representative.

The process of regression adopted the idea of stepwise regression. After each variable entering the equation, the variables that can be excluded are determined again. So each phase of the variables introduction provides an opportunity to eliminate the insignificant variables again, eliminating the effects of multiple co-linearity. According to Table IV, the

regression has been iterated five times. The first one that went into the equation is the debt asset ratio, and then the fixed asset ratio, the cash dividend, earnings before interest and tax, the total asset turnover entered the equation in turn, and then the iteration ended [4].

TABLE IV: VARIABLE DEFINITION TABLE

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.338[a]	.114	.114	.9341683
2	.391[b]	.153	.152	.9138428
3	.403[c]	.162	.160	.9092194
4	.416[d]	.173	.170	.9038474
5	.419[e]	.176	.173	.9024845

a. Predictors: (Constant), Dbassrt

b. Predictors: (Constant), Dbassrt, Fixassrt

c. Predictors: (Constant), Dbassrt, Fixassrt, Dividend

To summarize, enterprise value (Tobin's Q) has a strong correlation with debt asset ratio, fixed asset ratio, cash dividend, EBIT and total asset turnover ratio， and the degree of correlation decreases in turn [5].

Table IV is the test table of fitting for the model. The observed significance level (P-value) is less than 0.05, indicating that the model has a high degree of fit. In general, the prediction effect of the regression model is good.

From Table V (ANOVA table), the observed significance level is 0.00(less than 0.01). The linear relationship of regression equation is significant [6].

Table V is the regression coefficient analysis table. The Sig. of the constant α is less than 0.01, thus the constant term is not 0. Therefore, the regression equation with a constant term was selected, and its regression equation is as follows:

$$QVal = -1.392E + 3.008 + 0.917Dividend - 0.791Fixassrt + 0.115Totassrat - 1.941Dbassrt - 10EBIT \quad (2)$$

According to the results of multiple co-linear diagnoses, the characteristic root is not equal to 0 and the condition index is less than 30, so there is no collinear problem in this analysis.

TABLE V: VARIABLE DEFINITION TABLE

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.008	.101		29.818	.000
Dbassrt	-1.941	.153	-.324	-12.671	.000
Fixassrt	-.791	.115	-.173	-6.871	.000
Dividend	.917	.204	.119	4.501	.000
EBIT	-1.392E-10	.000	-.110	-4.187	.000
Totassrat	.115	.051	.058	2.254	.024

V. HYPOTHESIS VERIFICATION

By the regression equation, the enterprise value (measured by Tobin Q) has a strong positive correlation with cash dividends per share dividend amount. The dividend payment rate as a relative index in the iteration of the regression equation was excluded, which shows that dividend payment rates doesn't affect the company's market value greatly. It is at odds with our hypothesis.

Through consulting relevant literature, we found that the company's shareholders, especially small shareholders, pay more attention to their own interests. They are more sensitive to the absolute quantity (the amount of dividends paid per share). As for the dividend payment rate (dividends per share relative to the percentage of the profits), the shareholders are not sensitive. [7]

As a result, the more dividends paid per share, the more the interests of investors, the smaller the risk, w the more attractive will be the stock. According to the theory of signal transmission, the company's stock and enterprise value also can get a corresponding increase.

VI. EMPIRICAL ANALYSIS CONCLUSION

According to the model derived in the empirical analysis, we drew the following conclusions:

1) Enterprise value is related to whether the company pays dividends. Dividend payments increase enterprise value. From this perspective, the listed companies should pay dividends to stimulate investment.
2) Enterprise value is correlated with the level of cash dividend payments. At some ex-tent, the more dividends, the greater enterprise value. So the listed companies should pay as much as possible within rational financial limits.
3) The correlation between enterprise value and dividend payout ratio is not distinct. Though the dividend payout ratio is a good financial index, the listed companies do not need to consider it too much.
4) The investment decision of investors should be based on a comprehensive survey of multiple financial indices to reduce the investment risk.

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