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An Empirical Study on Identification of Corporate Life Cycle Phases

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Abstract
This paper classifies corporate life cycle in four stages, from start-up, through growth, maturity and deline. 762 listed manufactory corporations have been used as sample in empirical analysis methodology. Profit margin is chosen as the fundamental index first, then the index of development trend that based on comparing with average similar companies in this industry is constructed. According to those indexes that are chosen from half time of the whole corporate life cycle, we can demonstrate that what kind of life cycle phases are corporations at.

Key words: Corporate life cycle; Identification; Net profit margin on sales; Development trend

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INTRODUCTION
Identifying and classifying corporate life cycle phases correctly is essential due to there are different feature, tactical target and risks in different phases for a corporate. Corporate Life Cycle refers generally to a corporation's approach to managing activities and making decisions during ongoing refreshment of business and technical practices to support its corporate mission. Previous research has investigated several model of the life cycle in different ways. Greiner (1972) mentioned a main theory of the life cycle. According to him, phases of corporate life cycle should be classified by the development of corporations as from start-up to growth, maturity and decline. After comparing and analyzing different models of corporate life cycle theory, it illustrates that lots of phases are researched and main prevail trend is that to separate it in 3 to 5 stages. Although there are a variety of stages in different studies for various research target, identical development of enterprises demonstrates that stages can be identified as birth, growth, maturity and decline in general. There are several methodologies to classify stages of life cycle. It contains that non-financial indicators like ages of corporations, the target of corporations and management style and some financial indicators as the payout ratio, financial leverage, growth rate and ROE. These four stages also are used in this paper and our key point is to identify the essential index of the development of the corporation and gather data to calculate the development trend of this company to find out which stage of the life cycle is this company is at. Quantitative study and the empirical study will be used in this paper to support answers for decision-makers of the corporation in practical.

The remainder of the paper is organized as follows. Section 2 discusses the relevant literature and definition of index, including what indexes will be used and why them are chosen. Section 3 builds the model with gathering data, doing empirical study and analyzing results. Section 4 summarizes and concludes the paper.

1. RELATED LITERATURE AND DEFINITION OF INDEXES
The general indexes I have chosen are: set up date of corporation, the year that company went public and industries of corporations, etc.. The approval registration date is the day that corporation is set up. Also, as all sample corporations are listed, date that went public is a very significant index. Some previous theoretical research

shows that corporate life cycle is affected by industry factors too, so this paper chose all sample corporations from manufactory industry to reduce that bias. According to *Guidelines for the Industry Classification of Listed Companies* from China Securities Regulatory Commission, manufactory industry contains: (a) Food manufacturing, beverage and refined tea manufacturing; (b) Textile garment and apparel industry; Leathers, furs, feathers and related products and footwear industry; (c) Wood processing and wood, bamboo, rattan, Palm fiber, and straw product industry, Furniture manufacturing; (d) Papermaking and paper product industry, Printing and recording media reproduction industry; (e) Industries of petroleum processing, coking, and nuclear fuel processing; Industry of rubber and plastic products; (f) Electric machinery and equipment manufacturing; (g) Industry of ferrous metal smelting and rolling processing ,Industry of non-ferrous metal smelting and rolling processing Metal product industry; (h) General equipment manufacturing, Automobile manufacturing; (i) Pharmaceutical industry; (j) Other manufacturing industries. A well-known theory is that investors buy stocks in the security market is to earn dividend payment from listed corporations and obtain capital gain from increasing in the stock price just like companies carrying on for profits. Also, dividend payout and capital gain are reflected by companies' profitability which is related to sales of products, manager's ability, financial position and technical innovation. Consequently, assessment of companies' profitability is a major way to evaluate the development of corporations. The financial indicators of listed companies' profitability are including as follows. Revenues reflect company's realized value and the growth of revenues illustrates that the latest technology has been used and there are some new operating activities. Return on Equity draws the total return for shareholders. Also, Degree of financial leverage and sale per share are significant factors will be concerned. Managers of corporations make operating decisions based on net profit which is a necessary instrument for assessing corporation's management performance, profitability and liquidity. Net profit margin on sales is equal to net profit divided by revenues. Higher net profit margin on sales will lead to higher profitability for corporations. According to analysis of above factors, we choose net profit margin on sales as essential index for evaluating the growth of companies.

According to Modigliani and Miller, by the 1950s, free cash flow is a significant method to evaluate corporation's value due to cash is the primary stone of companies. Valuation of corporations can be considered as allocated maximum cash without damaging on growth and development of enterprises. In general, western researchers and some famous consulting firms like Mckinsey&Company prove that the most acceptable and agreed concept of assessment of corporations' value is that free cash flow method in modern corporate finance field. This model has been widely used in area of merge, investment and portfolio management in developed capital markets. If a corporation with lower growth opportunity and rich free cash flows, manager might invest in some projects with negative NPA or waste money for inefficient organizations (Jensen, 1986). According to Christie and Zimmerman, CEOs manipulate financial reports frequently to deceive harmful behavior of corporations. Chen (2007) chose listed corporations in China to be samples and tested that free cash flow model which is mentioned by Dickinson is also appropriate in China. It explained that proxy variable of free cash flow model can be used to classify corporate life cycle stages. Hu also reported that growth of manufactory companies in China is obvious correlated to factors of cash flow. The major contribution of this paper is that not only analyzing manufactory corporation's characteristics, but also classifying corporate life cycle as some indexes, including: date that company has been started up, year of IPO and some essential points like the net profit margin.

2. MODEL

2.1 Samples and Data Resource

We first choose some listed companies from Shanghai and Shenzhen from 2006 to 2011 as samples. The reason we choose manufactory industry as sample industry is that it is the core industry of the economy of China and the products it is produced accounts for the major part of whose products of China. Furthermore, with the innovation of China, manufactory industry expands dramatically in our country and turns to be mature which is named "manufactory factory" by the whole world. Choosing those six years data (from 2006 to 2011) is due to normal and average corporation's life time is seven to eight years while International Corporation is forty to fifty years in the USA. A researcher from Holland states that average corporate life is only twelve and a half years in Asian countries like Japan and Singapore. According to "Scientific investment" magazine, life of Group Company is seven to eight years while medium and small size company is only three to four years on average in China. Chinese researcher Zhao investigates and analyzes more than 1,400 listed companies as sample to get conclusion that Chinese corporations repeat their lives in 12 years and cycle them in the long run. Consequently, we choose data from 2006 to 2011 as the longest span is 6 years. It will reflect maybe the whole life cycle, half life cycle or a stage of the whole life cycle. Listed companies of manufactory industry from all these 6 years are analyzed in this paper on empirical study and we mainly focus on their growth to obtain evidence that whether their life cycle stages are sensible.

I research listed corporate data through Chinese listed company website and all companies I have chosen are those already IPO for three years till 2011. The reason

those related data from all manufactory industry listed corporations had been chosen is that it is necessary to calculate average net profit margin on sales in that industry in later research. In order to assure that all data and information with continuity and stability to analyze companies' feature of growth, I have to consider about those corporations that go public in the year 2009 and even before it. In specific study of the corporate life cycle, some data have been eliminated. I get rid of some companies which are commented with ST or *ST, of course during the year 2006 to 2011. The motive for doing that is to avoid some bias or subjective aspect, especially avoiding the negative effect on abnormal financial situation. After screening out some noisy data and information, all sample corporations I used is 755. There are some sub-industries of manufactory industry those are samples as follows: (a) 54 companies from food manufacturing, beverage and refined tea manufacturing industry; (b) 51 companies from textile garment and apparel industry, Leathers, furs, feathers and related products and footwear industry; (c) 9 companies from wood processing and wood product industry and furniture manufacturing industry; (d) 26 companies from papermaking and paper product industry, printing and recording media reproduction industry; (e) 137 companies from industries of petroleum processing, coking, and nuclear fuel processing; Industry of rubber and plastic products; (f) 64 companies from electric machinery manufacturing; (g) 107 companies from industry of ferrous metal smelting and rolling processing ,Industry of non-ferrous metal smelting and rolling processing Metal product industry; (h) 233 companies from general equipment manufacturing, Automobile manufacturing; (i) 91 companies from pharmaceutical industry; (j) 3 companies from other manufacturing industries.

2.2 Empirical Study

From the aspect of micro-economy, the growth of companies will be analyzed in both theoretical and practical way. It contains two aspects of content. One is to compare some data of companies like revenues, net profit and net profit margin on sales directly for different years. I am doing this for understanding companies in what development stages and controlling their trend of development. For instance, the corporation can be at the development stage of slow and stable. Stage of acceleration developed or stays where they are. Another one is to compare the growth rate of a corporation with other companies' in the same industry, with an average level of industry and the best level of industry especially. This is for controlling the change of this company, particularly in change of the position of this company in this industry in the first time.

2.2.1 Data and Methodology

I first calculate the average number of sample corporations of the net profit margin on sales in every sub-industry which is the benchmark. According to data I collected, average net profit margin on sales of ten sub-industries of manufactory industry are identified from 2006 to 2011. I then identify the maximum of the net profit margin on sales as the best scenario of each sub-industry and it contains eight best numbers in eight sub-industries of manufactory industry as best net profit margin on sales. It has shown in Table 1. I did not put two sub-industries which are wood processing and wood product industry and furniture manufacturing industry and other manufacturing industries in consideration because of there are only 9 samples in wood processing and wood product industry and furniture manufacturing industry and 3 samples in other manufacturing industries. If samples are not big enough, it may lead to some bias when we research in empirical study. So, I eliminate those two sub-industries from my model.

2.2.2 Identification of Assessment Index and Corporate Life Cycle From Sample Corporations

Based on the theory of corporate life cycle and the research result from Edith, the Y-axis of growth chart of corporate life cycle demonstrates that net profit margin on sales of the corporation can be used to reflect profitability and liquidity of the corporation.

Consequently, when I identify and classify the stages of corporate life cycle, net profit margin on sales is the key point index to use. On the other hand, the meaning of growth corporation is that revenues and net profit margin on sales of corporation are both higher than other corporations in this industry. From what we discussed above, we get rid of the factors like the change of growth of industry that may effect on growth of corporations in this research. The difference between average number of net profit margin on sales in industry and the number of sample companies will be constructed. We choose difference of net profit margin on sales between sample company and average level of industry to the difference of net profit margin on sales between the best level of industry and the average level of industry as a ratio to be index to explain the growth of this corporation.

It also can be shown as a formula: $(x_{ij}-\bar{x})/(\max x_i-\bar{x})$. We further define x_{ij} as the net profit margin on sales of corporation of industry j in year i, and $\bar{x}_i$ as the average net profit margin on sales of this industry in year i. In this study, max x_i is the best net profit margin on sales of this industry in year i.

The net profit margin on sales of all sample enterprises has been collected and analyzed from 2006 to 2011. It is also stated the average net profit margin on sales and the best net profit margin on sales of eight effective sub-industries in manufactory industry from 2006 to 2011 in Table 1. Then all of information and data from the table will be used into the above formula. The indexes of the development trend of sample corporations are

acquired finally. The set up date of sample companies, time that goes public of sample enterprises, index of the trend of development of sample companies and a portfolio of corporate free cash flows of sample corporations can be used to define the corporate life cycle. We further connect the characteristic of corporate life cycle stages to those indexes I mentioned above. It is possible to make the definition of the corporate life cycle phases for each sample company as follows.

Table1
Profit Margin of Best and Average Level in Manufactory Industry From 2006 To 2011 (%)

		Food beverage	Textile leather furs	Paper making printing	Petroleum nuclear fuel plastic	Electric machinery	Metal non-metal	General equipment automobile	Pharmaceutical
2006	Average	6.93	5.12	1.90	5.03	6.66	3.82	5.68	6.32
	Best	38.11	24.75	10.66	31.45	35.87	19.87	25.47	34.96
2007	Average	6.83	6.05	5.62	5.77	6.53	6.48	7.12	10.27
	Best	39.11	35.20	17.76	31.85	40.52	32.21	51.59	56.75
2008	Average	4.43	4.00	4.93	3.51	2.79	3.01	5.93	8.98
	Best	46.10	16.14	26.40	33.53	39.50	19.76	28.31	60.85
2009	Average	8.33	5.11	5.90	5.30	4.68	4.53	8.50	12.33
	Best	49.04	26.58	26.75	52.29	35.27	52.09	64.95	64.52
2010	Average	7.90	6.05	6.42	6.04	8.30	4.89	8.63	11.51
	Best	43.42	19.31	19.55	87.02	39.35	23.14	53.30	59.57
2011	Average	8.74	5.74	4.58	3.32	4.54	4.33	6.96	12.64
	Best	47.62	18.16	16.91	36.61	37.16	30.17	51.44	84.03

If that index of the development trend of sample companies is negative and absolute value of that index has a growth trend of going up. We can classify that company in the stage of start-up of the corporate life cycle. As we mentioned before, as all sample corporations we selected are listed corporations, they have already passed the stage of start-up. However, they are still to be considered as in the reborn stages after going public and we still put them in the start-up stage. When the index of the development trend of sample companies is negative and absolute value of that index has a decreasing trend, this company can be defined as in the stage of recession of the corporate life cycle. If that index of the development trend of sample companies is positive and number of that index has a growth trend, that kind of corporation can be treated as in the stage of growth of the corporate life cycle. If indexes of the development trend of sample companies positive and number of those indexes relatively stable and there is less fluctuation, those corporations are identified as in the stage of maturity of the corporate life cycle. Most companies can be classified in different stages of the corporate life cycle by their indexes of development trend, even though there is still some unobvious development trend of minor sample corporations. For those small part of companies, indexes of development trend and characteristic of those companies are both considered to identify their stages of the corporate life cycle. Another method is to use portfolio of free cash flows. However, index of portfolio of free cash flows can not reflect the development trend of sample companies accurately because it only explains the situation of sample corporations in specific period of time not the whole life of the corporation. So, it only will be treated as confirmatory index. That methodology illustrated above is used to identify stages of corporate life cycle and the solutions are calculated finally from sample corporations, that are there are 249 sample corporations in stage of start-up of corporate life cycle, 132 sample companies are in stage of growth of corporate life cycle, companies that in stage of maturity of corporate life cycle are 91 and the other 290 corporations are in stage of recession of corporate life cycle at the end of 2011.

CONCLUSION

This paper chooses profit margin as essential index to compare with benchmark in manufactory industry and build an index of the development trend for corporations. This paper gathers profit margin on sales as index from sample companies from 2006 to 2011 and calculated them to obtain growth trend index of corporations. This paper further identifies corporate life cycle stages of those enterprises based on the growth trend index by quantitative method. All of empirical study from above is aimed to research the identification of the corporate life cycle in an accurate, scientific and reliable way and support theoretical evidence for further research. Moreover, it supplies basic theory for investors and managers to make appropriate decision and strategy in practical.

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