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An empirical study on abnormal returns of listed companies of Chinese pharmaceutical industry

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ABSTRACT

This paper is based on the relative theories of dividend policy, uses the stock transaction data from listed companies of Chinese pharmaceutical industry, then constructing stock dividend and cash dividend portfolios and the composite price index. Thus we do empirical study with the using of CAPM, Sharpe ratio and Jensen index. As a result, the abnormal returns of the two pharmaceutical companies are significantly different，the stock portfolio is significantly superior to the cash, and the longer the holding periods, the more obvious the advantages. And then we put forward the relevant suggestions.

Key words: Listed Companies of Pharmaceutical Industry; Abnormal Returns; CAPM; Sharpe Ratio; Jensen Index;

INTRODUCTION

Pharmaceutical industry is considered to be one of most promising industries in twenty-first Century. It develops actively in modern science and has made largest achievements. With the accelerated aging speed of the population and the improvements of people's living standard in China, pharmaceutical industry will face an enormous potential market demands, and be supported by policies strongly[1]. Besides a new round of cure has appeared, it will bring lots of opportunities to the pharmaceutical industry. These factors will have a great role in promoting the development of pharmaceutical industry; meanwhile, they can bring widespread attentions on the industry in the future [2]. Therefore, it is valuable to do the research.

Lintner (1956) made pioneering research on the cash dividend policy. Through the establishment of cash incentives model and a large number of empirical studies, he pointed out that the dividend policy of listed companies are usually not changing with the economy [3]. If the dividend policy changes, it is only because of the influences of profit this year and dividend policy last year. Subsequently, the study suggests that the stable dividend policy is optimal, dividend changes are usually local adjustments on the basis of dividend policy.

Heinkel (1978) thought that different companies have different profitability, we can increase or decrease cash dividend by dividend policy, then transferring operation information of the listed companies to the investors in capital market. According to the Heinkel model, the bad operating performance of the listed companies cannot meet the originally expected performance level, they cannot do as the original dividend policy, so they just declared not issued cash dividend; as to good operating performance of the listed companies, they can get the high level profitability and be able to do as the original dividend policy, or raise the cash dividend ratio [4]. Therefore, we can identify the operating conditions of enterprises through their dividend policies, as well as signal of changes.

Grinblatt, Masulis and Titman (1984) pointed out that stock dividends makes the company's undistributed profits decrease, has a certain constraint on the profit distributions in the future. If the earnings prospects of listed companies cannot meet the expected levels, then it will affect the dividend policy. Therefore, it costs much when companies want to transfer optimistic earnings to market by stock dividend [5]. The stock cannot maintain a certain

level after distributing stock dividend, but cause the stock market prices felling, and damage the companies' reputation. If the listed companies can make rational decisions of stock dividend, then distributing stock dividends becomes the signal of good prospects.

This paper is based on the relative theories of dividend policy, constructs stock dividend and cash dividend portfolios and the composite price index in the listed companies of pharmaceutical industry, then doing empirical study with CAPM, Sharpe ratio and Jensen index, and coming up with the conclusions.

EXPERIMENTAL SECTION

2.1 RESEARCH HYPOTHESIS

From the listed companies of pharmaceutical industry, the dividend policy is determined by its own operating condition and the level of profitability. To decide dividend policy is an objective process, rather than a subjective voluntary behavior. Different companies take different dividend policies, and different dividend policies reflect the differences in the operating status of listed companies of pharmaceutical industry in a certain extent [6]. If the listed companies issue stock dividends, it usually shows the companies not only have enough profits, but also most of them are in high quality on growing stage, and worth investing. So it concludes the first basic hypothesis.

H1: Investment returns of stock dividend investment portfolio are significant superior to the cash of listed companies of pharmaceutical industry.

This paper assumes the returns are significant difference during the different holding periods in the cash dividend and stock dividend company of pharmaceutical industry, and the longer the holding periods, the more significant the difference. Holding periods can be divided into different intervals according to the trading days. They are intervals of a day, 20 days, 60 days, 120 days and 240 days, namely a day, a week, a month, a quarter, half a year and a year. Based on the related theories and literature researches, it comes to the second basic hypothesis.

H2: The longer the holding periods of stock dividend investment portfolio of listed companies of pharmaceutical industry, the higher the returns.

This paper builds the investment portfolios and composite index of the cash dividend and stock dividend of listed companies of pharmaceutical industry, calculates the returns and time series data of different holding periods from the two portfolios, then makes an empirical study and test on the H1 and H2 with Sharpe ratio and Jensen index.

2.2 VARIABLES AND MODELS

This paper bases on the investment portfolios and composite index of the cash dividend and stock dividend of listed companies of pharmaceutical industry, uses the one order logarithmic difference of each index, calculating the time series data of integrated investment returns of the two dividend policy portfolios respectively. R_{IS} respects stock dividend portfolio return， R_{IC} respects that of cash dividend. Taking stock dividend as example, the formula is

$$R_{IS,t} = ln(IS_t) - ln(IS_{t-1}) \quad (1)$$

At the same time, we also uses the Shanghai and Shenzhen 300 index I300, calculate the time series data of it by formula (1) ,and recorded as $R_{300,}$ as well as the returns of different intervals: a day, 20 days, 60 days, 120 days and 240 days.

The capital asset pricing model is based on the Marco Fitch mean variance theory, which studies the relationship between expected returns and risk assets in the securities market, and how equilibrium price is formed. CAPM is the first equilibrium model about the pricing of financial assets, but also the first to test and measure it. The model establishes the relationship between capital risk and returns, which indicates the expected stock return is the risk-free rate and risk compensation rate, reveals the internal structure of stock returns. The formula is

$$E(R_p) = \alpha_p + R_f + \beta_p (R_m - R_f) \quad (2)$$

In equation (2), $E(R_p)$ means expected return, R_m means return of market portfolio, R_f means risk-free rate, α_p means Alpha coefficient, β_p means Beta coefficient.

Sharp ratio is also known as Sharp index, its core idea is that rational investors will select and hold effective portfolios, namely maximizing expected return in the given risk level on investment portfolio, or those portfolios in the given expected return level to minimize the risk level. Sharp ratio reflects the returns over the risk-free rate level in the portfolio. If Sharp ratio is positive, it shows the portfolio returns over the risk-free rate. Sharp ratio is lager,

the higher unit risk return of the investment portfolio. The formula is

$$S_p = \frac{E(R_p) - R_f}{\sigma_p} \quad (3)$$

In equation（3）, σ_p means the standard deviation, S_p means Sharpe Ratio.

Jansen index is measure of portfolio performance and it is the difference of actual expected return and market line portfolio expectation in the security [7]. Jansen index is portfolio return which based on the capital asset pricing model. When Jansen index is positive, it shows that portfolio outperformed the market portfolio, the more the Jansen index, the better performance is. The formula is

$$J = E(R_p) - \{R_f + \beta_p (R_m - R_f)\} \quad (4)$$

In equation（3）, J means Jensen Index, $E(R_p)$ means abnormal return.

RESULTS AND DISCUSSION

The stocks of this paper are selected from Shanghai and Shenzhen A shares in the listed companies of pharmaceutical industry. They should meet the following conditions: not the ST and * ST shares or some data are missing and incomplete or non-disclosure company, companies in good condition without serious violation events and financial report troubles in a year recently. Data samples range from January 2007 to December 2012 of the trading days from 100 pharmaceutical industry stocks, and then constructing stock dividend and cash dividend portfolios and the composite price index.

According to the above empirical designs, we get the holding periods for 1 day, 20 days, 60 days, 120 days and 240 days of the CAPM model respectively by equation (2), and calculating Sharpe ratio according to the equation (3). The data shows in Table 1.

Table 1 Return and Sharpe Ratio of Cash and Stock Dividend Portfolio of Pharmaceutical Industry

Holding Periods		1	20	60	120	240
Risk Premium	Cash Dividend	0.0000	0.0001	0.0011	0.0039	0.0093
	Stock Dividend	0.0003	0.0087	0.0221	0.0434	0.1081
S. D.	Cash Dividend	0.0145	0.0743	0.1115	0.2352	0.3817
	Stock Dividend	0.0151	0.0756	0.1223	0.2521	0.4320
Sharpe Ratio	Cash Dividend	-0.0004	0.0023	0.0067	0.0120	0.0293
	Stock Dividend	0.0132	0.8056	0.1321	0.1980	0.2609

From Table 1, we can see there is a significant difference on returns of cash and stock dividend portfolios of listed companies of pharmaceutical industry, and stock dividend portfolio is obviously superior to the cash .And the difference is larger with increasing of the investment holding periods.

From empirical analysis, we know the risk premium of stock dividend portfolio of listed companies of pharmaceutical industry is significantly higher than the cash, and the difference of risk premium is larger with the increasing of investment holding periods. Meanwhile, the Sharpe ratio of stock dividend portfolio of listed companies of pharmaceutical industry is obviously higher than the cash, and the difference of Sharpe ratio is larger with the increasing of investment holding periods.

Therefore, we can know the two basic hypotheses H1 and H2 are right.

According to (4), we calculate the Jensen index in Table 2.

From Table 2, we can see there is a significant difference on Jensen index of cash dividend and stock dividend portfolios of listed companies of pharmaceutical industry, and the stock dividend portfolio is obviously superior to the cash. We also know the difference is larger with the increasing of holding periods.

Table 2 Jensen Index of Cash and Stock Dividend Portfolio of Pharmaceutical Industry

Holding Periods	Cash Dividend			Stock Dividend		
	Alpha Coefficient	Probability of Alpha Coefficient T value	Jensen Index	Alpha Coefficient	Probability of Alpha Coefficient T value	Jensen Index
1	-0.0007	0.0000	-0.0007	0.0000	0.0000	0.0005
20	-0.0029	0.0000	-0.0042	0.0035	0.0000	0.0047
60	-0.0087	0.0000	-0.0098	0.0089	0.0000	0.0096
120	-0.0170	0.0000	-0.0210	0.0177	0.0000	0.0221
240	-0.0383	0.0000	-0.0473	0.0389	0.0000	0.0475

According to the CAPM, probabilities of Alpha coefficient T values and related data analysis of Jensen index, we know Jensen index of cash dividend portfolio is negative. Furthermore, the probabilities of Alpha coefficient T values are very significant, which shows there is significantly negative abnormal returns; We also know, in the stock dividend portfolio, the probabilities of Alpha coefficient T values are very significant and all the Jensen index are positive . Thus revealing there is a significant difference on Jensen index of the two portfolios, and stock dividend portfolio is obviously superior to the cash of listed companies of pharmaceutical industry.

Meanwhile, with the increasing of the holding periods, the negative values of Jensen index are larger and larger in cash dividend portfolio, and the positive values are the same in stock dividend portfolio. This demonstrates that, with the increasing of holding periods, the abnormal returns of stock dividend portfolio are higher and higher, and the advantages of stock dividend portfolio are more and more obvious in the listed companies of pharmaceutical industry.

As a result, we can conclude the conclusions of the basic hypothesis of H1 and H2 are established again.

CONCLUSION

We can get two basic conclusions and some suggestions from above empirical studies.

Firstly, the investment portfolio of Stock dividend is obviously better than the cash of listed companies of pharmaceutical industry. Generally speaking, the investment portfolio return of stock dividend portfolio is superior to the cash, which indicates that operating performances are more ideal. Moreover, it shows stock dividend portfolio is in good condition and prospect, and more valuable to invest.

Secondly, the longer holding periods of stock dividend portfolio, the higher investment returns and risk premium in the listed companies of pharmaceutical industry. With the increasing

of holding periods in stock dividend portfolio, Sharpe ratio, which reflects unit risk premium, is increasing; Jensen index, which measures abnormal return levels, continues rising as well, and the advantages are more and more obvious.

Lastly，from the empirical study on the listed companies of Chinese pharmaceutical industry, although the dividend policies of China's listed companies lack of the continuity and stability when compared with mature market, but they include the operation and development. So investors should consider company's annual dividend policy as a very valuable reference in object selection. By investigating the changes of common stock total dividend and cash dividend, and judge the company earnings situation and future growth. Listed companies should establish a set of complete, scientific, continuous and stable dividend policy, so it can get a good balance in the form of dividend and future business situation and growth, and increase the long-term value.

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