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Analysis of Changhe Company's Financial Performance

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Abstract: This paper analyzes the financial indicators of listed companies by factor analysis. This paper collects the financial data of Changhe Company from 2002 to 2022, selects indicators that reflect the indicators per share, profitability, earnings quality, capital structure, solvency, growth ability and operating ability, and makes empirical analysis and comprehensive evaluation on the financial performance in recent years. The results show that nearly seven years of growth capacity has been at a relatively weak level for Changhe.

Keywords: Factor analysis, Performance evaluation, Financial indicators.

1. Introduction

Changjiang Hutchison Industrial Co., Ltd. is a comprehensive enterprise operating in many countries and regions around the world. The company operates its business through four departments. Port-related business division operates ports and terminals in Asia, Middle East, Africa, Europe, America and Australia. The retail division operates a number of health and beauty chain stores in Europe and Asia. It also operates supermarkets, consumer electronics and manufactures and distributes bottled water and drinks in Hong Kong, China and mainland China. Infrastructure has diversified investments in energy, transportation, water treatment, waste management, infrastructure and related businesses all over the world. The telecommunications division is engaged in the operation of telecommunications services and provides a wide range of telecommunications and digital services in Europe, Asia and Australia.

2. Literature Review

With the fierce market competition increasing day by day, financial performance analysis can help enterprises win a favorable position, at the same time, it also provides support basis for shareholders and creditors to make investment decisions. Financial performance evaluation methods mainly include DuPont analysis method, EVA economic added value method, balanced scorecard method and factor analysis method. This paper uses factor analysis to analyze the financial performance of Changhe listed companies. Factor analysis simplifies data by dimensionality reduction, and uses a few indicators to summarize a large amount of information. The representative indexes are selected by mathematical model, and the proportion of main factors is determined by comprehensive score of factors, which makes the analysis more objective.

3. Comprehensive Analysis of Changhe Company's Financial Evaluation Based on Factor Analysis

3.1. Construction of Financial Evaluation System

3.1.1. Principles of Index Selection

According to the viewpoint of system theory, the evaluation index system is a system composed of a series of indicators used to reflect the financial situation of enterprises, and its purpose is to realize evaluation. After referring to the existing research results of profit quality and the comparative study of corporate finance, it is finally concluded that the selection of indicators and the use of methods for constructing the evaluation system of enterprise profit quality should follow the principles of scientificity, systematicness and comprehensiveness.

(1) scientific. Scientificity is the primary value pursuit of constructing the evaluation index system, and it is the foundation and important basis for the evaluation index system to play a positive role. Only by being scientific can we standardize the evaluation method, make the evaluation model more reasonable, and make the evaluation results more authentic and credible.

(2) Systemic. The basic idea of system analysis is the reasonable composition and overall optimization of local and overall evaluation. When constructing the index system and selecting individual indicators, we must consider the reasonable composition of all kinds of indicators in the evaluation system as a whole, so that the indicators at different levels in the evaluation can give full play to their functions.

(3) Correlation. As an evaluation index for evaluating the business performance of an enterprise, it should conform to the strategic thinking of long-term development of the enterprise, so as to develop and enhance the core competitiveness of the enterprise and realize sustainable development.

3.1.2. Data Collection and Index Selection

In this paper, the basic framework of the standard level of the evaluation index system is constructed by referring to the tables of major regulatory indicators of the three major rating agencies in the world, such as Standard & Poor's, Moody's and Fitch, and related literature research. Combined with quantitative indicators and the characteristics of corporate finance, the semi-annual report of enterprises from December 31, 2002 to June 30, 2022 is adopted to select financial evaluation indicators from multiple levels and angles. The main indicators and data are as follows: The basic framework of the final standard level is as follows: indicators per share, profitability, earnings quality, capital structure, solvency, growth ability and operating ability. Specific explanatory variables are shown in Table 1 below.

Table 1. And index construction of the company's financial evaluation system

level	index
Index per share	Earnings per share EPS (basic) (RMB)
	Net assets per share (RMB)
	Net operating cash flow per share (RMB)
	Operating income per share (RMB)
profitability	Net profit rate of sales (%)
	Return on net assets (average) (%)
	Net interest rate of total assets (%)
	ROI ROIC(%)
Income quality	Operating profit/total profit (%)
	Total tax/profit (%)
	Net cash flow from operating activities/operating income (%)
capital structure	Asset liability ratio (%)
	Equity multiplier
	Property ratio
	Equity/invested capital attributable to shareholders of parent company (%)
debt paying ability	liquidity ratio
	quick ratio
	Total equity/liabilities attributable to shareholders of parent company (%)
	Total profit/liabilities (%)
Growth ability	Year-on-year growth of total assets (%)
	Year-on-year growth rate of equity attributable to shareholders of parent company (%)
	Year-on-year growth rate of operating profit (%)
	Year-on-year growth rate of operating income (%)
operating capacity	Turnover rate of current assets (times)
	Turnover rate of fixed assets (times)
	Total assets turnover rate (times)

3.2. Standardize the Original Data

Assume that there are m index variables for principal component analysis: x_1, x_2 B , x_m , with n evaluation objects, and the value of the j index of the ith evaluation object is x_{ij} .

$\tilde{x}_{ij}$ of each index,

$$\tilde{x}_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j}, \quad (i = 1,2,B \ , \ n; \ j = 1,2,B \ , \ m)$$

$$\bar{x}_j = \frac{1}{n}\sum_{i=1}^{n} x_{ij}, \quad s_j = \frac{1}{n-1}\sum_{i=1}^{n}(x_{ij} - \bar{x}_j)^2, \quad (j = 1,2,B \ ,$$

, i.e., $\bar{x}_j$, s_j, are the sample mean and standard deviation of the jth index. Correspondingly, $\tilde{x}_i = \frac{x_i - \bar{x}_i}{s_i}, \quad (i = 1,2,B \ , \ m)$ is called a standardized index variable.

3.3. Check Whether the Original Variables Can Meet the Basic Conditions for Factor Analysis

In order to ensure that the original data have the feasibility of factor analysis, firstly, KMO test and Bartlett spherical test are used to test all the original factors to ensure that these original factors can meet the premise of factor analysis. The test results of KMO and Bartlett are as follows. It can be seen from the results that KMO value is 0.624>0.5, and the significance p=0.000, which indicates that these variables are suitable for factor analysis, and the variables are highly correlated, which can provide a reasonable basis for factor analysis.

Table 2. KMO and Bartlett test

Kaiser-Meyer-Olkin measurement of sampling adequacy. Bart's sphericity test		.624
	Approximate chi-square	2225.386
	freedom	32 five
	significance	.000

After the preliminary test, the variance of the common factors extracted from the explanatory variables is determined, and the principal component analysis is the selected method. If the selected common factor can represent most of the information in the data, it indicates that the common factor is representative. As shown in the common factor variance in the following table, the information extracted from each original variable in this analysis is given. For example, the common factor variance of EPS (yuan) is 0.942, which indicates that several common factors can explain 94.2% of the variance of EPS. In addition, most of the variance of variables are above 80%. Therefore, the overall effect of the data extracted by factor analysis is ideal.

Table 3. Common Factor Variance Table

Earnings per share	1	0.942
Net asset per share	1	0.462
Net operating cash flow per share	1	0.872
Operating income per share	1	0.937
Net profit margin on sales	1	0.681
Return on equity	1	0.972
Net interest rate on total assets	1	0。 972
Return on invested capital ROIC	1	0.979
Operating profit/total profit	1	0.796
Total tax/profit	1	0.716
Net cash flow/operating income from operating activities	1	0.887
Asset liability ratio	1	0.971
The rights and interests multiplier	1	0.955
Equity ratio	1	0.962
Equity/invested capital attributable to shareholders of the parent company	1	0.974
Current ratio	1	0.839
Quick ratio	1	0.844
Total equity/liabilities attributable to shareholders of the parent company	1	0.905
Total operating profit/liabilities	1	0.824
Year-over-year growth rate of total assets	1	0.947
Year-over-year growth rate of equity attributable to parent shareholders	1	0.522
Year-over-year growth rate of operating profit	1	0.942
Year-over-year growth rate of operating revenue	1	0.807
Current asset turnover	1	0.866
Turnover of fixed assets	1	0.94
Total asset turnover	1	0.91

3.4. Extract Common Factors

As shown in Figure 3, the characteristic root and variance contribution rate table gives the explanation of the total variance of the original variable by each principal component. According to the results, the total variance of common factor 1 interpretation is 39.708%, which means that common factor 1 can cover 33.708% of all the information contained in the original data. Based on the characteristic value greater than 1, after extracting five factors, the five factors together explain 86.245% of the total variance of the original data. The information coverage of these five common factors covers most of the original data information.

It can also be seen from the gravel diagram results in the following figure that component 1, component 2, component 3, component 4 and component 5 occupy a very significant factor position, and their relative advantages are obvious, and the values of their eigenvalues are all greater than 1. However, the difference of characteristic values from component 6 to component 15 is less than 1. Therefore, it is reasonable to extract five common factors.

Table 4. Total variance of interpretation

	initial eigenvalues			Extract the sum of squared loads			Sum of squares of rotational loads		
component	total	Percentage of variance	accumulation	total	Percentage of variance	accumulation	total	variance	accumulation
1	10.808	41.569	41.569	10.808	41.569	41.569	10.324	39.708	39.708
2	6.287	24.18	65.749	6.287	65.749	65.749	6.191	23.811	23.811
3	2.557	9.833	75.582	2.557	75.582	75.582	2.855	10.982	10.982
4	1.432	5.506	81.088	1.432	81.088	81.088	1.536	5.903	5.903
5	1.341	5.158	86.245	1.341	86.245	86.245	1.591	5.841	5.841

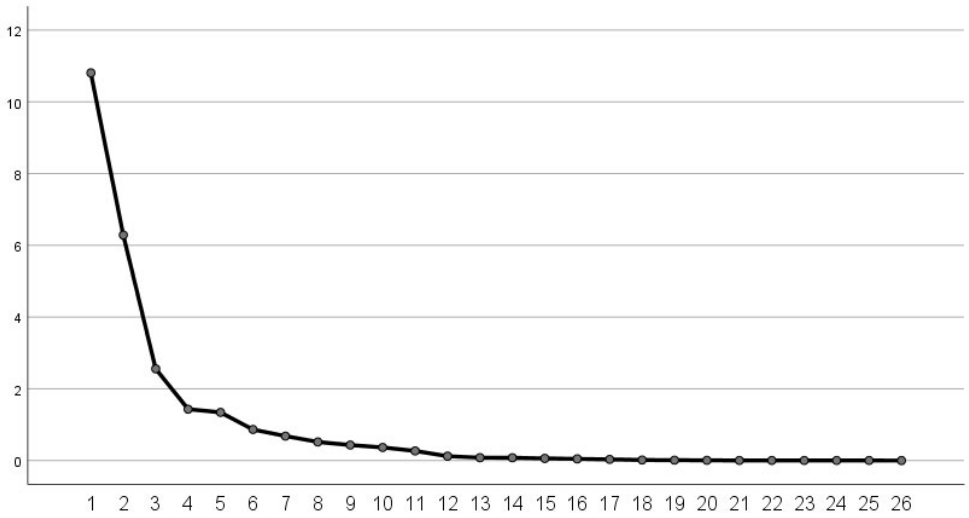

Figure 1. Gravel diagram

3.5. Naming of Common Factors

According to the factor load matrix after orthogonal rotation in Figure 5 below, the larger the correlation coefficient value, the greater the representativeness of the factor to the original variable. Taking 0.5 as the importance standard, it can be seen that the relationship between the first factor and the original variable is larger than that of the five factors, indicating that it has the largest amount of explanation for the original variable. Finally, the retained correlation coefficient values are shown in the following figure. The first factor has a large load on twelve variables, such as operating income per share, asset-liability ratio, total asset turnover rate, property right ratio, equity multiplier, equity investment capital attributable to shareholders of the parent company, and turnover rate of current assets. These variables represent the profitability of the company, so the first factor is named as profitability factor; Similarly, other factors are named growth ability factor, operation ability factor, income quality factor and solvency factor in turn.

Table 5. Factor load matrix after orthogonal rotation (after sorting)

	1	2	3	4	5
Operating income per share	0.942				
Asset liability ratio	0.939				
Total asset turnover	0.93				
Equity ratio	0.929				
The rights and interests multiplier	0.927				
Equity/invested capital attributable to shareholders of the parent company	-0.924				
Current asset turnover	0.908				
Total equity/liabilities attributable to shareholders of the parent company	-0.9				
Total operating profit	0.886				
Current ratio	-0.844				
Net operating cash flow per share	0.706			0.606	
Net profit margin on sales	-0.695				
Average return on equity		0.954			
EPS		0.946			
Year-over-year growth rate of total assets		0.939			
Year-over-year growth rate of operating profit		0.916			
ROIC		0.901			
Year-over-year growth rate of operating revenue		0.843			
Net interest rate on total assets		0.842			
Year-over-year growth rate of equity attributable to parent shareholders					
Turnover of fixed assets			0.817		
Total operating profit/liabilities			0.803		
Net asset per share					
Net cash flow/operating income generated from operating activities				0.935	
Quick ratio					0.87
Total tax/profit					0.722

3.6. Calculate the Common Factor Score

According to the scores of each factor calculated by spss26.0: FAC1, FAC2, FAC3, FAC4, FAC5, then combined with the five common factors obtained by spss26.0, the total variance value is explained as the weight of each factor, and then the weighted average is used to sum up, and the comprehensive score of enterprise financial status evaluation is calculated. The formula is as follows:

Comprehensive f = (0.41569 * fac1+0.24180 * fac2+0.09833 * fac3+0.05506 * fac4+0.05158 * fac5)/0.86245

Table 6. Factor score

	FAC1	FAC2	FAC3	FAC4	FAC5	F zong
2002-12-31	-1.42108	-.22700	-1.43096	2.37911	-1.91711	-.87
2003-06-30	-1.15453	-.68393	-1.46132	1.64156	-1.08975	-.88
2003-12-31	-.93590	-.35020	-.25867	1.36256	3.71444	-.27
2004-06-30	-1.02252	-.51175	-.57039	.47822	.69380	-.63
2004-12-31	-.70565	-.24166	.07680	-.62400	.87914	-.39
2005-06-30	-1.11061	-.24767	-.90778	-1.40514	.59660	-.76
2005-12-31	-1.01817	-.09651	-.21330	.54037	.96660	-.45
2006-06-30	-.67636	-.22773	-.82606	-3.43049	.22097	-.69
2006-12-31	-.47542	.08629	.23910	-2.33229	-.46630	-.35
2007-06-30	-1.02907	.31398	-.83171	-1.21796	-.59721	-.62
2007-12-31	-.57072	.52211	1.14151	-.44306	-.68471	-.07
2008-06-30	-.62158	-.38115	-.05876	-.43879	-.55593	-.47
2008-12-31	-.50723	-.35233	-.14758	.05414	-.95195	-.41
2009-06-30	-.47460	-.18379	.56291	.54797	-1.36316	-.26
2009-12-31	-.42862	-.05310	.98118	1.21333	-.95434	-.09
2010-06-30	-.37664	-.39194	.48431	.52783	-.76099	-.25
2010-12-31	-.23341	.17028	1.31631	.40258	-.64583	.07
2011-06-30	-.38115	.51325	1.53101	-.33964	-.91332	.06
2011-12-31	-.11849	.83149	2.53158	-.98111	-.77782	.36
2012-06-30	-.64227	-.40936	.26609	.44807	-.48450	-.39
2012-12-31	-.52992	.15151	1.31661	-.56146	.07753	-.09
2013-06-30	-.87868	-.50383	-.25603	.23680	.30490	-.56
2013-12-31	-.80033	.15991	1.51866	.94618	2.02825	.01
2014-06-30	-.84606	-.08021	-.22665	-.10069	1.07593	-.40
2014-12-31	-.70448	.89142	1.37815	.29599	.56096	.12
2015-06-30	.08255	3.64978	-1.97841	-.13200	-.22560	.82
2015-12-31	1.21190	4.22837	-.62954	.78703	.39437	1.77
2016-06-30	.86261	-.66509	-1.22441	-.16548	-.29175	.06
2016-12-31	1.48653	-.43530	.18939	.25125	-.03235	.63
2017-06-30	.78122	-.62152	-1.02077	-.31750	.74234	.11
2017-12-31	1.42229	-.23671	.38342	.28272	1.07279	.75
2018-06-30	.80066	-.57539	-1.00139	-.07593	.52406	.14
2018-12-31	1.73001	-.27147	.27613	.12541	.54457	.83
2019-06-30	1.17214	-.48828	-1.11641	-.17855	-.87543	.24
2019-12-31	1.85068	-.34819	.85860	.47380	-.36171	.90
2020-06-30	1.09241	-.70127	-.81720	-.34095	-.01704	.21
2020-12-31	1.82862	-.48270	.65551	.49419	-.27527	.84
2021-06-30	.96705	-.50684	-.54992	-.62615	.42198	.25
2021-12-31	1.62088	-.50157	.66825	.08141	.20172	.73
2022-06-30	.75393	-.74187	-.84826	.14068	-.77888	.02

4. Result Analysis

As shown in Table 5 below, the composition scores and comprehensive scores of the five common factors of Changhe Company's financial evaluation system are ranked in 40 periods. As can be seen from Figure 6, Changhe Company's comprehensive financial performance was the best in 2015, with a comprehensive score of 1.77 in that year. However, in the first half of 2003, Changhe's comprehensive score of financial performance was only -0.88, which was the worst in these 40 periods, and nearly two points lower than the score in 2015.

Judging from the scores and rankings of these five common factors, the five factors (profitability factor, growth factor, operational factor, income quality factor and solvency factor) ranked first in 2019, 2015, 2011, 2002 and 2003 respectively. When the score of the common factor is positive, the greater its value, the stronger the ability of the corresponding aspect; When the score is negative, it means that the ability it represents is weak. Therefore, observing the scores of these five common factors, the score of F2 (growth ability factor) has been negative and small in recent seven years, that is to say, the growth ability has been at a relatively weak level in the past seven years; F3 (Operational Capability Factor) ranked first in 2011, but its value in the last five years has been relatively small, so it can be seen that these two factors have a significant impact on Changhe's financial performance; As for the factor F1 (profitability factor), the scores in recent years are relatively large, which means that Changhe has a relatively stable profitability level in recent years. Based on the above analysis, the financial performance of Wangfujing Group is mainly influenced by growth capacity factor (F2) and operation capacity factor (F3).

Table 7. Ranking of scores of various factors and comprehensive scores

	FAC1	FAC2	FAC3	FAC4	FAC5	F zong
2002-12-31	40	16	38 yuan	one	40	39 yuan
2003-06-30	39 yuan	38 yuan	39 yuan	2	38 yuan	40
2003-12-31	34 yuan	23 yuan	25	three	one	26
2004-06-30	36	34 yuan	27 yuan	1	eight	36
2004-12-31	30	19 yuan	19 yuan	34 yuan	six	28
2005-06-30	38 yuan	20	33 yuan	38 yuan	nine	38 yuan
2005-12-31	35 yuan	14	22	eight	five	32
2006-06-30	28	17 yuan	30	40	16	37 yuan
2006-12-31	22	1	17 yuan	39 yuan	25	27 yuan
2007-06-30	37 yuan	seven	31 yuan	37 yuan	28	35 yuan
2007-12-31	25	five	seven	32	30	21 yuan
2008-06-30	26	25	20	31 yuan	27 yuan	33 yuan
2008-12-31	23 yuan	24	21 yuan	22	36	31 yuan
2009-06-30	21 yuan	15	12	seven	39 yuan	25
2009-12-31	20	12	eight	four	37 yuan	22
2010-06-30	18	26	13	nine	31 yuan	24
2010-12-31	17 yuan	eight	six	14	29 yuan	16
2011-06-30	19 yuan	six	2	29 yuan	35 yuan	17 yuan
2011-12-31	16	four	one	36	32	nine
2012-06-30	27 yuan	27 yuan	16	13	26	28
2012-12-31	24	10	five	33 yuan	18	22
2013-06-30	33 yuan	32	24	18	15	34 yuan
2013-12-31	31 yuan	nine	three	five	2	20
2014-06-30	32	13	23 yuan	24	three	30
2014-12-31	29 yuan	three	four	15	10	14
2015-06-30	15	2	40	25	21 yuan	five
2015-12-31	seven	one	28	six	14	one
2016-06-30	1	37 yuan	37 yuan	26	23 yuan	17 yuan
2016-12-31	five	28	18	17 yuan	20	eight
2017-06-30	13	36	35 yuan	28	seven	15
2017-12-31	six	18	14	16	four	six
2018-06-30	12	35 yuan	34 yuan	23 yuan	12	13
2018-12-31	three	21 yuan	15	20	1	four
2019-06-30	eight	30	36	27 yuan	34 yuan	1
2019-12-31	one	22	nine	12	24	2
2020-06-30	nine	39 yuan	29 yuan	30	19 yuan	12
2020-12-31	2	29 yuan	1	10	22	three
2021-06-30	10	33 yuan	26	35 yuan	13	10
2021-12-31	four	31 yuan	10	21 yuan	17 yuan	seven
2022-06-30	14	40	32	19 yuan	33 yuan	19 yuan

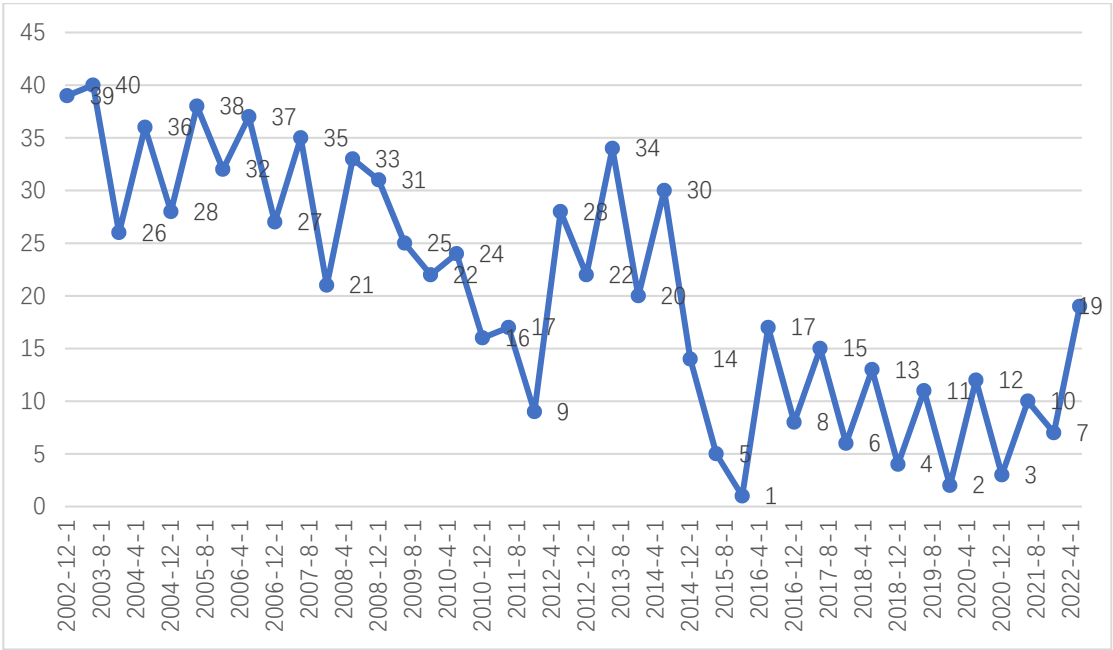

Figure 2. Ranking of comprehensive scores on December 31, 2002-February 22.6.30

References

[1] Ma Huiqi. Research on the financial performance evaluation system of state-owned enterprises in China [J]. Productivity Research, 2008 (7): 134-137

[2] Wei Xue. Statistical analysis method and application of SPSS [M]. Beijing: Electronic Industry Press, 2013: 21-78

[3] Liu Yujiang. Financial Performance Evaluation of Listed Commercial Banks in China [J]. Special Economic Zone, 2014 (02): 41-43

[4] Yu Sha. Financial Performance Evaluation of Real Estate Listed Companies Based on Factor Analysis [J]. Technology and Management, 2013 (01): 23-27

[5] Wang Na, Yin Qin. The application of DuPont analysis in enterprises [J]. China Securities and Futures, 1012, (5): 35-37

[6] Yu Yonghong, Chen Yiping. Introduction and implementation of balanced scorecard [M]. Beijing: Electronic Industry Press, 2007

[7] Belcaid, K., and A. El Ghini.'Macro-finance Determinants and the Stock Market Development: Evidence From Morocco'[J].Middle East Development Journal, 2021, 13 (1): 99-127.

[8] Bouteska, A., and B. Regaieg.Psychology and Behavioral Finance Anchoring Bias by Financial Analysts On the Tunisian Stock Market[J].Euromed Journal of Business, 2020, 15(1):39-64.