

The Impact of Economic Shift on the Financial Status of China's Listed Garment Companies Based on a Factor Analysis Method

Zhengyan Shao^{1,*}

¹Business School of Beijing Institute of Fashion Technology, Beijing 100029, China

*Corresponding author. Email: sxyshaozhengyan@bift.edu.cn

ABSTRACT

The rapid decline in China's economic growth has significantly impacted on the garment industry. This paper uses the factor analysis method and analyzes the dynamic changes in the financial conditions of 77 listed garment companies during a period of rapid economic shift, with the aim of revealing the overall characteristics and trends of China's garment industry, and providing a reference for garment enterprises to better adapt to the new normal and achieve sustainable development in the long run.

Keywords: economic shift, China's garment industry, financial status, factor analysis method

I. INTRODUCTION

As China's economy has shifted from high-speed growth to medium and low-speed growth in recent years, the garment industry, a traditional pillar industry of China is certainly impacted. Current research on the issue is mainly based on individual cases or macroeconomic research methods, with analysis concentrated on representative regions, and research on China's garment industry as a whole based on financial analysis is rarely seen [1]. With 77 listed Chinese garment companies selected as the target of research, this paper creates an indicator system for the financial conditions of the garment industry based on the factor analysis method, and analyzes the dynamic changes in the financial conditions of the listed companies in China's garment industry during 2010-2013, in which China saw the change of pace in economic growth. It's aimed to reveal the overall characteristics and trends of China's garment industry represented by the listed companies as China's economy enters new normal, and to provide a reference for garment enterprises to make decisions and thus be better adapted to the new normal and achieve sustainable development in the long run.

II. LITERATURE REVIEW

Since the second decade of the 21st century, the world has seen a sluggish recovery in economy, with developed economies reporting a weak demand and low long-term growth and emerging economies finding it hard to curb the decline in growth. In China, as the reform dividend and demographic dividend disappear, there is little room for government investment to drive economic growth. A 7% or even lower economic

growth rate, slid from an earlier rate of 10%, will become the basic nature and main characteristic of China's economic development in a rather long period of time in the future (Jin Bei, 2015) [2]. As the foremost influence on the garment industry, which relies on the intensive input of capital and labor in exchange for growth of scale, the change in the pace of economic growth will result in a slower pace of growth in its prime operating income, the failure to give full play to the scale of economy and constant declines in the marginal income ratio of investment (Shao Zhengyan, 2014) [3]. Based on the data from World Brand Lab, Qu Xiang and Xie Shao'an (2015) [4] used mathematical method and analyzed the three problems about China's garment brands during the transitional period, i.e. unbalanced geographical distribution of brands, irrational distribution of brand values and varying profitability of brands, and proposed to innovate in the 4Ps and 4Cs theories to improve the values of China's textile & garment brands and drive the growth in the performance of garment companies. Cheng Pengpeng, Chen Daoling and Chen Dongsheng (2016) [5] used statistical data and analyzed the difficulties that Fujian's textile & garment industry faces amid the slowing economic growth: The lower position in the industrial chain is hard to be changed, leading to sharp declines in overall profits; marketing channels are narrow and there is a heavy dependence on foreign demand; enterprises have poor abilities in independent innovation and fostering their own brands. They advocated an upgrade in Fujian's textile & garment industry with the "Internet plus" strategy, and proposed to optimize the structure and enhance the performance of Fujian's textile & garment industry by improving the industrial chain, implementing the brand

strategy, innovating in marketing channels and accelerating intelligent manufacturing.

III. SELECTION OF FINANCIAL INDICATORS AND SAMPLE DATA

A. Selection of indicators

In combination with the characteristics of listed garment companies, and based on the principles of

using systematic, comprehensive, scientific, layered, simple and available data, this paper chooses 15 representative financial indicators in three aspects, i.e. fundraising, investment and business activities, to comprehensively assess the financial conditions of enterprises. The selected financial indicators are shown in "Table I".

TABLE I. INSTRUCTIONS OF FINANCIAL VARIABLES

Financial indicators	Code	Calculation formula
Equity ratio	X1	Equity/total assets
Liquidity ratio	X2	Current assets/current liabilities
Conservative quick ratio	X3	(Cash+ short-term securities + net account receivable) / current liabilities
Ratio of current assets	X4	Current assets/total assets
Capital expenditure/depreciation and amortization	X5	Annual capital expenditure/annual depreciation and amortization amounts
Turnover of fixed assets	X6	Annual proceeds of sale/annual average fixed assets
Turnover of account receivable	X7	Annual proceeds of sale/annual average account receivable
Return on common stockholders' equity	X8	Annual net profits/annual average stockholders' equity
Return on invested capital	X9	(Annual after-tax profits + annual financial expenses)/(annual average stockholders' equity + annual average interest-bearing debts)
Overhead expenses ratio	X10	Annual overhead expenses /annual sales income
Net profit margin on sales	X11	Annual after-tax profits/annual sales income
Ratio of the net income from operating activities to total profits	X12	Annual net income from operating activities /annual profits
Gross profit margin on sales	X13	Annual gross sales profits/annual sales income
Operating expenses ratio	X14	Annual operating expenses/ annual sales income
Sales income growth rate	X15	(Sales income of the period – sales income of the previous period)/sales income of the previous period

B. Sample data

To better reflect the impact of the slowdown in China's economic growth on garment enterprises and make sample data more reliable and effective, this paper excludes the garment enterprises with late listing and those with inconsistent disclosure of financial data, and makes 77 garment enterprises audited during 2010-2013 the target of research. The listed garment companies studied in the paper cover those in men's clothes, women's clothes, leisure clothes, shoes & hats and other sub-sectors of the textile & garment sector listed in A-share or H-share markets, so as to highlight the financial characteristics and changes of the garment manufacturing and retail industry.

IV. EMPIRICAL ANALYSIS OF THE CHANGES IN THE FINANCIAL CONDITIONS OF THE LISTED GARMENT COMPANIES

A. Analysis method

This paper comprehensively assesses the financial conditions of the garment enterprises during 2010-2013 with the factor analysis method, which is a multivariate statistical analysis method that proceeds from the dependency inside the indicator related matrix and reduces some variables with overlapped information and complex relations to several irrelevant comprehensive factors. The basic idea is to group the variables based on the degree of correlation, so as to make the variables within the same group highly correlated and the variables in different groups uncorrelated or less correlated, with the basic characteristic of every group of variables represented by a common factor. The method has been widely applied to the assessment of financial performance and

financial health conditions in several industries including iron & steel and machinery manufacturing, and shows sound adaptability and evaluation effects [6][7].

B. Factor analysis process

1) *Applicability test of factor analysis*: To confirm whether the data selected is suitable for factor analysis, KMO and Bartlett tests are conducted for the data. SPSS operation results show, the KMO value of the garment industry is 0.546, reaching the average level for factor analysis. Bartlett's sphericity test value is 1971.119, and the concomitant probability is 0.000, which is obviously lower than the significance level of 0.05. This indicates the correlation among variables and common factors can be extracted.

2) *Extracting common factors*: Extracting common factors from 15 financial indicators is to determine the number of factors based on the characteristic values and variance contribution rates of factor variables and

extract the factors with the characteristic values above 1. Meanwhile, to make the meaning of factor variables clearer, the factor loading matrix is rotated. After the rotation, the characteristic values of all the common factors are more even than those before the rotation, but the contribution rates are unchanged. After the rotation, the factor loading coefficient is completely different from the factor loading matrix before rotation, which is better for the classification of factors. For the garment companies, the characteristic values and variance contribution rates of common factors before and after rotation are shown in "Table II", with the characteristic values of the first six common factors bigger than 1 and the combined variance contribution rate being 71%, indicating a sound ability in information explanation. So, this paper uses the first six common factors to assess the financial conditions of listed garment companies.

TABLE II. THE CHARACTERISTIC VALUES AND VARIANCE CONTRIBUTION RATES OF THE COMMON FACTORS OF LISTED GARMENT COMPANIES

Components	Initial characteristic values			Extracting square and loading			Rotating square and loading		
	Total	Variance %	Accumulation %	Total	Variance %	Accumulation %	Total	Variance %	Accumulation %
1	2.875	19.169	19.169	2.875	19.169	19.169	2.504	16.691	16.691
2	2.195	14.634	33.803	2.195	14.634	33.803	2.175	14.501	31.192
3	1.904	12.694	46.497	1.904	12.694	46.497	1.986	13.243	44.435
4	1.315	8.768	55.285	1.315	8.768	55.265	1.333	8.886	53.321
5	1.214	8.096	63.362	1.214	8.096	63.362	1.293	8.622	61.943
6	1.074	7.157	70.519	1.074	7.157	70.519	1.286	8.576	70.519
7	.948	6.318	76.836						
8	.821	5.474	82.310						
9	.773	5.156	87.467						
10	.639	4.261	91.728						
11	.528	3.522	95.250						
12	.425	2.831	98.081						
13	.145	.969	99.050						
14	.092	.612	99.663						
15	.051	.337	100.00						

^a. * Analysis of main components

3) *Explanation and Calculation of Common Factors*: This paper uses the maximum variance method to calculate the load of the six common factors in original variables, form the rotation component matrix (see "Table III") and thus summarize the characteristics of the six main factors. As common factor 1 features a bigger load in the liquidity ratio, conservative quick ratio and equity ratio, and reflects the repayment risk of long and short-term debts, it can be called the "debt-paying ability factor". As common factor 2 features a bigger load in the return on common stockholders' equity and the return on invested capital, and reflects the return on capital, it can be called the "capital profitability factor". As common factor 3 features a bigger load in the operating expenses ratio

and gross profit margin on sales, and reflects the premium ability of products driven by the cost structure and sales channels, it can be called the "product premium ability factor". As common factor 4 features a bigger load in the ratio of the net income from operating activities to total profits, turnover of fixed assets and Ratio of current assets, and reflects the investment layout and profitability of prime businesses, it can be called the "prime business dedication factor". As common factor 5 features a bigger load in the sales income growth rate and is highly correlated to the ratio of capital expenditure to depreciation and overhead expenses ratio, and reflects enterprises' ability in meeting market demand, capital expenditure and expanding the scale of operation, it can be called the

“operation expansion ability factor”. As common factor 6 features a bigger load in the turnover of account receivable and net profit margin on sales, and reflects

the ability to make profits and recover capital through cost control activities, it can be called the “operation expenditure reduction ability factor”.

TABLE III. ROTATION COMPONENT MATRIX

	Components					
	1	2	3	4	5	6
Liquidity ratio	.927	-.025	.013	.061	.038	-.017
Conservative quick ratio	.881	-.057	-.119	.081	.087	-.083
Equity ratio	.745	.173	.149	-.032	-.042	-.009
Return on common stockholders' equity	.001	.951	.007	-.034	.161	.008
Return on invested capital	.084	.939	.036	.024	.150	-.028
Operating expenses ratio	-.087	-.142	.927	-.063	-.058	-.006
Gross profit margin on sales	.069	.237	.909	.004	-.052	.076
Turnover of fixed assets	.152	-.015	.434	.433	.336	-.086
Ratio of the net income from operating activities to total profits	.057	-.122	-.120	.740	.096	.041
Overhead expenses ratio	.049	-.180	-.066	-.596	.349	-.005
Sales income growth rate	-.043	.239	.005	-.049	.743	.114
The ratio of capital expenditure to depreciation and amortization	.372	.128	-.074	.056	.451	-.013
Turnover of account receivable	-.045	-.064	.082	.178	.299	.796
Ratio of current assets	.257	.028	.154	.435	.147	-.628
Net profit margin on sales	.238	.391	.146	.016	-.345	.471

a. Extract method: Main components

b. Rotation method: Kaiser standardized orthogonal rotation method.

c. a. Rotation is converged after eight iterations.

C. Factor assessment results

This paper uses the SPSS software to calculate the factor score coefficient matrix, establish the scoring formula for the six common factors, and calculate the values of the six common factors based on the original financial indicators of the samples during 2010-2013. Finally, the variance contribution rates of the six common factors are made as the weight to calculate the annual score of the financial conditions of the enterprises. The detailed formula is below:

The comprehensive score of the financial conditions of an enterprise = 0.19169*debt-paying ability

factor+0.14634*capital profitability
 factor+0.12694*product premium ability
 factor+0.08768*prime business dedication
 factor+0.08096*operation expansion ability
 factor+0.07157*operation expenditure reduction ability
 factor

The median of the scores of the listed Chinese garment companies during 2010-2013 is calculated based on the factor scores and financial scores of the 77 sample enterprises every year, which is shown in "Table IV".

TABLE IV. CHANGES IN THE FACTOR SCORES OF THE FINANCIAL CONDITIONS OF THE LISTED CHINESE GARMENT COMPANIES DURING 2010-2013

Year	Score of debt-paying ability factor	Score of capital profitability factor	Score of product premium ability factor	Score of prime business dedication factor	Score of operation expansion ability factor	Score of operation expenditure reduction ability factor	Comprehensive score of financial conditions
2010	-0.29	0.33	-0.21	0.24	0.21	-0.10	0.08
2011	-0.07	0.15	-0.19	0.25	0.01	-0.15	0.02
2012	-0.14	-0.02	-0.12	-0.16	-0.38	-0.16	-0.07
2013	-0.24	-0.12	-0.17	-0.05	-0.36	-0.10	-0.12
Average score	-0.15	0.02	-0.17	0.08	-0.16	-0.13	-0.05

a. * The values in the table are all shown in medians.

As the changes in the factor scores show, during 2010-2013, the comprehensive score of the financial conditions of the listed Chinese garment companies is decreasing year by year, and became negative from

2012. According to the data released by the National Bureau of Statistics, China saw the first absolute decline in the working-age population aged 15-59 in 2012, which decreased by 3.45 million people from

2011, and the dependence rate began to climb. This means the demographic dividend in China began to disappear in 2012, and the change in the demographic structure had negative influence on the financial conditions of the garment industry. The changes in the six factor scores show, the score of the operation expansion ability factor fell most significantly from 0.21 in 2010 to -0.36 in 2013, which indicates the listed Chinese garment companies generally saw a weak growth in consumer demand and insufficient power driving the expansion of investment and operation. The second biggest decline was seen in the score of the capital profitability factor, which fell from 0.33 in 2010 to -0.12 in 2013. This indicates an increasingly weaker profitability of capital; there had been a general loss on investment from 2012, implying China's garment industry will have a fading appeal to long-term capital like equity capital. The score of prime business dedication factor became negative from 2012, showing the stability of prime business investment began to decline. The scores of debt-paying ability factor, product premium ability factor and operation expenditure reduction ability factor were negative for four years in a row. The debt-paying ability factor had the poorest performance, indicating 1) the listed Chinese garment companies depend highly on short-term commercial financing; 2) the suppliers are highly homogenized and competing fiercely with each other, and are thus located in a weak position in the industrial chain and have poor bargaining ability; they are tightly bound with the interests of the listed garment companies and support the latter. The score of product premium ability factor was low, but showed a year-by-year improvement. This indicates although the listed Chinese garment companies generally face problems like low added values of products and weak support to sales channels, with the decline in the economic growth, they have begun to optimize the product structure, and worked to address the downward risk in the market by improving added values and increasing marketing input. The score of the operation expenditure reduction ability factor was low, too, indicating the garment enterprises have weak control on costs and costs show a trend of rigid rise. The average values during 2010-2013 show the score of the product premium ability factor was the lowest (-0.17), and followed by the score of the operation expansion ability factor (-0.16), and then the score of the debt-paying ability factor (-0.15) and operation expenditure reduction ability factor (-0.13). The scores show, during the adjustment of China's demographic structure and the continued decline of the economic growth, the listed Chinese garment companies failed to adjust product structures and channel marketing abilities in a timely manner; that resulted in low added values of products, sluggish growth in product sales income, a declining ability in operation expansion, a strong reliance on commercial credit, a trend of growing financial risks, weak

profitability in operating activities, a low speed in recovering capital and a slow turnover of capital across the industrial chain.

V. CONCLUSION

During 2010-2013, great changes took place in China's economic fundamentals. The size of China's labor force shrank constantly from its peak, and China's GDP growth dropped from 10.6% in 2010 to 7.7% in 2013[8]. This paper uses the factor analysis method and analyzes the dynamic changes in the financial conditions of the listed Chinese garment companies during the same period. The empirical results show, the slowdown in China's economic growth had the biggest impact on the operation expansion of the garment industry, which was reflected in the notable drop in the sales income growth, the continued decline in the ratio of capital expenditure to depreciation and amortization, and the slowed growth of the overhead expenses ratio. Next, the economic slowdown seriously affected the profitability of capital in the garment industry, leading to declines in both the return on common stockholders' equity and the return on invested capital, and that's bad for the steady and sustainable development of the garment industry in the long run. Comparison of the average values of the factors in the four years shows, the product premium ability factor was the intrinsic factor that led to the deteriorating financial conditions of the listed garment companies. For a long time, the listed garment companies have seen a generally low gross profit margin and a slow speed in collecting sales proceeds. They have steady profitability by increasing market demand amid fast economic growth, but when the economic growth slows down, their weak ability in product design and innovation, unreasonable product structure and other problems at a deeper level will affect market demand, resulting in a notable decline in operation expansion and profitability.

Here are three suggestions: (1) The listed garment companies shall accelerate innovation in product design, fabric development, intelligent manufacturing and channel marketing, and work to improve product quality and added values by systematically and comprehensively changing product structures, and thus lead the upgrade of the garment industry; (2) They shall introduce the Internet-based way of thinking, innovate in marketing means, improve the response to fragmented demand, steadily increase sales income and thus enhance the ability in operation expansion; (3) Amid sluggish market environment, those with good brand reputation and strong management abilities shall accelerate the pace of M&A and use the capital market to advance the quality and fast development of the garment industry.

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