Information Technology and Quantitative Management (ITQM2013)

Sector Indices Correlation Analysis in China's Stock Market

Dingmu Cao[a,b], Wen Long [a,b,*], Wenning Yang [a,b]

[a]University of Chinese Academy of Sciences, Beijing, 100190, China
[b]*Research Center on Fictitious Economy & Data Science, Chinese Academy of Sciences, Beijing 100190, China*

Abstract

China's stock market has experienced a big bull market in 2007 and a bear market in 2008. Since then, with the influence of the global economy, China's stock market exhibits ups and downs as usual. We examine the relationship between the stock market sector indices from the meso level, and divide the periods into two stages. One stage represents the drastic shock periods in 2007 and 2008, and the other represents the general ups and downs periods. In the first stage when the market experiences drastic ups and downs, the sector indices tend to rise or fall together, and exhibit very close correlations between each other. In the second stage, however, much smaller correlations appear, and the stock price indices reflect the cyclical characteristics of the real sector economy.

Selection and peer-review under responsibility of the organizers of the 2013 International Conference on Information Technology and Quantitative Management

1. Introduction

According to the modern portfolio theory, when a group of securities are not perfect positive correlated, the yield can keep the same and the variance/risk is reduced by decentralized investment at the same time. Theoretically, the non-systematic risk can be reduced to zero by fully diversified investment. With the influence of this theory, many researches on correlations among stocks or stock groups have been made, mainly on correlations between stock markets of different regions, different styles or different sectors. The correlation among the stocks affects the investor's investment risk and return, and help people better understand and evaluate China's securities objectively at the same time.

_____

* Corresponding author. Tel.: +86-010-82680927;
E-mail address: longwen@ucas.ac.cn.

King (1966) is the first one who finds that industry factors have a significant impact on the stock price. Schwartz and Altlnan (l973) used the test of Kendall's coefficient of concordance studying the co-movements of the volatility of the stock price index of the U.S. industries. The results indicated that some industries had a higher volatility than some others, and this relationship kept stable in all of the stages. Livingston (1977) found that up to 26% volatility of equity shares could be explained by industry factors. Roll (1992) found that industry concentration was a significant factor in global stock market correlation and diversification benefits. Colm Keamcy and Valeri Poti (2005), using France, Germany, Italy, the Netherlands and Spain's stock price indexes from 1993 to 2002, analyzed the correlation of the stock markets in Europe with the DCC-MVGARCH model. They calculated the return and risk of portfolio in the five countries, and the results demonstrated that the correlation among stock markets in the same countries performed asymmetry in the case of good and bad news, which meant that national factor was not the main contributor to stock index volatility. Besides, investors were suggested to choose some industry indexes in European market to reduce investment risks. Meric et al. (2008) studied the portfolio diversification implications of the co-movements of sector indexes in the US, UK, German, French, and Japanese stock markets in bull and bear markets, and found the difference between investing in the same industry in different countries and investing in different industries within the same country.

There also existed some researches on correlations in stock markets in China.

Pengfei Guo and Chaojun Yang (2004) studied the A-stock listed companies' monthly performance and stock price behavior characteristics according to industry classification, and tested the Industry Effects by performance and stock return and risk. Correlation analysis and regression analysis were conducted using the share revenue, company performance and risk. The results demonstrated that companies' performances were significantly different within different industries, while there was no noticeable difference about share revenue and risk. Share revenue had no correlation with company performance, while had a significant positive correlation to risk, say, approximately, 25.3% of the volatility of share revenue can be explained by this.

Lanzeng Lao and Yumin Shao (2005), using the test of Kendall's coefficient of concordance, analyzed stock price indexes of all industries in Shenzhen, in order to investigate the possible stability and consistency in the order of short-term volatility in various industries. The empirical results indicated that the order the market-related part in volatility of the various industries is not stable. To some extent, it confirmed that the stability of the systemic risk of Shenzhen market was relatively poor compared with mature markets.

Genming Zhang and Fujun Ren (2006) analyzed the fluctuation characteristics of industry segment in Chinese securities market. In this study, it turned out that the industrial fluctuations, which kept stability in each cycle, had relationship with industrial characteristics.

Xiaoxin Chen and WeiZhong Chen (2007) analyzed the status quo and trends of the correlation among the major industries in Chinese stock market and the security market in Hong Kong, the United States and Japan, respectively. The results demonstrated that various industries in Chinese stock market had low correlation with the international correlation, but the correlation trend was generally increasing. The degree of the differences of international correlation to various industries was becoming large, demonstrating that the international economic and financial effects on China's various kinds of industries were increasingly different. The growth rate of different industries' international correlation was also different. The international correlation of financial, basic materials, technology, utilities and consumer services was relatively high, and the correlation's changes of utilities and consumer services are of relatively strong differences among different markets. Changhong Liang (2008) did some research on correlation of Sino-US industry stock indexes within same industries, and the factors which would affect the correlation, mainly including QFH holdings and overseas listing of Chinese enterprises. The study demonstrated that they did have correlation, of which the degree had the industry characteristics, between the Sino-US industry stock indexes. With the continuous development and improvement of capital markets in China and the world, the correlation between China and the United States industrial stock indexes would grow.