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The Application of Longitudinal Clustering Analysis in Futures Investment

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ABSTRACT

This paper selects listed futures commodity index data, standardized processing, using SPSS software for longitudinal clustering. Research results show that, using this rational investment analysis method can help investors to accurately understand and grasp the future overall characteristics, reduce the investment risk.

Keywords: *future price ; longitudinal clustering ; SPSS software*

I. INTRODUCTION

Futures market tends gradually reasonable, development speed is accelerated stage by stage, transaction size increased significantly, economic status and influence are obviously promoted. With the development of technique and futures investment securities regulation method maturing, listed goods number continued to grow, how to scientifically and rationally futures price analysis and selection of every investor is the most important problem to be solved.

Cluster analysis is an effective guidance method for futures investors. Cluster analysis is based on a commodity futures industry factors, profitability and other basic level survey, and then use the comprehensive evaluation index system to measure the sample commodities at different points in time of "The degree of similarity ".Apply clustering model can help investors to accurately understand and grasp the futures at different time points of the overall characteristics, determine the investment of time, and by the overall price level to predict future changes in commodity prices trend, choose favorable investment opportunity. Although the clustering analysis method in various fields of application is very wide, but in the investment in futures studies have great potential space. We research on the existing basis, in-depth study of cluster analysis on the applied value of futures investment. To enrich and improve the clustering index system, the method for the majority of futures investors more guidance is very important.

There are many scholars also used cluster analysis method for the analysis of futures characteristics [1-2].Li[3],Shen[4] extent traditional clustering analysis method to the fuzzy clustering method. But they are according to different object clustering, that is ,to analysis of the characteristics of what species are similar and cluster them to a kind.。It is the object of study for lateral clustering, and on a certain varieties of futures, investors tend to analyze the variety law。Therefore, this article will cluster analysis applied to longitudinal analysis. That is used to analyze the same variety for clustering, analysis of the varieties in different period of time performance, which is conducive to dig out the futures varieties change, convenient for investors to make investment analysis.

II. THE STEPS OF CLUSTER ANALYSIS

Clustering analysis is one by one into a number of subsets of individuals, until the whole in a collection within. The classification procedure is as follows [5]:

1) Data transform before by clustering ;
2) The beginning of clustering analysis processing is each sample into a respective (n samples have n kinds, Calculate the distance between sample, and cluster the nearest two samples to a class).
3) Select and calculate the distance between class and class, and merge the nearest two classes. If the class number is greater than 1, then continued and, until all the samples are classified as a category.
4) The last cluster pedigree diagram drawing system, according to the different classification criteria or different classification principle, it leads to different results of classification.

3. EMPIRICAL RESEARCH

3.1 Data Selection and Pretreatment

This paper selects the futures commodity al1104, data from 2011,1 to 4 [6], the opening price, high, low, close price, settlement price 5 indicators, using system clustering method for al1104.

Data processing refers to the removal of the original data dimension different effect, adopting normal standardized mathematical transform. Commonly used transform method has two kinds: the standard deviation of standard and standardization of range. After changing the index mean value is 0, the standard deviation is 1.

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Let $\overline{x_j}$, s_j are R_j respectively express the samples、sample standard deviation and range of the j index.

$$\overline{x_j} = \frac{1}{n}\sum_{j=1}^{n} x_{ij} \quad ;$$

$$S_j = \sqrt{\frac{1}{n-1}\sum_{j=1}^{n}\left(x_{ij} - \overline{x_j}\right)^2} \quad ;$$

$$R_j = \max\{x_{ij}\} - \min\{x_{ij}\}$$

Standard deviation standard $x_{ij}^{/} = \dfrac{x_{ij} - \overline{x_j}}{s_j}$

（i=1, 2, …, n ; j=1, 2, … p）

Range standardization $x_{ij}^{/} = \dfrac{x_{ij} - \overline{x_j}}{R_j}$

（i=1, 2, ……, n ; j=1, 2, ……, p）

The inverse index positive handled: Equity is the inverse index (fetch unit billion shares) , Take reciprocal of its absolute value,

$$x_{ij}^{/} = 1/\left|x_{ij}\right|$$

（i=1, 2, ……, n ; j=1, 2, ……, p）

Moderate index positive handled:Firstly, to determine the index of moderate value$a$, then calculate the difference of appropriate value and each index data, Finally, to take reciprocal of the absolute value of difference:

$$x_{ij}^{/} = 1/\left|a - x_{ij}\right|$$

（i=1, 2, ……, n ; j=1, 2, ……, p）

3.2 SPSS Clustering Analysis and Conclusion

Using SPSS， we get the clustering results, (If the sample is divided into 3 categories):

The first class（20110104 20110105 20110106 20110107 20110110 20110111 20110112 20110113 20110201 20110209 20110210 20110211 20110214 20110215 20110216 20110217 20110218 20110221 20110222）

The second class（20110114 20110117 20110118 20110119 20110120 20110121 20110124 20110125 20110126 20110127 20110128 20110131 20110223 20110224 20110225 20110228 20110301 20110302 20110303 20110304 20110307）

The third class（20110308 20110309 20110310 20110311 20110314 20110315 20110316 20110317 20110318 20110321 20110322 20110323 20110324 20110325 20110328 20110329 20110330 20110331 20110401 20110406 20110407 20110408 20110411 20110412 20110413 20110414 20110415）

Hierarchical diagram shows the clustering process from the graph can be seen clearly different time futures price belong to different class. According to the different distance we can according to the different graphics on different time futures price for a new classification. In addition to cluster pedigree diagram we can clearly see that the different time futures price of the original classification and clustering process from which we can understand the different time futures price relationship.

First class belongs to the high income futures. Five indicators are relatively high, the possibility of prices continue rising is very small. This period of time is in the first half of January, about twenty days before the February. So， Investors in this period should be quickly sell their futures contracts. Forbid buy this commodity futures contracts.

Second class belongs to the category of income in the future five indicators are more general, price increases and decreases are possible. This period of time is in the second half of the January month, at the end of February and early three's for a period of time。So Investors in this period of time whether to sell or buy is investors personal opinions.

The third types belong to the low income futures， Five indicators are relatively low, the possibility of increasing price is large. This period of time is in the second half of the March month and the first half of April. Therefore, investors in this period should be a large number of buying the commodity futures contracts. For the price hill rises to sell out.

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Cluster analysis is based on the futures contract the fundamentals of quantitative analysis for the lack of qualitative analysis, as a rational long-term investment reference, its purpose lies in that from futures basic characteristics determine the intrinsic value of futures investment real value explore.

Through the cluster pedigree diagram, it is more intuitive judgment of investors into buying or selling futures contract time, investors use the rational investment analysis method, can help investors to accurately understand and grasp the different futures contract price change time, can reduce the investment risk, investment norms.

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REFERENCES

[1]. Min Li,Li He. The application of cluster analysis in security investment fundamental analysis application [J]. Journal of Liaoning Normal University (NATURAL SCIENCE EDITION)2006,29(2):154-146.

[2]. Q.D.Li, Ying Li. New exploration on the methods of securities investment analysis cluster analysis method and Application [J]. Modern information, 2005, 11 : 11-15

[3]. Xing Li. Fuzzy cluster analysis application in securities investment, China securities futures,2011,8:45-47.

[4]. Z.H.Sen, Z.X.Ye. Futures Company customer risk management with fuzzy clustering analysis. Journal of Guangxi Normal University : 2011,29(3):101-103.

[5]. X.L.Yu. Multivariate statistical analysis [M].Beijing: China Statistics Press, 1999, 4 : 10-18

[6]. http://finance.sina.com.cn/money/future/futuresroll/20070602/20513655962.shtml