

The Motivation and Identification of Listed Companies with Large Stock Dividends

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Abstract—It is of great significance to reduce the blindness and the losses for investors to invest in listed companies with large stock dividends. Based on the characteristics of investors and listed companies in Chinese stock market, the motives to implement large stock dividends policy of listed companies can be summarized by the importance from high to low: signal transmission, additional issuance, low-priced stock preference and equity expansion. An index system for selecting large stock dividends is presented. According to the calculation results of analytic network process (ANP), the importance of the indices from high to low is: the new investment projects, the return on net assets, the net profit growth rate, the retained earnings per share, private equity, net cash flow per share, share price, total share capital, turnover rate and the ratio of circulating stock. The case study of listed companies indicates that the listed companies with a score greater than 0.44 are most likely to carry out large stock dividends policy in the future.

Keywords—listed company; large stock dividends; motivation; identification; analytic network process

I. INTRODUCTION

Dividend distribution policy is a decision-making problem that the listed company allocates or retains the profit for reinvestment, which is related to the long-term development of the company, the demand of shareholders for return on investment and the rationality of capital structure. On the one hand, a reasonable dividend distribution policy can provide a source of funds for the expansion of the enterprise. On the other hand, it can help enterprise to establish a good image and to attract potential investors so as to maximize the value of the company and shareholders' wealth.

According to the theory of signal transmission, the asymmetry is obvious between listed companies and investors [1], and investors are eager to acquire the development prospects of listed company by the management [2]. The firm may smooth its dividend or adopt a more flexible dividend payout depending on the strength of the information asymmetry and the structure of the financial market [3]. A change of the dividend-payout ratio not only can signal a variation in the expected net-revenue, but also can affect capital expansion via its retention [4]. Hence listed companies can transmit optimistic expectations about profitability and future prospects by implementing stock dividends or stock splits [5]. It is a signal that the management is confident of the development and performance [6]. Especially when insiders can influence the decision-making process, stock dividends are more likely to signal an optimistic financial future [7]. According to reference

[8], the relationship between dividend payout and firm value is positive. In the American market, the performance of the company will be significantly improved after the stock splits [9].

The "dividend catering" is based on investors' irrationality and management's rationality. Investors' preferences and choices have an effect on the payout policy [10]. Baker et al. [11] pointed out that management had a good understanding of the value of the company and the preferences of investors. Some investors prefer low-priced stocks. Therefore, management will lower the stock price through stock splits and other means to meet the irrational requirements of investors [12]. Moreover, the prevalent demand for dividend is mainly due to the dividend chasing of individual investors [13] and the preference for payout policy of institutional investors [14]. There are different dividend caterings in the stock markets of different countries [15]. For example, firms are more likely to offer optional stock dividends to their shareholders in France [16].

Affected by the psychology and own capital, most investors prefer low-priced stocks and are afraid of high-priced stocks [17]. This kind of sentiment indicator will play a more and more important role in the investors' quantitative trade strategy [18]. Therefore, the stock has an appropriate trading price range. If the price of the stock is too high, then the management will depress the price to the optimal price range through the stock dividends.

Most management believes that stock dividends or stock splits will increase market liquidity [19]. According to reference [20], there is a positive relationship between stock liquidity and dividend payout for Chinese listed companies. On the basis of the liquidity hypothesis, more and more investors will be attracted to participate in the trade, and the market attention will be increased, and thus the stock liquidity will be improved [21].

The main contributions of this study are as below.

(1) An index system for selecting potential listed companies with large stock dividends is presented from the four aspects: signal transmission, additional issuance, low-priced stock preference and equity expansion. A network structure is developed to describe the interaction and feedback among indices.

(2) An analytic network process method for the selection of listed companies with large stock dividends is proposed. The

unweighted supermatrix, the weighted supermatrix and the limit supermatrix are constructed, and the global weights of the indices are obtained.

(3) The case study of listed companies indicates that the listed companies with a score greater than 0.44 are most likely to carry out large stock dividends policy in the future.

II. LARGE STOCK DIVIDENDS SELECTION METHOD BASED ON ANP

A. The Index System and Their Interaction and Feedback Relationships

The meaning of "large stock dividends" is high proportion of bonus shares and transferring shares. "Bonus shares" indicates that the listed company distributes its stocks to shareholders instead of cash dividends. "Transferring shares" indicates that the listed company transfers capital reserve funds into shares. "High" indicates that the proportion of bonus shares or transferring shares is large. After the implementation of large stock dividends, the number of shares will increase, and the stock price becomes lower. Based on the experience and preference of experts or decision-makers, the local weights and global weights can be determined by ANP method, which is combined qualitative analysis and quantitative analysis. Analytic network process method was proposed by Saaty [22], which is a multi-criteria decision-making method. ANP adapts to non-independent network structure.

According to the existing studies and the motivations of listed companies, an index system for selecting listed company with large stock dividend is presented, as shown in Table I.

TABLE I. INDICES FOR SELECTING LISTED COMPANY WITH LARGE STOCK DIVIDENDS

Factors	Sub-factors
Low price preference (C ₁)	Share price (C ₁₁)
	Turnover rate (C ₁₂)
Equity expansion (C ₂)	Total share capital (C ₂₁)
	Ratio of circulating stock (C ₂₂)
Additional issuance (C ₃)	New investment projects (C ₃₁)
	Private equity (C ₃₂)
Signal transmission (C ₄)	Return on net assets (C ₄₁)
	Net profit growth rate (C ₄₂)
	Retained earnings per share (C ₄₃)
	Net cash flow per share (C ₄₄)

B. The Identification of Listed Companies with Large Stock Dividends Based on ANP

There are four element sets on the basis of the motivations of listed companies. Among them, the set of equity expansion is influenced by the sets of low price preference and additional issuance, and the set of equity expansion has an effect on the sets of the signal transmission and additional issuance. In addition, there are internal dependence relationships in the sets of signal transmission and additional issuance. The interaction relationships of the other element sets are shown in Figure 1.

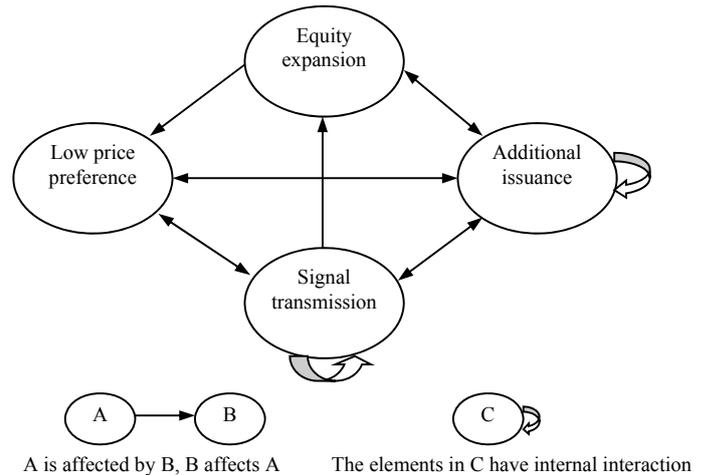


FIGURE 1. THE ANP NETWORK STRUCTURE

According to the interaction relationships between the elements and the element sets, the pairwise comparison are performed to obtain judgment matrices and the local weights. The relative importance is measured by Saaty's 1-9 scale. The preference information about the criteria and indices of the three experts are determined. Then the corresponding judgment matrices can be acquired.

The judgment matrices embody the preference opinions of experts or decision makers. In the process of establishing the judgment matrix, the recognition ability, the complexity of objective and the measurement scales will affect the consistency of the judgment matrix. They make the complete consistency of judgment matrix impossible. Therefore, the consistency check of the judgment matrix needs to be performed. The eigenvalue method is used to calculate the local weights and to test the consistency of the judgment matrix. Generally speaking, if the consistency ratio is less than 0.1, then the inconsistency degree is acceptable. Otherwise, the judgment matrix needs to be revised until the consistency is satisfied. Consistency tests were performed for all the judgment matrices of criteria and indices, and all of them passed the test.

The local weights of judgment matrices were solved by Super Decision (SD) software, which is developed by the Expert Choice Company in the United States. SD software is designed to solve the parameters of ANP, including the local weight, consistency index, and the global weight.

According to the calculation results of SD software, an unweighted supermatrix is constructed in line with the local weights and ANP network structure, as shown in Table II. The unweighted supermatrix indicates the interrelationships among the indices.

The weighted supermatrix is acquired by randomizing the columns of the unweighted supermatrix. A stable limit supermatrix can be achieved by multiplying the weighted supermatrix itself. Both the weighted supermatrix and the limit supermatrix show the influence of the indicators on the whole system. The columns of the limit supermatrix indicate the global weights of indices, while the columns of the weighted

supermatrix are not stable. The limit supermatrix is shown in Table III.

The local weights and the global weights of the criteria and indices can be achieved by SD software. The results are shown in Table IV.

According to the calculation results, it is obvious that the motivation for signal transmission is the most important for

selecting listed companies with large stock dividends. Its weight is about 55.91%, hence investors should pay more attention to this motivation. The second important criterion is the additional issuance of stock, with a weight of 29.26%. To cater the low price preference of the shareholders is the third motivation of the listed companies. Equity expansion is the last important factor, and its weight is approximately 4.13%.

TABLE II. THE UNWEIGHTED SUPERMATRIX

	C₁₁	C₁₂	C₂₁	C₂₂	C₃₁	C₃₂	C₄₁	C₄₂	C₄₃	C₄₄
C₁₁	0.0000	0.0000	0.8333	0.8333	0.8333	1.0000	0.8333	0.8333	0.8333	0.8333
C₁₂	0.0000	0.0000	0.1667	0.1667	0.1667	0.0000	0.1667	0.1667	0.1667	0.1667
C₂₁	0.0000	0.0000	0.0000	0.0000	0.1667	0.1667	0.8333	0.8333	0.8333	0.8333
C₂₂	0.0000	0.0000	0.0000	0.0000	0.8333	0.8333	0.1667	0.1667	0.1667	0.1667
C₃₁	0.1250	0.8750	0.1667	0.1667	0.8750	1.0000	0.8333	0.8333	0.8333	0.8333
C₃₂	0.8750	0.1250	0.8333	0.8333	0.1250	0.0000	0.1667	0.1667	0.1667	0.1667
C₄₁	0.5806	0.5806	0.0000	0.0000	0.5806	0.5806	0.0000	0.1047	0.6370	0.6370
C₄₂	0.2554	0.2554	0.0000	0.0000	0.2554	0.2554	0.6370	0.0000	0.2583	0.2583
C₄₃	0.0499	0.0499	0.0000	0.0000	0.0499	0.0499	0.1047	0.6370	0.0000	0.1047
C₄₄	0.1141	0.1141	0.0000	0.0000	0.1141	0.1141	0.2583	0.2583	0.1047	0.0000

TABLE III. THE LIMIT SUPERMATRIX

	C₁₁	C₁₂	C₂₁	C₂₂	C₃₁	C₃₂	C₄₁	C₄₂	C₄₃	C₄₄
C₁₁	0.0915	0.0915	0.0915	0.0915	0.0915	0.0915	0.0915	0.0915	0.0915	0.0915
C₁₂	0.0154	0.0154	0.0154	0.0154	0.0154	0.0154	0.0154	0.0154	0.0154	0.0154
C₂₁	0.0305	0.0305	0.0305	0.0305	0.0305	0.0305	0.0305	0.0305	0.0305	0.0305
C₂₂	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108
C₃₁	0.1989	0.1989	0.1989	0.1989	0.1989	0.1989	0.1989	0.1989	0.1989	0.1989
C₃₂	0.0937	0.0937	0.0937	0.0937	0.0937	0.0937	0.0937	0.0937	0.0937	0.0937
C₄₁	0.1966	0.1966	0.1966	0.1966	0.1966	0.1966	0.1966	0.1966	0.1966	0.1966
C₄₂	0.1661	0.1661	0.1661	0.1661	0.1661	0.1661	0.1661	0.1661	0.1661	0.1661
C₄₃	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040
C₄₄	0.0925	0.0925	0.0925	0.0925	0.0925	0.0925	0.0925	0.0925	0.0925	0.0925

TABLE IV. THE COMPREHENSIVE WEIGHTS OF CRITERIA AND INDICES

Criteria	Weights of criteria	Indices	Local weights	Global weights
C ₁	0.1069	C ₁₁	0.8558	0.0915
		C ₁₂	0.1442	0.0154
C ₂	0.0413	C ₂₁	0.7376	0.0304
		C ₂₂	0.2624	0.0108
C ₃	0.2926	C ₃₁	0.6797	0.1989
		C ₃₂	0.3203	0.0937
C ₄	0.5591	C ₄₁	0.3516	0.1966
		C ₄₂	0.2971	0.1661
		C ₄₃	0.1860	0.1040
		C ₄₄	0.1654	0.0925

Specifically, for the motivation of catering the low price preference of stockholders, the local weight of the stock price is 85.58%, which is significantly important than that of the turnover rate. The total share capital is more important than the ratio of circulating stock in the consideration of equity expansion. Compared with private equity, whether the company has new investment projects is more important, because the local weight of new investment projects is about twice as that of private equity. The priority order of the four indicators under the criterion of signal transmission is: return on net assets, net profit growth rate, retained earnings per share and net cash flow per share.

In conclusion, the indicators can be divided into three different levels according to their importance: (1) Very important. This level includes new investment projects, return on net assets and net profit growth rates, and their weights are 19.89%, 19.66% and 16.61% respectively. (2) Important. The following indices belong to this level: retained earnings per share, private equity, net cash flow per share and share price, and their weights are 10.40%, 9.37%, 9.25% and 9.15% in turn. (3) General important. The total share capital, the turnover rate and the ratio of circulating stock are in this level, and their weights are relatively small. Therefore, when selecting listed

companies with large stock dividends, investors should focus on the first and second level important indicators.

III. CASE STUDY

A. Problem Description and Data Processing

Assume that a listed company that has transferred or sent 10 or over 10 shares for every 10 shares is a listed company with large stock dividends. Fifty listed companies in Chinese stock market that have implemented large stock dividends policy in 2017 are randomly selected. Ten listed companies without large stock dividends policy are chosen for the comparison experiment according to their financial rankings in Wind database. Specifically, one listed company will be selected every 300 or so on the basis of net profit. The corresponding data of these 50 listed companies are extracted from Wind database.

In order to reduce the accidental errors, the monthly average closing price prior to the announcement of large stock dividends policy is taken as the share price of listed company, and the monthly average turnover rate before the announcement of large stock dividends is selected as turnover rate. Most listed companies will announce the large stock dividends policy with semiannual report or annual report. The averaged share price and turnover rate in the first half of 2017 are taken for the listed companies without large stock dividends. As the total share capital and the proportion of circulating stock are generally stable, the corresponding data of the day before the announcement are selected, while the average data of the first half of 2017 are adopted for the listed companies without large stock dividends. If the listed companies have private equity last year, then the indicator is one, otherwise is zero. In the same way, if the listed companies have new investment projects last year, then the index is one, otherwise is zero. The data of other indices are extracted from the annual report data of 2016.

According to the maximum-minimum standardization method, the non-logical data are standardized. For instance, the data of share price, return on net assets and net profit growth rate are processed as benefit indicators, that is, the bigger is the better for these kind indicators. While the ratio of circulating stock and total share capital are standardized as cost indicators, that is, the smaller is the better.

For benefit indicators: $C_{ij} = [C_{ij} - \min(C_{ij})] / [\max(C_{ij}) - \min(C_{ij})]$

For cost indicators: $C_{ij} = [\max(C_{ij}) - C_{ij}] / [\max(C_{ij}) - \min(C_{ij})]$

B. The Comprehensive Scores of the Samples

According to the global weights of indices in Table IV and the standardized data of the listed companies, the comprehensive scores of the samples can be obtained by the following formula:

The comprehensive score of the sample

$$= 0.0915 * C_{11} + 0.0154 * C_{12} + 0.0304 * C_{21} + 0.0108 * C_{22} + 0.1989 * C_{31} + 0.0937 * C_{32} + 0.1966 * C_{41} + 0.1661 * C_{42} + 0.1039 * C_{43} + 0.0924 * C_{44}$$

The scores of the samples are sorted in descending order, as shown in Table V. From the results, the scores of top 10

listed companies are greater than 0.54, and they all implemented large stock dividends policy last year. The scores of the first 43 listed companies are higher than 0.44, and only one of them does not perform large stock dividends policy. The last seven listed companies do not carry out large stock dividends policy up to now, and their scores are smaller than 0.32. The results show that the proposed method for selecting listed companies with large stock dividends is scientific and effective, and the selection indicators are also reasonable and appropriate. Of course, the global weight of each index solved by ANP is accurate as well.

TABLE V. THE COMPREHENSIVE SCORES OF THE SAMPLES COMPREHENSIVE WEIGHTS OF CRITERIA AND INDICES

Number	Stock code	Large stock dividends policy	Score
1	603239	Yes	0.6676
2	002668	Yes	0.6239
3	300017	Yes	0.5840
4	300569	Yes	0.5831
5	600892	Yes	0.5702
6	300376	Yes	0.5683
7	300487	Yes	0.5567
8	300502	Yes	0.5548
9	300398	Yes	0.5366
10	300319	Yes	0.5318
11	603766	Yes	0.5252
12	300546	Yes	0.5208
13	002354	Yes	0.5138
14	603528	Yes	0.5131
15	603030	Yes	0.5107
16	300304	Yes	0.5098
17	603066	Yes	0.4892
18	002537	Yes	0.4870
19	002620	Yes	0.4866
20	300377	Yes	0.4865
21	002747	Yes	0.4859
22	002456	Yes	0.4852
23	002206	Yes	0.4776
24	600337	Yes	0.4757
25	300520	Yes	0.4611
26	300352	Yes	0.4590
27	002383	Yes	0.4573
28	002239	Yes	0.4561
29	300194	Yes	0.4556
30	300403	Yes	0.4530
31	603636	Yes	0.4523
32	002131	Yes	0.4484
33	002429	Yes	0.4454
34	000541	none	0.4422
35	300534	Yes	0.4309
36	603007	Yes	0.4201
37	603077	Yes	0.4168
38	002783	Yes	0.4166
39	603628	none	0.3674
40	002148	Yes	0.3650
41	300356	Yes	0.3556
42	300021	Yes	0.3519
43	300562	Yes	0.3478

TABLE V. Continue

44	300264	none	0.3156
45	600751	none	0.3117
46	000968	none	0.2886
47	002886	none	0.2464
48	600371	none	0.1981
49	601818	none	0.1802
50	002272	none	0.1128

IV. CONCLUSIONS AND SUGGESTIONS

Based on the characteristics of Chinese stock market and listed companies, an index system with network structure is presented for selecting listed companies with large stock dividends, and an ANP method is proposed. The main conclusions are as follows: (1) The motives for Chinese listed companies to implement large stock dividends can be summarized by the importance from high to low: signal transmission, additional issuance, low price preference and equity expansion. (2) According to the calculation results of analytic network process, the importance of the indices from high to low is: the new investment projects, the return on net assets, the net profit growth rate, the retained earnings per share, private equity, net cash flow per share, share price, total share capital, turnover rate and the ratio of circulating stock. (3) The case study of the 50 listed companies show that the listed companies with a score greater than 0.44 are most likely to carry out large stock dividends policy in the future.

According to above findings, investors should pay more attention to the financial status when selecting potential listed companies with large stock dividends, especially the four indicator sets presented in this paper. The most important four indices are new investment projects, return on net assets, net profit growth rate and retained earnings per share, and their global weights are greater than 10%. The higher of these indices are, the more likely of the listed company to implement large stock dividends policy is. Because these indices indicate that the listed company has strong profitability and good development prospect, and thus the company is inclined to carry out large stock dividends policy to convey these signals to investors. Whether the listed company has new investment projects or not is very important as well. Most listed companies will announce the plan of new investment projects together with the announcement of large stock dividends policy. Generally speaking, the listed companies will conduct private equity to raise funds for a new investment plan. Net cash flow per share and share price have an impact on the amount of the large stock dividends.

Finally, we would like to remind investors that the purpose of this paper is to explore the incentives for listed companies to implement large stock dividends policy, and how to select listed companies that they may carry out large stock dividends policy in the future. If investors intend to invest in listed companies with large stock dividends, it is necessary to make an investment plan according to their own capital and risk tolerance, such as how to participate in, when to exit, and so on.

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