Dividend Payout Tendency in Chinese Listed Companies

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Abstract This paper puts first time forward the concept of dividend payout tendency, which is the difference between the utility of paying dividend and the utility of not paying dividend. We use logistical model to analyze the issues of quantification of dividend payout tendency and its influenced factors. Empirical results show that logistic model can portray soundly the relationship between dividend policy and dividend payout tendency, and 75.99 per cent of companies were forecasted correctly paying dividend, and firm's profitability and business risk are the main influenced factors of paying dividend.

Key Words: Dividend policy, Dividend payout tendency, logistical model

1. Introduction

This paper put forward the concept of dividend payout tendency, and tries to utilize empirical model to portray dividend payout tendency.

Research on dividend policy has been one of important issues since Miller and Modigliani 1961 established the irrelevance of dividends in perfect capital markets, and numerous studies have been focusing on dividend policy without consider the precondition of dividend payment, it will be no use to study the influenced factors of paying dividend if companies did not pay any dividend, especially, for Chinese listed companies, nearly half of listed companies did not pay cash dividend in past ten years, therefore it is very important to study dividend payout tendency.

As for Chinese listed companies, there are so far three hypotheses regarding dividend policy: (1) the relevance of share price to dividend policy (Wei, 1998), (2) the signaling effect and agency cost problem of dividend policy (Lu, 1999,2001), (3) the influenced factors of dividend payment (Liu, 1997). All of these papers study dividend policy under the condition of companies paying dividend. There is so far no paper focus on the basic issue of dividend policy-whether or not to pay dividend. In fact, as for a company financial manager, dividend policy should include following issues: (1) whether to pay dividend? (2) If pay, how much should to pay? How to pay? Pay cash or shares? (3) How to financing money for dividend? With retained earning or debt or issuing equity? How ever, the first issue is the most fundamental issue, only if firm choose to pay dividend, then we can study the following issues. This paper will focus on the first fundamental issue. We will draw lessons from utility theory, put forward the concept of dividend payout tendency, which is the difference between the utility of paying dividend and the utility of not paying dividend. If dividend payout tendency over a certain break-even point, then

company will pay dividend, otherwise, company will refuse paying, then we can transfer the study of whether or not to pay dividend into the study of dividend payout tendency. According to this thought, we will introduce corresponding influenced factors and variables, establish forecasting model of dividend payout. First, we will analyze various influenced factors of dividend payout, then set up logistic model to forecast the extent of dividend payout tendency, finally, with empirical data to test the goodness of fit and conduct parameter estimation of logistic model, and evaluate the validity of the model.

2. Theoretical analysis

According to utility theory, people's behavior base on their utility level. Utility express a kind of subjective satisfaction degree, and cannot be quantitative. Similar to utility function, different dividend behavior has different "utility" to corporate manager. We define the difference between the utility of paying dividend and the utility of not paying dividend as dividend payout tendency. Dividend payout tendency was decided by manager's rational judgment, which needs to balance diversified factors, its concrete value cannot be observed, but it can be expressed approximatively by proper mathematical model. If dividend payout tendency over a certain break even point, then company will pay dividend, otherwise, company will refuse paying. Therefore, we should first study the influenced factors of dividend payout tendency, and then analyze the break-even point.

2.1 Analysis on the influenced factors of dividend payout tendency
There exist different influenced factors between dividend payout tendency and cash dividend paying level. Dividend payout tendency is an issue of whether or not to pay dividend, only if decide to pay dividend, then to consider the influenced factors of paying dividend. Therefore, we put forward following hypotheses on the influenced factors of dividend payout tendency:

Smith and Watts (1992) argue, compared with small firm, large firm prefer pay high dividend. Research by Lloyd, Jahera, and Page (1985), and Vogt (1994) indicate that firm size plays a role in explaining the dividend-payout ratio of firms. They find that larger firms tend to be more mature and thus have easier access to the capital markets, which reduces their dependence on internally generated funding and allows for higher dividend-payout ratios. As for Chinese listed companies, most of the larger firms are stated owned enterprises, most of them cannot offer dividend because of low profitability, if possible, they can only pay cash dividend because they have not enough space to pay share dividend, and they increase return on equity by paying cash dividend also. Asset structure forecasts firm's future development ability, firms with high ratio of fixed assets tend to more mature and steady, they can easily financing from debt market by high solvency with enough mortgage, and they prefer to pay dividend for maintaining firm reputation. Therefore, we present:

Hypotheses 1 Firm size and assets structure can affect dividend payout

tendency.

High risk has been argued by Venkatech (1989) to cause a reduction in a firm's willingness to discharge cash through dividend payment. Kale and Noe (1990) develop a model in which high risk results in a lower dividend payout. Greater business risk makes the expected direct relationship between current and expected future profitability less certain, more business risk, more uncertain, less tendency to pay dividend. Therefore, we have:

Hypotheses 2 Firm business risk can affect dividend payout tendency.

Similar to firm size, firm capital size and ownership structure can affect dividend payout tendency. In China, Most of large capital firms come from stated owned enterprises, with high debt ratio and less profitability, most of them cannot pay dividend. A typical listed stock company in China has a mixed ownership structure with the state, legal persons (institutions), and domestic individuals (called as tradable shares) as the three predominant groups of shareholders. Because state shares and legal shares cannot be traded, only individual shares can tradable in market, shareholder belong to different ownership structure has different right. Firm's dividend payout tendency will be different in different ownership structure, firms with high ratio of state shares or legal shares will prefer cash dividend, firms with high ratio of tradable shares will prefer share dividend. Therefore, we have:

Hypotheses 3 Firm capital size and ownership structure can affect dividend payout tendency.

According to agency cost theory, the separation of corporate ownership and control creates the opportunity for managers to pursue their own interests rather than shareholders' interests. Dividends can be used in reducing the discretionary funds available to managers for perquisite consumption and help address the manager-stockholder conflict. Rozeff (1982) and Easterbrook (1984) point out that the payment of cash dividends increases the chance that external equity capital will have to be raised, thereby reducing agency costs as a result of the monitoring the capital market places on the company. Born and Rimbey (1993) provide further empirical evidence supporting Easterbrook (1984). Titman and Wessels (1988) argue that firms that hold more collateralizable assets have fewer agency problems between their bondholders and stockholders because these assets may serve as collateral against borrowing. Firm's managerial efficiency can impact the tendency of dividend payout in the frame of agency cost. More high of managerial efficiency, more high of asset turnover ratio, more value-added to shareholder, shareholder prefer more earnings to reinvest in firm, then less dividend will be paid. Therefore, we get following hypothesis:

Hypotheses 4 Agency cost and managerial efficiency can affect dividend payout tendency.

In general, profitable firms in mature industries tend to put out much larger fractions of their earnings than do firms in younger, rapidly growing industries, and utility companies have very high dividend payouts in almost every country. Edelman, Farrelly and Baker (1985) argue that Utility managers need to consider

how dividend policy is made in industries where volatility and competition is the norm, they conducted a survey of 318 financial executives in the utility, manufacturing, and wholesale-retail sectors to determine their views on dividend policy formulation. Their results show that industry classification is a determinant of dividend policy, there are differences between the industries regarding the factors they view as important when determining dividend policy. It is a matter of concern that utilities do not give much consideration to the availability of profitable investment opportunities when setting dividend policy. Therefore, we present:

Hypotheses 5 industry patterns can affect dividend payout tendency.

Lintner's (1956) famous investigation of dividend policy stresses that firms only increase dividends when management believes that earnings have permanently increased, meaning that a dividend increase implies a rightward shift in (management's perceived) distribution of earnings. As for Chinese listed companies' dividend policy, Lu (1999) showed that dividends tend to be more sensitive to profitability and move more quickly to their target level. However, the relationship between dividend payout tendency and profitability seem to be nonlinear, when firm's profitability reach a curtain point, reinvest earning in firm can achieve more future profit, the opportunity cost of holding cash dividend for shareholder will increase, then the tendency of paying dividend will decrease, the relationship between dividend payout tendency and profitability will be expressed as following figure, and we present::

Hypotheses 6 there exist nonlinear relationship between profitability and dividend payout tendency.
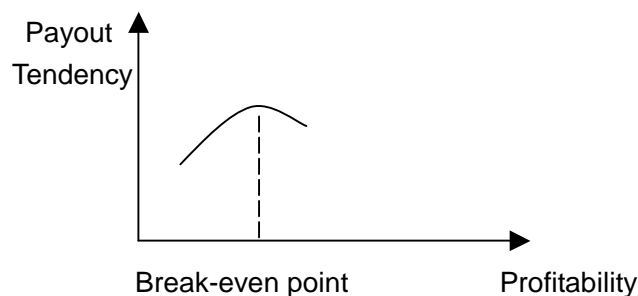
2.2 Break-even analysis on dividend payout tendency

The choice of dividend payment plan is decided by dividend payout tendency. If dividend payout tendency over a certain break-even point, then dividend will be paid, otherwise, no dividend will be paid. Suppose break-even point is zero, if dividend payout tendency over zero, then dividend will be paid. Let y* denote dividend payout tendency, y denote dividend choice result, then we can establish duality dependent variables model:

$$y_i^* = x_i'\beta + u_i$$

$$y = \begin{cases} 1 & y^* > 0 \end{cases}$$

0　　other

y* is latent variable, which can be observed its concrete volume. X_i denote the influenced factor vector of dividend payout tendency. U_i is residual error.

From the model, we get that expectation value of y is the probability of y equal to 1, namely:

$$E(y_i|x_i,\beta) = 1 \cdot \Pr(y=1|x_i,\beta) + 0 \cdot \Pr(y=0|x_i,\beta) = \Pr(y=1|x_i,\beta)$$

The probability of y equal to 1 is the probability of y* >0, thus:

$$\Pr(y_i=1|x_i,\beta) = \Pr(y_i^*>0) = \Pr(x_i'\beta+u_i>0) = 1-F_u(-x_i'\beta)$$

F_u is the cumulated distribution function of u, and it follow probit or logit distribution, this paper adopt logit distribution often used, namely:

$$\Pr(y_i=1|x_i,\beta) = 1-F_u(-x_i'\beta) = F_u(x_i'\beta) = \frac{1}{1+\exp(-x_i'\beta)}$$

According to this model, the probability of paying dividend is decided by influenced factors of dividend payout tendency, we can get marginal impact of influenced factors on dividend payout tendency and its influence on the probability of paying dividend from this model, and can estimate the extent of dividend payment tendency by a group of factor vector X_l, therefore can forecast and evaluate the choice results of dividend payment plan.

3. Empirical analysis

3.1 Data collection

This paper chooses all of 515 listed companies, which went public before 1997, as samples. We exclude financial firms and firms that management expense or shareholder equity under zero. We then eliminate three firms that cannot provide enough information. Finally, we got 504 listed companies. We collect data for each Chinese firm from CSMAR　2000　and Handbook of '97 ' 98 '98 listing companies' information. Edited by China's Securities Association.

3.2 Variable Choice

According to above analysis, we choose 13 variables to be the influenced factors of dividend payout tendency as showed in table 1.

The variables in table were calculated as averages over a three-year period (1997, 1998, 1999). The purpose of averaging the variables was to alleviate measurement problems encountered when a firm reports unusual financial data in one year. Y will be 1 if firm pay cash dividend in any year of 1997 to 1999, otherwise, Y will be zero.

3.3 Test of the validity of Model

In order to test the validity of the model, first we test the goodness of fit and

conduct parameter estimation of logistic model, Eviews software was used to conduct Hosmer-Lemeshow goodness of fit test, it test model by grouping expectation of Y, and dividing expectation of Y into four groups, the results are presented in table 2.

Table 1

Variable	Definition	Proxy for
LNMAG	Natural log of management expense	Firm's agency cost
LIBINV	Ratio of debt to operating cash flow	Investment from debt
FIXRAT	Fixed assets ratio	Asset structure
SHARE	Total capital	Capital size
INDUS	1. Industrials 2.Properties 3.Utilities 4. Commerce 5. Conglomerate	Industry
DEBTR	Debt ratio	Capital structure
LNASS	Natural log of total asset	Asset size
LISHR	Tradable shares ratio	Ownership structure
EPS	Earnings per share	Profitability
EPS2	Square of earnings per share	Profitability
SALE	Main operating income	Sale capacity
SAVA	Variance coefficient of main operating income (1995-1999)	Business risk
TURNAS2	Square of assets turnover ratio	Managerial efficiency

Table 2

	Grouping		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0000	0.2435	119	114.528	7	11.472	126	1.91809
2	0.2461	0.4662	80	81.1980	46	44.802	126	0.04971
3	0.4662	0.6881	48	53.1714	78	72.828	126	0.87016
4	0.6934	0.9966	25	23.1030	101	102.89	126	0.19074
Total			272	272.000	232	232.000	504	3.0287
H-L Statistic:3.0287				Prob. Chi-Sq(2)	0.2200			

H-L statistic significance level 0.22>0.05 reject original hypothesis, this implies original logistic model is correct. In table 2, H-L statistic level is less, the goodness of fit is better, and therefore, the reliability of expectation value dropped between group 2 and group 4 is more reasonable. If we dividing expectation value into ten groups, then H-L statistic level will be 4.6829, and significance level will be 0.7909, refuse original hypothesis also. It is obvious that logistic model can portray dividend payout tendency of Chinese listed companies soundly.

3.4 Parameter estimation

We employed Eviews software to estimate logistic model, the results are presented in table 3.

Table 3

Variable	Coefficient	Standard errors	P value	Marginal effect ratio
C	-11.68705***	2.909603	0.0001	
LNMAG	0.427346**	0.204790	0.0369	1
LIBINV	0.001233***	0.000395	0.0018	0.002885
FIXRAT	0.013474**	0.006804	0.0477	0.031529
SHARE	-1.22E-05***	4.43E-10	0.0061	-2.9E-5
INDUS	0.167593**	0.070828	0.0180	0.392172
DEBTR	-0.031876***	0.008325	0.0001	-0.07459
LNASS	0.450932*	0.256782	0.0791	1.055192
LISHR	-0.025042***	0.009639	0.0094	-0.0586
EPS	8.298705***	1.339991	0.0000	5.234
EPS2	-9.534328***	1.989747	0.0000	
SALE	6.66E-06***	2.52E-06	0.0083	1.56E-05
SAVA	-1.048061**	0.495142	0.0343	-2.45249
TURNAS2	-0.534068**	0.233344	0.0221	-1.24973

***	Significance level of 1%	
**	Significance level of 5%	
*	Significance level of 10%	

Dependent variable mean	0.46	Standard error	0.498918

LR Statictic	13df	185.9252	P Value LR stat	0.000000

McFadden R-squared	0.26732

We can get following results from table 3:

(1) The coefficients of fixed assets ratio, log of management expense, log of total assets, main operating income, ratio of debt to investment are positive, and there is a positive relationship between these variables and the probability of dividend payout tendency; The coefficients of debt ratio, total capital, tradable shares ratio, the variance coefficient of main operating income are negative, and there is a negative relationship between these variables and the probability of dividend payout tendency. Therefore, hypothesis 1 to 5 are supported, this means that firm size, assets structure, business risk, capital size, ownership structure, agency cost, managerial efficiency, and industry patterns can affect dividend payout tendency.

(2) Hypothesis 6 was accepted. As for Chinese listed companies in the period of 1997 to 1999, dividend payout tendency is the quadratic function of EPS, when EPS=0.435, then quadratic equation reach extremum point. When EPS less than 0.435, there is a positive relationship between dividend payout tendency and EPS, and the probability of paying dividend will increase with the increase of EPS; when EPS more than 0.435, there is a negative relationship between dividend payout tendency and EPS, and the probability of paying dividend will decrease with the increase of EPS, but this does not means no dividend, it only implies the probability of paying dividend decrease.

(3) LR statistic shows that the logistic model is significant.

(4) McFadden R-squared statistic is a likelihood ratio calculated by

$1 - \ln \hat{l}(\Omega) / \ln \hat{l}(\omega)$, $\hat{l}(\Omega)$ is the value of likelihood function in maximum

likelihood estimation point, $\ln \hat{l}(\omega)$ is the maximum value of likelihood function when suppose slope coefficients equal to zero. McFadden R-squared is 0.26732, and can acceptable.

(5) The marginal impact of influenced factors to dividend payout tendency can be calculated by formula $\beta_j P_i (1 - P_i)$. The line of row in the table is the relative marginal impact of influenced factors to dividend payout tendency. From the last row of the table, we can see that EPS is the most important influenced factors to dividend payout tendency, and SAVA is second important factor. Therefore, profitability and business risk are two important influenced factors.

3.5 Test of forecasting ability of model

In order to evaluate the forecasting correct ratio of logistic model, 504 listed companies were utilized to test the model, the correct ratios of forecasting are presented in table 4.

Table 4

	No dividend to pay	Paying dividend	Total
P(Y=1)<=0.5	211	60	271
P(Y=1)>0.5	61	172	233
Total	272	232	504
Correct	211	172	383
Correct ratio	77.57	74.14	75.99

The first row in table denote the probability of paying dividend take 50% as standard, this means that if P(Y=1)>0.5, then firm will pay dividend; if P(Y=1)<=0.5, then firm will not pay dividend. In table 4, we can see that 211 companies of 272 companies which no dividend to pay were forecasted did not pay dividend, correct ratio is 77.57%; 172 companies of 232 paying dividend companies were forecasted pay dividend, correct ratio is 74.14%. The total correct ratio of model is 75.99%, this means that our model can forecast dividend payout tendency correctly.

4. Conclusion

Through above analysis, we argue that the choice of dividend policy is decided by the tendency of dividend payout. When dividend payout tendency over a certain break-even point, firm pay dividend, otherwise, refuse paying dividend. The main influenced factors of dividend payout tendency are profitability, business risk, firm size, asset structure, capital size, ownership structure, agency cost, industry patterns and managerial efficiency. Though we cannot observe the level of dividend payout tendency, we can portray it by logistic model. Empirical results show that

with the increase of fixed assets ratio, agency cost, firm size, investment from debt, the probability of dividend payout tendency will increase; with the increase of capital size, tradable shares ratio, business risk, the probability of dividend payout tendency will decrease. As for Chinese listed companies, dividend payout tendency is the quadratic function of EPS, When EPS less than 0.435, the probability of paying dividend will increase with the increase of EPS; when EPS more than 0.435, the probability of paying dividend will decrease with the increase of EPS. Profitability and business risk are two important influenced factors on dividend payout tendency. The total correct ratio of logistic model is 75.99%.

How ever, the share price has not been considered in our paper because of the imperfect capital market in China. The price cannot reflect reliable information of firm value, and there exist banker's manipulation phenomenon also. But with the development of capital market, we should regard the share price as an important factor.

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