Empirical Analysis of Financial Performance of Listed Company in Retail Based on Factor Analysis Method

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Received 14 July 2018; accepted 17 September 2018
Published online 26 September 2018

Abstract
This paper use factor analysis method to compare the financial performance of listed retail companies horizontally. We can get the level of the development of the company in the industry. Because the data of every year are available, every year factor analysis can be carried out and obtained a comprehensive score, which is a dynamic and changing analysis process. It provides us the direction for the improvement of enterprise’s financial performance.

Key words: Financial performance; Factor analysis method

INTRODUCTION
With the continuous deepening of the national optimization of service reform, the retail industry is increasingly actively. In 2016, the transformation and upgrading of retail enterprises were effective, and the growth of retail sales was slow and stable. The retail industry is developing well, the market is expanding and the scale is increasing.

The retail industry has become an essential component of China’s economic growth. Retail industry capital structure, ownership structure, internal control, enterprise size and other factors have impacted on the financial performance of Listed Retail companies at different levels. Therefore, through the financial performance evaluation, we can discover the advantages and disadvantages of the retail industry, make up for the deficiencies, further explore the factors which affect the financial performance of the retail industry, and then put the right remedy for the existing problems to give countermeasures.

1. THEORIES
Retail refers to the direct sale of goods purchased from wholesalers, middlemen or manufacturers to consumers by individuals or companies engaged in marketing activities ranging from producers to consumers (Wei, 2011).

Enterprise financial performance evaluation refers to the use of certain technical analysis methods from the perspective of financial accounting to conduct a scientific evaluation of enterprise operating benefits. The financial performance evaluation of listed companies is the core part of the performance evaluation of listed companies. Financial performance mainly refers to the profitability, debt paying ability, operation ability and development ability of the enterprise (Zhang, 2017, pp.90-92).

2. DATA AND METHODOLOGY
2.1 Data
According to the Guidelines on Classification of Listed Companies in China, till this March, there are 95 retail listed companies in Shanghai and Shenzhen A stock market in total. This research is based on the 2016 financial reports of all those retail listed corporations.

To make sure the sample valid, some abnormal samples were dropped. Details are as follows:

1) 2 ST companies were excluded from the sample
for continuous loss in more than 2 years or insolvency.
(2) 8 unlisted companies till 2016 were excluded from the
sample because those companies lack complete financial
information of 2016 which is important for this study.
(3) 18 companies were excluded for lacking financial
information, which may lead to unnecessary difficulty in
counting, influencing the conclusion’s reliability.

67 retail listed companies are composed of the sample
and all the data is from Guotai’an database.

2.2 Method
With the use of SPSS19.0, factor analysis are applied to
evaluate the financial performance of these 68 retail listed
corporations.

3. RESULTS

3.1 KMO and Bartlett Tests
In this section, KMO and Bartlett tests are used to judge
whether the variables are suitable for this analysis.
KMO is an indicator to judge whether there are obvious
correlations between variables. Bartlett tests are meant to
decide what kind of type this matrix is (Table 1).

Table 1
KMO and Bartlett Tests Outcome

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin measurement</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMO</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bartlett’s sphericity test</td>
<td>262.01</td>
<td>36</td>
<td>.000</td>
</tr>
</tbody>
</table>

In table 3, 4 common factors were selected because their
eigenvalue is above 1. They extracted 80.05% of the total
initial variables, which means most information of initial 9
variables has been extracted. Thus, it is absolutely feasible
using these four common factors to evaluate the financial
performance of listed companies in retail industry.

Table 3
Explanation of Total Variance

<table>
<thead>
<tr>
<th>factors</th>
<th>Initial eigenvalue</th>
<th>Total</th>
<th>Variance%</th>
<th>Accumulative%</th>
<th>Total</th>
<th>Variance%</th>
<th>Accumulative%</th>
<th>Total</th>
<th>Variance%</th>
<th>Accumulative%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.835</td>
<td>31.21</td>
<td>31.21</td>
<td>2.835</td>
<td>31.496</td>
<td>31.496</td>
<td>2.702</td>
<td>30.025</td>
<td>30.025</td>
<td>30.025</td>
</tr>
<tr>
<td>2</td>
<td>1.689</td>
<td>18.74</td>
<td>49.95</td>
<td>1.689</td>
<td>18.765</td>
<td>50.262</td>
<td>1.732</td>
<td>19.248</td>
<td>49.273</td>
<td>49.273</td>
</tr>
<tr>
<td>3</td>
<td>1.556</td>
<td>17.29</td>
<td>67.24</td>
<td>1.556</td>
<td>17.288</td>
<td>67.549</td>
<td>1.622</td>
<td>18.022</td>
<td>67.295</td>
<td>67.295</td>
</tr>
<tr>
<td>4</td>
<td>1.114</td>
<td>12.81</td>
<td>80.05</td>
<td>1.144</td>
<td>12.715</td>
<td>80.265</td>
<td>1.167</td>
<td>12.969</td>
<td>80.265</td>
<td>80.265</td>
</tr>
<tr>
<td>5</td>
<td>.707</td>
<td>7.86</td>
<td>87.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>.434</td>
<td>4.85</td>
<td>92.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>.367</td>
<td>4.08</td>
<td>96.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>.174</td>
<td>1.93</td>
<td>98.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>.095</td>
<td>1.23</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To have a better understanding of the common factors
in practical, the factors were being rotated to move
toward different directions in the interval of (0, 1). Then
the rotated component matrix was obtained after using
varimax rotation method. The results were shown in table 4.
### Table 4
**Rotated Component Matrix**

<table>
<thead>
<tr>
<th>Components</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick ratio</td>
<td>.927</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash ratio</td>
<td>.911</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt to Asset Ratio</td>
<td>-.878</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets Turnover</td>
<td></td>
<td>.884</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Asset Turnover</td>
<td></td>
<td></td>
<td>.792</td>
<td></td>
</tr>
<tr>
<td>Return of Equity</td>
<td></td>
<td></td>
<td></td>
<td>.913</td>
</tr>
<tr>
<td>Return of Assets</td>
<td></td>
<td></td>
<td></td>
<td>.875</td>
</tr>
<tr>
<td>Total Assets Growth Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Profit Growth Rate</td>
<td></td>
<td></td>
<td></td>
<td>-.577</td>
</tr>
</tbody>
</table>

The first common factor F₁ was named solvency factor for higher loads in quick ratio, cash ratio, and debt to asset ratio which represent solvency of the company.

The second common factor F₂ was named operating capacity factor for higher loads in the index of total assets turnover and current asset turnover. These two indicators show the operating ability of the company.

The third common factor F₃ was named profitability factor for better performance in ROA and ROE which show the ability the company have to make profits.

The forth common factor F₄ was named development capacity factor for higher loads in total assets growth rate and net profit growth rate which indicate the development capacity of the company.

### 3.3 Calculations of All Common Factors and the Integrated Score

Table 5 is component score coefficient matrix, according to which, the four factors’ score functions were obtained. With the new score function, common factors’ score of the retail listed companies can be calculated.

\[
F_1 = 0.082X_1 - 0.127X_2 - 0.338X_3 + 0.347X_4 + 0.332X_5 + 0.060X_6 - 0.042X_7 + 0.087X_8 + 0.046X_9,
\]

\[
F_2 = 0.058X_1 - 0.074X_2 - 0.076X_3 + 0.013X_4 - 0.047X_5 + 0.526X_6 + 0.457X_7 + 0.275X_8 + 0.127X_9,
\]

\[
F_3 = 0.533X_1 + 0.571X_2 + 0.052X_3 - 0.013X_4 - 0.011X_5 - 0.035X_6 - 0.003X_7 + 0.075X_8 + 0.053X_9,
\]

\[
F_4 = 0.087X_1 - 0.052X_2 - 0.081X_3 - 0.003X_4 - 0.072X_5 + 0.083X_6 + 0.041X_7 - 0.458X_8 + 0.788X_9
\]

### Table 5
**Component Score Coefficient Matrix**

<table>
<thead>
<tr>
<th>Components</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return of Assets X₁</td>
<td>.082</td>
<td>.058</td>
<td>.533</td>
<td>.087</td>
</tr>
<tr>
<td>Return of Equity X₂</td>
<td>-.127</td>
<td>-.074</td>
<td>.571</td>
<td>-.052</td>
</tr>
<tr>
<td>Debt to Asset Ratio X₃</td>
<td>-.338</td>
<td>-.076</td>
<td>.052</td>
<td>-.081</td>
</tr>
<tr>
<td>Quick ratio X₄</td>
<td>.347</td>
<td>.013</td>
<td>-.013</td>
<td>-.003</td>
</tr>
<tr>
<td>Cash ratio X₅</td>
<td>.332</td>
<td>-.047</td>
<td>-.011</td>
<td>-.072</td>
</tr>
<tr>
<td>Total Assets Turnover X₆</td>
<td>.060</td>
<td>.526</td>
<td>-.035</td>
<td>.083</td>
</tr>
<tr>
<td>Current Asset Turnover X₇</td>
<td>-.042</td>
<td>.457</td>
<td>-.003</td>
<td>.041</td>
</tr>
<tr>
<td>Net Profit Growth Rate X₈</td>
<td>.087</td>
<td>.275</td>
<td>.075</td>
<td>-.458</td>
</tr>
<tr>
<td>Total Assets Growth Rate X₉</td>
<td>.046</td>
<td>.127</td>
<td>.053</td>
<td>.788</td>
</tr>
</tbody>
</table>

The following formula was used to calculate the integrated score F over financial performance of all listed companies this research selected.

\[
F = \sum (d_j * F_j)
\]

In this formula, \(d_j\) (j=1,2,3,4) serves as weight, which means the proportion of the Jth common factor’s variance accounted for in the accumulated variance including all 4 common factors. The outcomes are as following: the weight of solvency factor is 0.3742, the weight of operating capacity factor is 0.2397, the weight of profitability factor is 0.2244 and the weight of development capacity factor is 0.1617, so the integrated score can be shown as:

\[
F = 0.3742F_1 + 0.2397F_2 + 0.2244F_3 + 0.1617F_4
\]

There are 33 listed companies, accounting for 50% of the total sample whose combined score is less than 0 of the retail industry. Only 3 listed retail companies with comprehensive scores greater than 1

### CONCLUSIONS

In this study, we use factor analysis method to compare the financial performance of listed retail companies horizontally. We can get the level of the development of the company in the industry. Because the data of every year are available, every year factor analysis can be carried out and obtained a comprehensive score, which is
a dynamic and changing analysis process. It provides us the direction for the improvement of enterprise’s financial performance.

REFERENCES


