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Analysis of Investment Value of Blockchain Concept Stock Based on Factor Analysis

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Abstract: This article empirically analyzes the financial indicators of 35 stocks in the blockchain concept block by using SPSS software and factor analysis. Established a comprehensive evaluation system for listed companies in the blockchain sector. Through comparison of the composite score with the price-earnings ratio, it can be concluded that: Win-Win, Flying Integrity, Precise Information, Gaosheng Holdings, Xinchen Technology, and Golden Stocks are the stocks underestimated by the stock market. Provincial Guang Group, Alto Electronics, Guangzhou Express, Shenzhen Science and Technology, Tianguang Zhongmao, Hailian Jinhui, Ai Kang Technology, and Yujiu Games have overestimated stocks for the market. Based on this, it can provide investors with reference for investment decisions.

Keywords: Blockchain, Factor Analysis, Investment Value, Financial Scoring System.

I. Introduction

On December 28, 2016,the "Thirteenth Five-Year Plan for National Informatization" issued by the State Council proposed to vigorously support the development of blockchain technology. The attention of the community to the blockchain is also rising. A lot of money is flowing into the blockchain technology, and the blockchain is gradually developing steadily. For some time in the near future, the concept of blockchain stocks has been heated up. Because investors are unable to accurately estimate new technologies and concepts, how to grasp in numerous block chain concept stock investment opportunities and avoid risks and how to measure these investors invest value related to the value of stocks, is now the most concern for investors. In this article, the author uses factor analysis to analyze the investment value of the blockchain concept stock.

II. Literature Review

In the existing literature, some scholars have conducted some evaluations on the blockchain concept stocks. Lichun Fu and Qinghua Ma (2018) believe that the recent surge in the concept of blockchain stocks is still a "concept hype" behavior. Many stocks only have the concept of a blockchain and do not actually complete the blockchain entity project. Investors in the market should have a calm attitude toward the blockchain. In the future, the blockchain has a good environment for its growth. In the future, there should be many excellent blockchain projects. The trend of the future should be steadily rising. [1] Liyong Li (2018) analyzed the blockchain concept stock from the point of view of revenue, the blockchain really only stays at the "concept" level. [2]

In the study of the investment value of stocks, Guangqi Ma and Jing Chen (2017) used factor analysis to use the idea of dimensionality reduction to convert multiple indicators into several minority comprehensive indicators, and then obtained factor scores for each stock. Help evaluate the investment value of extractive

industry stocks [3]. Lanlan Rao and Yuping Zheng(2016) used SPSS to perform factor analysis on the financial indicators of 20 listed companies in the second-to-behind concept segment of Shanghai and Shenzhen Stock Exchanges, and established a rating system for listed companies in the second-cycle concept sector, and compared them with the p/b ratio. The study found that the three major factors of profitability, debt repayment ability and growth can significantly measure the investment value of second-concept listed companies. Investors can compare the rankings of the listed companies' comprehensive factor scores with the market's net rate, evaluate the stocks that are overvalued and undervalued, and finally make appropriate investment decisions [4]. Xia Yang and Yaxuan Wang (2015) took 16 commercial banks listed in China as samples, and according to the financial analysis reports of commercial banks announced by Flushing Software, they selected indicators that can reflect the bank's assets, profitability, growth capacity, and solvency. And use multivariate statistical analysis of factor analysis method to build a comprehensive evaluation index system to reflect the profitability and development level of listed commercial banks, to provide a basis for stock investors to analyze the bank's development prospects and stock appreciation space [5]. Lin Yang, Tianshen Wang, and Guimei Zhao(2014) used the value of stock investment in the financial industry as the research object, and used factor analysis to propose four indicators reflecting the value of stock investment: profitability, debt repayment ability, operational ability, and growth ability. Combined with the cluster analysis method, the article considers that bank stocks in the financial industry stocks are worthy of attention and safety, and AVIC investment is highly growth. AJ shares have poor performance in debt repayment ability and growth ability, and investment needs to be cautious[6]. Shuwen Hu and Jianwu Xu (2017) use principal component analysis and factor analysis to analyze the Chinese stock market. Principal component analysis and factor analysis can extract components that reflect the capabilities of various aspects of the stock, such as the main component of capital expansion ability and the main component of profitability, so that each stock can be ranked and help investors make decisions [7]. Yanxin Niu (2017) conducted an evaluation and analysis of the financial indicators of 24 listed Chinese tourism stocks, and ranked the factors that comprehensively influenced tourism stocks using factor analysis methods. Finally, we summarized the analysis results and put forward corresponding countermeasures and suggestions: First Brigade Hotel is the most worthwhile stock for everybody's priority investment. Besides, it provides reasonable theoretical basis for investors and provides reference for the sustainable development of Chinese tourism listed company stocks[8].

From the above research results, it can be found that no data analysis has been used in the research on the blockchain concept stocks, and no specific investment guidance has been made for the blockchain concept stocks. The method of factor analysis can analyze the investment value of stocks. Through indepth analysis of the growth capabilities, profitability, solvency, and operational capabilities of the blockchain concept stocks, the author establishes a financial indicators evaluation system to evaluate the blockchain stocks and come up with specific investment advice.

III. Empirical Analysis

A. Data selection and preprocessing

This article selected 35 stocks in the blockchain concept stock as a sample for observation and analysis. They are Shenzhen Sci-Tech, Shenzhen Datong, Gaosheng Holdings, Yuanguang Software, Guangbo, Hengbao, Guangzhou Express, Royal Bank, Annie, Weishitong, Zhuo Yi Technology, Guangdong Guangguang, Chenxin Technology, Tianguang. Zhongmao, Hailian Jinhui, Alto Electronics, iKang Technology, Jinyi Technology, Precision Information, New China Capital, Winning Time, Flying Integrity, Storm Group, Galway, Quartet

Jingchuang, Xinchen Technology, Kelan Software, Yi See shares, Gold Securities, Hang Seng Electronics, Sunyard, UFIDA, Youjiu Games, Zheda.com, Evergreen.com.

The 35 listed company disclosed in 2016 annual report and annual report 2016 of solvency (current ratio, quick ratio, asset-liability ratio), operating capacity (flow total asset turnover, asset turnover), growth ability (net growth rate, basic earnings per share and net profit growth rate), profitability (return on total assets, return on net assets, net operating income rates) 4 principal components of 11 financial indexes such as pretreatment (data from wind financial terminal). Take the average value of each financial indicator for 2016 and 2017. Using SPSS software, use factor analysis to process and analyze these data.

B. Data processing and inspection

- In this paper, the original data is dimensioned and SPSS is used to perform operations on the data. First, the original data is subjected to the KMO and Bartlett sphericity tests. The results are shown in the following table 1:

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.620
Bartlett's Test of Sphericity	Approx. Chi-Square	313.913
	df	55
	Sig.	.000

Table 1

According to Kaiser's metrics, KMO's result needs > 0.5, and Bartlett's P value is 0 before factor analysis can be performed. From the above table, it can be seen that KMO=0.620 > 0.5, Bartlett's value is 313.913, and P=0.000 < 0.01, indicating that the bartlett sphericity test rejects the null hypothesis that the correlation coefficient matrix is an identity matrix. It shows that there is a certain correlation between the variables, so satisfy the factor analysis conditions.

- The common factor extraction method for independent variables is through principal component analysis. The importance of measuring common factors is the contribution of variance. The greater the variance contribution rate, the more important the public factors in all evaluation factors.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.750	34.089	34.089	3.750	34.089	34.089	2.759	25.078	25.078
2	2.798	25.437	59.526	2.798	25.437	59.526	2.463	22.390	47.469
3	1.627	14.795	74.322	1.627	14.795	74.322	2.067	18.790	66.259
4	.959	8.719	83.040	.959	8.719	83.040	1.846	16.781	83.040
5	.723	6.576	89.616						
6	.411	3.736	93.352						
7	.406	3.688	97.039						
8	.145	1.320	98.359						
9	.090	.814	99.173						
10	.079	.720	99.893						
11	.012	.107	100.000						

Extraction Method: Principal Component Analysis.

Table 2

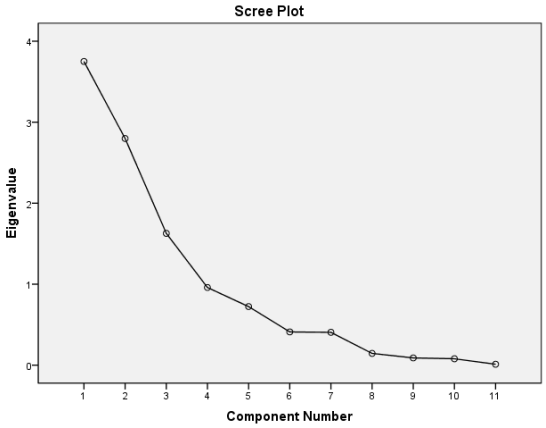

Figure 1

According to the above table 2, the first column is the characteristic value, and the second column and the third column are the factor contribution rate and the cumulative contribution rate in turn. We extract four eigenvalues here, because the cumulative contribution rate of variance reaches 83.040%. Therefore, these four common factors reflect most of the original information and have strong reliability, that is, they can reasonably reflect the statistical results.

Here, F1, F2, F3, and F4 are selected as the first main component, the second main component, the third main component, and the fourth main component in this order. From Figure 1 you can see the value of the eigenvalues and the magnitude of the increase or decrease. You can determine the number of common factors by observing these changes.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
QR	.944	.104		-.183
CR	.940	.158		-.198
DebtAssetRatio	-.762			.364
ROA	.113	.903	.115	
ROE	-.137	.892		.146
OprabtingNetProfitRate	.195	.826	.141	
Net Profit		.171	.945	
Primary Earnings Per Share		.265	.893	
Net Asset	.397		.559	
Total Assets Turnover	-.228	.149	-.129	.919
Current Assets Turnover	-.339			.876

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Table 3

C. Factor naming

From the rotation component matrix in Table 3 above, it can be seen that the F1 common factor has a larger load on the quick ratio (Z1), the current ratio (Z2), and the asset-liability ratio (Z3) indicator. They are: 0.944, 0.940, and -0.762, indicating that these three indicators have strong correlations. These indicators can reflect the ability to repay debt, so they can be divided into the same category, and F1 is named debt repayment factor; The F2 public factor has a relatively large load on the three indexes of ROA (Z4), ROE (Z5), and net profit (Z6). They are: 0.903, 0.892, and 0.826. The same explanations for Z4, Z5, and Z6 have strong correlations and can be grouped into the same category. These indexes of F2 are named as profit factors; The F3 common factor has a relatively large load on net profit (Z7), basic earnings per share (Z8), and net assets (Z9).

These indicators illustrate the growth of the company, that is, its ability to grow. Then name F3 growth factor; In the fourth principal component F4, there is a strong load on the total asset turnover rate (Z10) and the current asset turnover rate (Z11). They are: 0.919, 0.876. These two indicators reflect the turnover status of the company's capital. If the capital turnover is good, the business performance of the company will be better. Therefore, the company's cash flow is directly linked to its operating performance, and the use of funds by enterprises can be affected to a certain extent, so the F4 is named operational factor.

D. Factor Score Calculation and Evaluation of Business Performance

From above, has been named after the four common factor, respectively is: F1 repayment factor (Z1, Z2, Z3) and F2 profit factor (Z4, Z5, Z6), F3 growth factors (Z7 Z8 Z9) and F4 operating factor (Z10, Z11). The coefficient of each factor score obtained by SPSS processing is shown in Table 4:

Component Score Coefficient Matrix

	Component			
	1	2	3	4
CR	.405	.021	-.045	.144
QR	.416	-.009	-.020	.165
Debt Asset Ratio	-.273	.048	-.002	.018
Total Assets Turnover	.180	.006	-.018	.610
Current Assets Turnover	.120	-.087	.082	.570
ROA	-.011	.387	-.065	-.050
ROE	-.089	.390	-.066	-.021
Oprabting Net Profit Rate	.029	.345	-.044	-.031
Primary Earnings Per Share	-.098	.008	.443	-.024
Net Profit	-.039	-.048	.479	.011
Net Asset	.188	-.147	.304	.155

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Table 4

The formula for calculating the score of each principal component factor is:

$$F_j = \sum_{i=1}^{n=11} a_{ij} \times Z_i \qquad (1)$$

As shown in Table 5, the variables are brought into the formula:

$$F_1 = 0.405 \times Z_1 + 0.416 \times Z_2 - 0.273 \times Z_3 + 0.18 \times Z_4 + 0.12 \times Z_5 - 0.011 \times Z_6 - 0.089 \times Z_7 + 0.029 \times Z_8 - 0.098 \times Z_9 - 0.039 \times Z_{10} + 0.188 \times Z_{11} \qquad (2)$$

$$F_2 = 0.021 \times Z_1 - 0.009 \times Z_2 + 0.048 \times Z_3 + 0.006 \times Z_4 - 0.087 \times Z_5 + 0.387 \times Z_6 + 0.39 \times Z_7 + 0.345 \times Z_8 + 0.008 \times Z_9 - 0.048 \times Z_{10} - 0.147 \times Z_{11} \qquad (3)$$

$$F_3 = -0.045 \times Z_1 - 0.02 \times Z_2 - 0.002 \times Z_3 - 0.018 \times Z_4 + 0.082 \times Z_5 - 0.065 \times Z_6 - 0.066 \times Z_7 - 0.044 \times Z_8 + 0.443 \times Z_9 + 0.479 \times Z_{10} + 0.304 \times Z_{11} \qquad (4)$$

$$F_4 = 0.144 \times Z_1 + 0.165 \times Z_2 + 0.018 \times Z_3 + 0.61 \times Z_4 + 0.57 \times Z_5 - 0.05 \times Z_6 - 0.021 \times Z_7 - 0.031 \times Z_8 - 0.024 \times Z_9 + 0.011 \times Z_{10} + 0.155 \times Z_{11} \quad (5)$$

By scoring each of the main factors and taking the contribution of the main factor's characteristic values as weights, the comprehensive factor scores of listed companies within the blockchain concept can be obtained. The formula is as follows:

$$F = \frac{K_1 \times F_1 + K_2 \times F_2 + K_3 \times F_3 + K_4 \times F_4}{K_1 + K_2 + K_3 + K_4} \quad (6)$$

Where F is the composite score of the common factor, and K is the variance contribution rate of each principal component factor before rotation. From Table 2, K1, K2, K3, and K4 are: 0.341, 0.254, 0.148, and 0.087, respectively. After calculating the scores of each principal component factor by using the above function, you can get the expression of the four factor scores as:

$$F = \frac{0.341 \times F_1 + 0.254 \times F_2 + 0.148 \times F_3 + 0.087 \times F_4}{0.341 + 0.254 + 0.148 + 0.087} \quad (7)$$

The ranking of the scores of the comprehensive factors of each listed company, so as to obtain the ranking of the investment value of each stock. Select the PE of the 35 stocks in this article on December 31, 2017. The value of PE represents the market performance of the stock. The lower the value of the stock, the higher the investment value, and vice versa. Therefore, the price-earnings ratio is also ranked in ascending order. This ranking is the market performance ranking represented by the price-earnings ratio, as shown in Table 5.

Stock name	**F**	**Comprehensive score ranking（F）**	**P/E ratio**	**P/E ratio represents market performance ranking**
Win when winning	1.538086	1	52.8525	20
Shenzhen Datong	1.276225	2	27.7697	4
Flying integrity	0.704619	3	54.6056	21
Accurate information	0.498101	4	69.407	25
Gaosheng Holdings	0.484862	5	47.8817	17
Hengbao shares	0.414196	6	41.4402	13
Easy to see shares	0.387123	7	15.5895	1
Far-light software	0.352312	8	39.4193	12
Quartet	0.246988	9	48.6586	18
Jin Yi Technology	0.240942	10	30.8269	6
Xinchen Technology	0.182957	11	74.4461	27
Gold Securities	0.17496	12	75.482	28
Chenxin Technology	0.118998	13	32.2721	7
Hengyin Financial	0.114253	14	46.8825	16
Provincial Group	0.110409	15	26.0767	3
Guangbo Shares	0.057923	16	39.0909	10

Alto Electronics	0.057667	17	37.0664	8
Zhejiang University	0.0507	18	42.6048	14
Guangzhou Express	-0.00844	19	18.1611	2
Kelan Software	-0.0423	20	61.7209	23
Deep Technology	-0.10885	21	37.6822	9
Tian Guang Zhong Mao	-0.16434	22	39.1515	11
Hang Seng Electronics	-0.2079	23	278.8928	32
Guardian	-0.21728	24	354.1674	34
Gao Weida	-0.24612	25	183.5761	31
Sunyard	-0.27559	26	72.6773	26
Zhuo Wing Technology	-0.27837	27	310.9525	33
New State Capital	-0.37561	28	58.8463	22
Royal Bank	-0.40095	29	1,621.77	35
UF network	-0.49469	30	106.035	29
Hailian Jinhui	-0.62025	31	29.2935	5
Anne shares	-0.67814	32	66.85	24
Love Kang Technology	-0.75783	33	48.7552	19
Storm Group	-0.81429	34	134.762	30
Long game	-1.32037	35	46.0697	15

Table 5

IV. Conclusion

Through the ranking of the scores of various comprehensive factors in Table 5, we can know the investment value ranking of the 35 listed companies in the blockchain in this paper. Through the ranking of the price-earnings ratio of listed companies, we can see the market performance of 35 listed companies.

Comparing the scores of the comprehensive factors and the price-earnings ratio, it can be seen that there are differences in the market performance rankings of the listed companies' investment value rankings and price-earnings ratios. That is, if a company with a high comprehensive factor score has a lower price-to-earnings ratio, it means that the value of this stock is undervalued. It can be concerned about such stocks or long-term holding, and has certain investment potential. On the contrary, if the comprehensive factor score of this stock is low and its price-earnings ratio ranks higher, it indicates that such stocks are overvalued by the market, have no investment value, and have high risks. If the stock's investment value ranking and the price-earnings ratio ranking are relatively close, then the investment value of such stocks is normally valued and can be paid attention in the short term. Through the above analysis, the author analyzes the investment value of the 35 stocks of the blockchain concept stock plate and draws the following conclusions:

- Stocks whose stock investment value is underestimated are: Win time wins, flying integrity, accurate information, Gao Sheng Holdings, Hengbao shares, Quartet Jingchuang, Xinchen Technology, Gold shares, Hang Seng Electronics, Guardian, CVI, Zhuo Yi Technology, Royal Silver shares. Among them, there is a big gap between the overall score rankings and the price-earnings ratio rankings, which are Win-Win, Flying Integrity, Accurate Information, Gao Sheng Holdings, Xin Chen Technology, and Jin Securities. This shows that the value of these stock investments is seriously undervalued by the market and can be focused or held for a long time.

- The stocks whose stock investment value is overvalued are: Easy to see shares, Chen Xin Technology, Provincial Group, Guangbo shares, Alto Electronics, Guangzhou Express, Shenzhen Science and Technology, Tianguang Zhongmao, Hailian Jinhui, Anne shares, love Kang technology, long game. The price of such stocks has over-reacted to their value. Investors should carefully consider such stocks. Among them, Guangdong Provincial Group, Alto Electronics, Guangzhou Express, Shenzhen Science and Technology, Tianguang Zhongmao, Hailian Jinhui, Ai Kang Technology and You Jiu Game have higher stock prices. It shows that the stock price is seriously overvalued by the market, the bubble is relatively large, and the risk is high. Investors should lighten up or clear their positions in due course.
- The rankings of stock value rankings and price-earnings ratios are similar: Shenzhen Datong, Yuanguang Software, Jinyi Technology, Evergrande Finance, Zheda Netnew, Kelan Software, Sunyard, New Guodu, UFIDA, and Storm Group. The rankings of these two kinds of stocks are relatively close, indicating that the intrinsic value of stocks can be properly valued by the market, and investors receive sufficient attention and investment. Therefore, investors can focus on such stocks in the short term.

In summary, through the 35 blockchain concept listed companies selected in this paper and the corresponding investment value evaluation system established, investors can use this system to score 35 stocks of blockchain concepts. With the comparison of the ranking of comprehensive factor scores and the ranking of the price-earnings ratio, it is judged whether the stock investment value is overvalued or undervalued by the market. Then, the idea of portfolio management is used to select appropriate positions for each stock, make reasonable long-term and short-term asset allocation, effectively avoid risks, and grasp the investment opportunity to obtain profits.

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