

Investigation of the Status Quo and Promotion of Financial Management in Enterprises

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Objectives: In day-to-day operation and management activities, attention is paid to preventing and controlling financial risks, which will prevent risks or minimize losses. **Methods:** The current state of financial management in companies is analyzed, and then how to effectively prevent and promote measures is systematically discussed. **Results:** Firstly, a multi-fractal spectrum program design algorithm is constructed and multi-fractal spectrum analysis and feature derivations are carried out. Then, several companies are selected as research objects, and the financial management of the company's operations and stock price changes and tests are simulated. **Conclusion:** It can be seen that the algorithm constructed in this paper can predict the stock price through the shape of the bell-shaped spectrum and has high accuracy.

Keywords: financial governance efficiency; data mining; simulation

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The enterprises in the industry in China have a relatively small scale and a small number of small companies. Compared with multinational companies in developed countries, the gap is very obvious. According to the statistics of 2016 commodity fluctuations, products increased or decreased in 2016, with 24,941 enterprises above designated size and 3,155 loss-making enterprises. The industry's total loss was 100.22 billion yuan, a year-on-year increase of 10.9%¹. At present, the financial management of China's companies has generally failed to form a good sense of risk, resulting in many risks in the development of the enterprise. The risk early warning mechanism has not been scientifically and effectively formed, resulting in many unstable factors in the production and

operation of enterprises. It has become a constraint factor in the healthy and sustainable development of the company². With the gradual establishment and continuous improvement of China's socialist market economic system, the scale of production of companies has continued to expand, facing fierce competition from domestic and international markets. As a result, various risk opportunities are encountered, and the company's production and operation will be affected and even bankrupt³. However, many of China's companies are indifferent to risk awareness and even some companies are not aware of the risks. Therefore, it is of far-reaching significance to carry out targeted research on the risks that may exist in the financial management of companies in China⁴.

Research on financial management can be

traced back to 1976. The scholars have proposed models such as debt ratio signal transmission model, operator shareholding ratio signal transmission model, investment signal transmission model, guarantee model, and control model, which have greatly influenced the study of financial capital structure theory⁵. Based on the research of Western scholars, Chinese scholars clearly put forward the theory of financial management and achieved certain research results. Scholars preliminarily clarified the connotation of financial management and proposed the framework of the financial management system. This is the opening of the research boom in financial governance in China's financial theory community⁶. The research on financial management and improvement measures is mainly reflected in the empirical study of corporate management efficiency. Scholars believe that the fundamental goal of corporate financial management is to improve corporate management efficiency, and to achieve information symmetry and balance of interests of internal and external stakeholders. Some scholars believe that to improve the financial management efficiency of listed companies, the financing structure of listed companies must be changed, the impact of information asymmetry on the interests of all parties, must be controlled and an important role of independent audit in financial management must be fully played⁷. Some scholars have systematically proposed and constructed a three-tier system of "financial

management behavior - financial management efficiency - operating performance". Constructing a financial management index is proposed to measure the efficiency of financial management and the data of companies in China is used to test it.

METHODS

Financial Management Practice Evaluation Model

The practice evaluation model is one of the more effective methods for calculating the statistics of modern statistics. It consists of E-steps and M-steps and obtains the desired results after much iteration. This method was proposed by Dempster et al. in 1977 and was mainly used to calculate the mode of the posterior distribution. Domestic scholars have also studied this, but there is no relevant report on the direct application of the practice evaluation model to factor analysis. θ is let to be the model parameter. $f(\theta|y, z)$ represents the θ posterior distribution density function obtained after adding the data Z . $k(z|y, \theta)$ denotes the conditional distribution density function of potential data Z under a given θ and observation data y . θ^i is recorded to be the estimated value of the parameter at the beginning of the $i+1$ th iteration, then the two steps of the $i+1$ th iteration are: E steps. Conditional expectations for $f(\theta|y, z)$ or $\log^{f(\theta|y, z)}$ is calculated so that z is accumulated, that is:

$$Q(\theta, \theta) = E^e[\log^{f(\theta|y, z)}, \theta] = \int \log^{f(\theta|y, z)} k(z|y, \theta) dz \quad (1)$$

until $\|\theta^{i+1} - \theta^i\|$ or $\|Q(\theta^{i+1} - \theta^i) - Q(\theta^i, \theta^i)\|$ disappears completely. A practice evaluation model based on factor analysis is built: There are n observation samples X_1, X_2, \dots, X_n , and $\theta^{(k)} = (A^{(k)}, \psi^{(k)})$ indicates the value of the parameter at the k th iteration, then:

In step M, $Q(\theta, \theta^i)$ is maximize and a point θ^{i+1} is found to make:

$$Q(\theta^{i+1}, \theta) = \max Q(\theta, \theta) \quad (2)$$

In this way, an iteration $\theta^i \rightarrow \theta^{i+1}$ is formed. The above steps E and M are iterated repeatedly

$$\begin{aligned} Q(\theta|\theta^{(k)}, X) &= E^f \left\{ \log \left[\prod_{i=1}^n (2\pi)^{-p/2} |\psi|^{1/2} \exp \left[-\frac{1}{2} (X_i - AF)' \psi^{-1} (X_i - AF) \right] \right\} \\ &= -\frac{np}{2} \log(2\pi) - \frac{n}{2} \log |\psi| - \frac{1}{2} \sum_{i=1}^n E(X_i' \psi^{-1} X_i - 2X_i' \psi^{-1} AF + F'A' \psi^{-1} AF) \\ &= -\frac{np}{2} \log(2\pi) - \frac{n}{2} \log |\psi| - \frac{1}{2} \sum_{i=1}^n \{ X_i' \psi^{-1} X_i - 2X_i' \psi^{-1} AE(F|\theta^{(k)}, X_i) + tr[A' \psi^{-1} AE(FF'|\theta^{(k)}, X_i)] \} \end{aligned} \quad (3)$$

To maximize $Q(\theta|\theta^{(k)}, X)$, derivatives for A and ψ

are calculated respectively, and there is:

$$\psi^{(k+1)} = \frac{1}{n} \left[\sum_{i=1}^n X_i X_i' - A^{(k+1)} E(F | \theta^{(k)}, X_i) X_i' \right] \quad (4)$$

Finally, it is diagonalized as:

$$\psi^{(k+1)} = \frac{1}{n} \text{diag} \left\{ \sum_{i=1}^n X_i X_i' - A^{(k+1)} E(F | \theta^{(k)}, X_i) X_i' \right\}$$

Among them, diag denotes the diagonal matrix composed of the main diagonal elements of the matrix, so it is possible to conduct an iterative evaluation model.

Data Analysis

After several preliminary questionnaire surveys, the questionnaire is revised repeatedly, and the questionnaire is finalized. The set item is set to X in sequence, and data analysis is performed using SPSS/PC. There are a total of 70 items in the questionnaire, all of which are topics related to the characteristics of managers. The options are set to good and bad. Rickett Scale is used for evaluation and is divided into seven grades. In the questionnaire, it is necessary to select the best and worst behavioral characteristics of the financial management of managers. Questionnaires are distributed to the respondents, and the questionnaires are collected and statistics are collected. Averages of all variables are taken. Then the management personnel is compared with good quality of financial management and poor quality of financial management to find out their differences.

From the statistical results, it is found that the management personnel with good financial management quality and poor financial management quality has no significant difference except for the 39th variable (management personnel and colleagues) and the 52nd variable (management personnel and leadership relationship). The other variables are significantly different at the level of 0.001. Therefore, according to the degree of differentiation of the project, the 68 items in the questionnaire have the ability to distinguish between good and poor financial management personnel, and it also indicates that the project has a certain degree of validity. On the basis of the above results, the scores of the evaluation results of managers with

good financial management and their behavior characteristics are compared with the difference of 4.00 in the scale of the 7th scale. The results are identified with Z values. Here, the medium number means the score of the middle-level management personnel. If the scores of the management personnel with good financial management quality are different, the difference between the scores indicates that the index has a good degree of distinction. Therefore, as long as the difference between the score of a certain variable and the median of 4.00 differs significantly at the level of 0.05, it can be regarded as the characteristic of good quality of financial management of the management personnel who are recognized by the employees. From the statistical results, it can be seen that 36 of the 70 managers' behavioral characteristics are significantly different from the medium number of 4.00, that is, employees generally believe that the best financial management personnel should have the above 36 characteristics.

Then reliability testing is conducted. The two Before and after parts of the appraisers use the consistency of the index system. Two managers are selected as the status of assessment, and the employees who are currently practicing and having studied the management system they have been taught are evaluated. The correlation coefficient of statistical results is 0.372, indicating that there is still considerable consistency in the evaluation of the same manager at different times. The above review of the three aspects of the reliability of evaluation indicators, between the evaluators, and before and after evaluation consistency show that the indicator system is credible.

Data Processing

Raw data is converted to membership and quantitative data. The raw data is the number of employees who count the employee's underlying indicator level for the manager. In the primary evaluation, the data is converted into membership degree. In the detailed evaluation, the data is converted into quantitative data, which is obtained according to the weight and degree of membership of each index. The data processing of young managers' teaching quality evaluation is calculated by programming. From the above

analysis of the credibility and validity of the data, it can be seen that different scorers have different scores for the same manager, and sometimes they are very different. The consistency of the scorer's score must be estimated. Because at this time the error is mainly due to the difference in the rater. Kendall used the harmony coefficient to test for consistency among more than three evaluators and to test the consistency of the two raters using

the Spearman rank correlation method. Here, the consistency between the evaluators was tested by using Kendall's Harmony Coefficient and the results were passed. A practical teaching evaluation model was used for factor analysis. The original data of 15 managers were processed and programmed using Matlab. The results are shown in Table 1.

Table1
Factor Analysis Using EM Algorithm

Serial number	Code of formula	Index name	F actor1	F actor2	F actor3	F actor4	F actor5	F actor6
1	U111	Completeness of lesson preparation	0.6338					
2	U112	Teaching attitude	0.8633					
3	U113	After-school situation	0.6816					

4	U1 2	Attitude of educating people	0 .72 25					
5	U2 1	Teaching materials		0. 636 6				
6	U2 2	Teaching content		0. 853 5				
7	U2 3	Knowledge width		0. 738 0				
8	U3 11	The enlightening of teaching methods			0. 708 4			
9	U3 12	The vividness of the way of teaching			0. 780 2			
10	U3 13	Degree of training ability			0. 781 6			
11	U3 2	teaching devices			0. 608 4			
12	U4 1	Language function				0. 726 7		
13	U4 2	The situation of blackboard				0. 670 4		
14	U4 3	Instrument , teaching state				0. 640 8		
15	U5 1	Imparting the effect of knowledge					0 .81 25	
16	U5 2	Effect of educating people					0 .68 45	
17	U6	personality characteristics						0. 682 5

RESULTS

Analysis of Sample Company Financial Management Efficiency Change

Three stocks of three companies in China are randomly selected as research objects. The sampling data is stock price transaction data with frequency $f=5\text{min}$ (data from analyst stock analysis software). The data collection starts from 9:35 in each trading day and ends at 15:00 in the closing time. A data record is taken every 5 minutes. After deducting transaction breaks from 11:30 to 13:00, each transaction R can collect $t = 48$ data. The data of $n=5$ trading days will be selected to examine the multifractal spectrum of 5 trading days before and after the continuous soaring or sustained heavy fall. The time span of the raw data of company 1 is from October 17, 2005 to October 21, 2005. The time span of the raw data of company 2 (continued to soar) is

from September 13, 2004 to December 1, 2004. The time span of the raw data of the company 3 is from April 18, 2006 to April 24, 2006. The time span of the original data for the company 2 (Continuing Daqi) was from April 12, 2004 to April 16, 2004. Since 48 data are selected for each of the four stocks on each trading day, the time scale δ has a value of $\delta = \{1/48, 1/24, 1/16, 1/12, 1/8, 1/6, 1/4, 1/3, 1/2, 1\}$. The value of q is defined as the factor $\eta < 0.2\%$ of the change of $f(a)$ with q . According to the calculation, it can be found that when the above four stocks are $|q|_{\max} \leq 120$, $\eta < 0.2\%$ is calculated. At this time, the change of Δf is very small, so $|q|_{\max} = 120$ is taken.

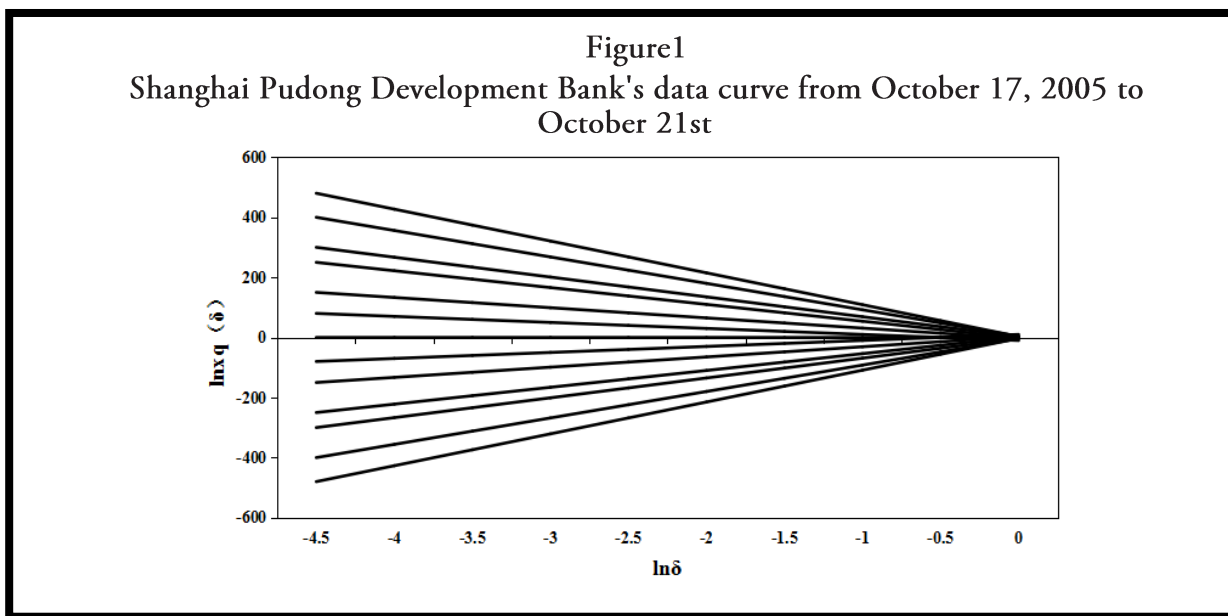


Figure 1
Shanghai Pudong Development Bank's data curve from October 17, 2005 to October 21st

Fig.1 is the relation curve of $\ln x_q(\delta) \sim \ln \delta$ when q takes different values, which is the first company's data calculated from the algorithm program written in the Matlab tool from October 17 to October 21, 2005. As can be seen from the figure, $\ln x_q(\delta) \sim \ln \delta$ has a good linear relationship and exhibits good scale invariability regardless of any value of q . Calculating the data of any selected unit in the same way leads to the same conclusion. This can be used to determine the

multi-scale relationship between price per unit price time series of individual stocks, indicating that the price fluctuation per unit of a stock follows a multi-fractal random walk.

Multifractal Spectrum Feature Analysis

According to the algorithm described in the previous section, the multifractal spectrum and the important parameters of the two data that support the continuous upswing of the stock for 5 trading days are calculated, as shown in the

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 following chart:

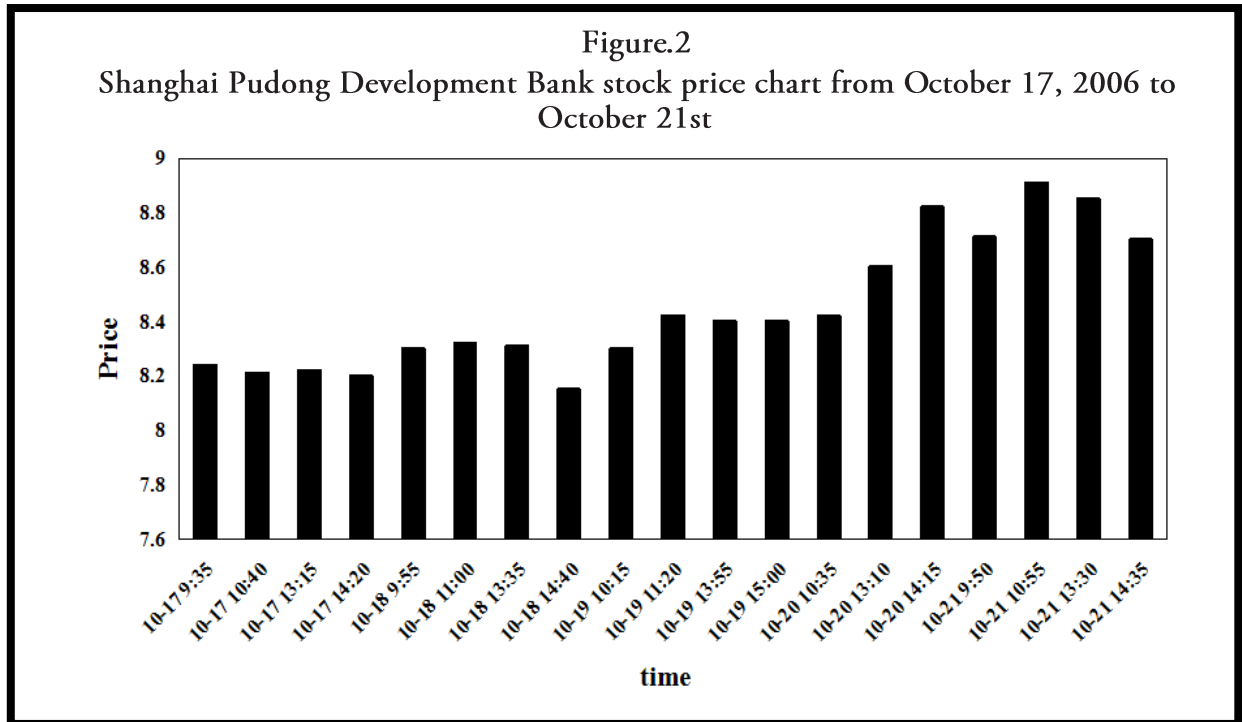


Table2
 The Main Parameter Table of Multifractal Spectrum

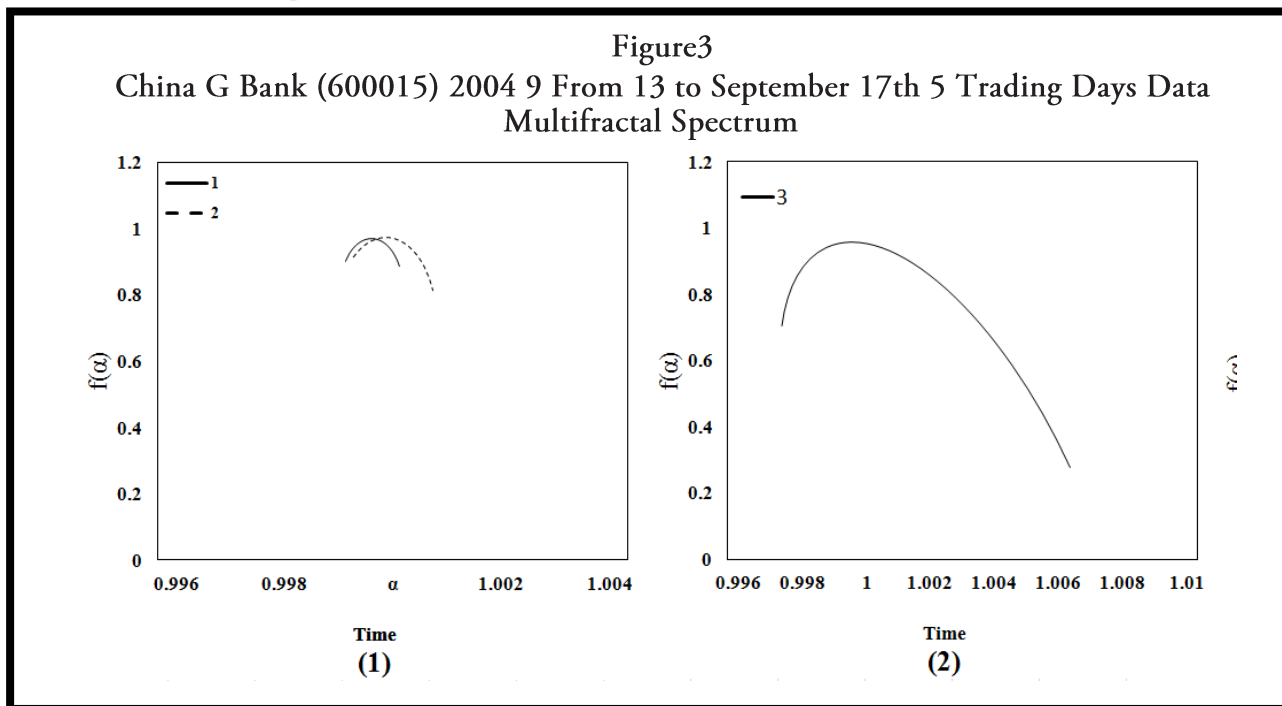
	α_{\min}	α_{\max}	$\Delta\alpha$	α_0	$f(\alpha_{\min})$	$f(\alpha_{\max})$	Δf
1 unit	0.99 95	1.0 004	0.0 009	1. 000 0	0.97 10	0.97 44	- 0.003 4
2 unit	0.99 95	1.0 013	0.0 019	1. 000 0	0.97 33	0.91 24	0.06 09
3 unit	0.99 90	1.0 034	0.0 044	1. 000 0	0.95 41	0.77 65	0.17 76
4 unit	0.99 63	1.0 038	0.0 075	1. 000 0	0.81 16	0.81 53	- 0.003 7
5 unit	0.99 92	1.0 010	0.0 019	1. 000 0	0.95 16	0.93 71	0.01 45

Table 2 and Figure 2 are the multifractal spectrum of each unit data and the

corresponding main parameter table for a period of time before and after the continuous surge in the stock price of companies. Figure 3 is a multifractal

spectrum of the stock price of Hua Xia Bank. From the graphs and tables, it can be seen that the multi-fractal spectrum graphs of different stocks have different shapes and their main

parameters change significantly. This shows that the distribution structure of the stock price fluctuations of companies is very complicated.



By studying the multifractal spectrum at each stage, the following conclusions can be drawn: First, as can be seen from Table 1 and Figure 2, in the early period of continuous stock boom, the top of the multifractal spectrum is sharper, the opening is smaller, and the curve is relatively close, indicating that the distribution of stock price activity is relatively uniform at this time, and it can be seen from the parameters in the chart and the table that the opportunity for the price to be at the highest price level is larger, indicating that the stock has a rising trend. Secondly, from the changes in Unit 1 to Unit 2 in Figure 3, it is found that the right deviation of the $f(\alpha) \sim \alpha$ spectrum becomes more and more obvious as the continuous upswing approaches, the opening widens from narrow to sharp, and the top becomes sharp and sharp, the span obviously widens, the left and right endpoints decreases, especially the right endpoint ($\alpha_{max}, f(\alpha_{max})$) drops sharply. Third, the sharp increase in the value of $\Delta\alpha$ shows that the singularity of the fluctuation distribution of financial governance efficiency increases, and the

difference between the highest price and the lowest price of the unit is more significant. The increase of α_{max} value shows that the financial management efficiency of companies in enterprises has reached new heights. The decrease in the value of α_{min} indicates that the efficiency of financial governance has reached a new low, but the decrease in α_{min} is smaller than the decrease in α_{max} , indicating that the stock market is gaining momentum significantly. The decrease in $f(\alpha_{min})$ indicates that the number of events with higher normalized prices is less than that of sweeter ones. The decrease in $f(\alpha_{max})$ indicates that the number of events with normalized lower prices has decreased as compared with before. Δf is positive, indicating that the efficiency of financial governance per unit of data is higher than the lowest number of times, and the events with higher normalized prices dominate. The above characteristics appearing in the spectrum of each unit indicate that the financial management efficiency in the future will have a tendency to rise sharply, but there will be a partial shock in the

surge.

According to the algorithm described in the previous section, the multifractal spectrum and important parameters of the two data that support the five consecutive trading days of the stock fall are calculated, as shown in the following chart:

Analysis of Multifractal Spectrum Features Before and After Single Stock Falls

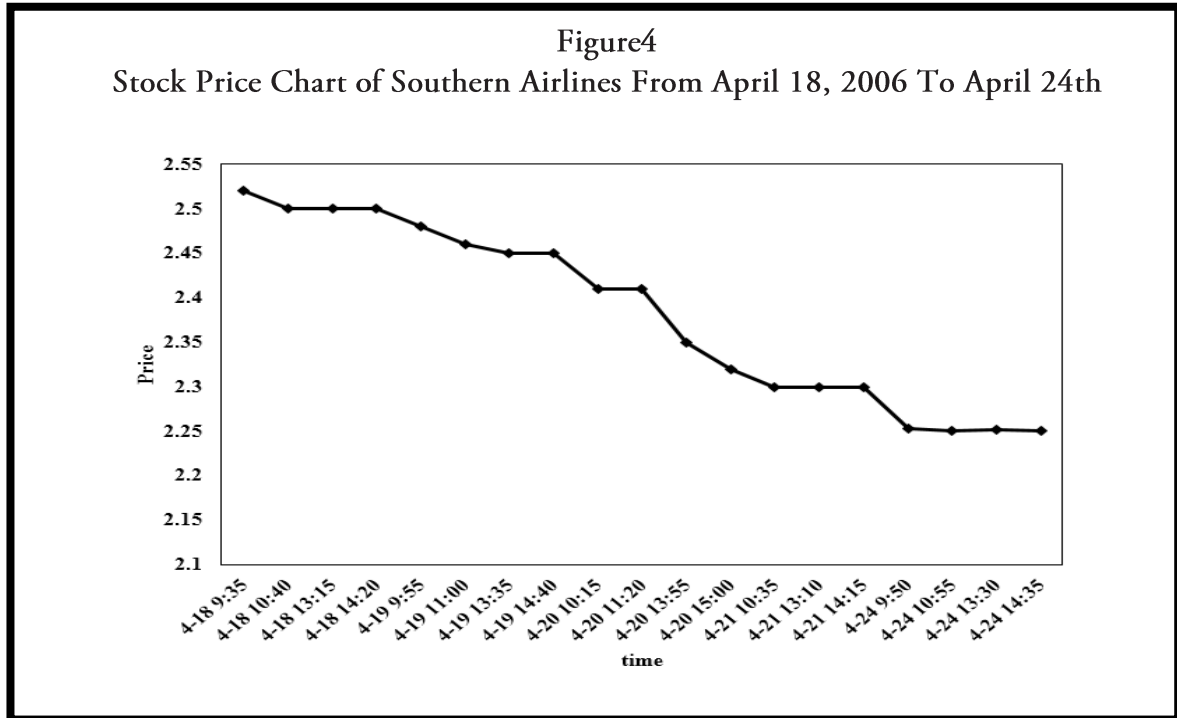


Table2
The Main Parameters of Multifractal Spectrum

	α_{min}	α_{max}	$\Delta\alpha$	α_0	$f(\alpha_{min})$	$f(\alpha_{max})$	Δf
1 unit	0.9995	1.0004	0.0009	1.0000	0.9697	0.9745	0.0048
2 unit	0.9992	1.0008	0.0016	1.0000	0.9522	0.9569	0.0048

3 unit	0.99 86	1.0 008	0.0 022	1. 000 0	0.91 22	0.95 75	- 0.045 3
4 unit	0.99 91	1.0 006	0.0 015	1. 000 0	0.94 07	0.97 02	- 0.029 5
5 unit	0.99 91	1.0 009	0.0 018	1. 000 0	0.94 89	0.94 68	0.00 21

Table 2 and Figure 4 are the multifractal spectrum of each unit data and the corresponding main parameter table for a period of time before and after the prices of these two stocks of company 2 and company 3 are continuously falling. From the chart and the table, it can be seen that the different multifractal spectrum $f(\alpha) \sim \alpha$ curves of different stocks have different shapes and their main parameters change significantly, which shows that the distribution structure of stock price fluctuations is very complicated.

By studying the multifractal spectrum of each stage, the following conclusions can be drawn: First, in the early period of continuous stock fall, the top of the multifractal spectrum is sharper, the opening is smaller, and the curve is relatively close. This indicates that the distribution of financial data activities is more uniform and the financial data is less volatile. And it can be seen from the figure and the parameters in the table that the normalized price price at this time has a greater chance of being at the lowest price, indicating that the stock has followed a downward trend. Secondly, from the change from Unit 1 to Unit 2 in Figure 4, it is found that when the continuous fall is approaching, the $f(\alpha) \sim \alpha$ -spectrum left-bias phenomenon becomes more and more obvious, the opening widens from narrow to sharp, the top becomes sharp and sharp, the span is obviously widening, and the left and right endpoints fall, especially the left endpoint drops sharply. Third, the sharp increase in the value of $\Delta\alpha$ means that the singularity of the fluctuation distribution of financial data is enhanced, and the difference between the highest price and the lowest price of

the unit is even more significant. The increase of α_{max} value shows that the financial management efficiency of companies is low again. The lowering of the value of α_{min} indicates that the efficiency of financial management has reached a new high, but the decrease in α_{max} is less than the decrease in α_{min} , indicating that the stock market has experienced a significant decline. The decrease in $f(\alpha_{min})$ indicates that the number of normalized higher-priced events has decreased as compared with the previous period. The decrease in $f(\alpha_{max})$ indicates that the number of events with normalized lower prices has decreased as compared with before. Δf is negative, indicating that the efficiency of financial governance per unit of data is at the lowest point more than at the highest point. At this time, events with normalized prices are dominant. The above-mentioned characteristics appearing in each unit spectrum indicate that there will be a sharp downward trend in the stock price in the future, but there is a partial rise in the big drop. In short, as the stocks continued to plummet, the span of the $f(\alpha) \sim \alpha$ spectrum gradually widens, the top becomes sharper, the spectrum significantly turns left, and the value of $f(\alpha_{min})$ fall sharply, reflecting the increase in the complexity (non-uniformity) of the fractal structure of the stock time series. These phenomena may be precursory features that have predictive significance before the stock price continues to drop. When the spectrum's bell-shaped opening is narrowed and the top is sharpened, it indicates that abnormal fluctuations in the stock price have ended.

DISCUSSION

companies should seek the best cooperation between risks and interests and choose the capital gains that are most beneficial to the company. The basis is its own risk tolerance. In this context, a multi-fractal spectrum program design algorithm is constructed. On this basis, the maps are analyzed and characterized. China's three companies are selected as test objects. The changes in stock prices under the influence of negative financial information are simulated. After testing, it can be seen that the algorithm constructed in this paper can predict the stock price through the shape of the bell-shaped spectrum. Data mining technology is used to identify financial report violations can reduce subjective judgments, shorten the recognition time, and improve the accuracy of identification. The proposed evaluation method achieves the desired effect and the financial management evaluation model is feasible for factor analysis. A practical evaluation model is used to perform factor analysis on the data can be applied to more models, but it requires that the data as a whole be presented with a normal distribution, which is easy to satisfy in practical work. Therefore, the algorithm and model constructed in this paper have applicability and can meet the needs of practical work.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

None declared.

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