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Research on the Spillover Effect between the Same Resource Industries in the Chinese and American Stock Markets Based on the Trade Balance Algorithm

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ABSTRACT. Under the condition of economic globalization and financial market integration, with the development of international trade, transnational direct investment, capital flow and modern information technology, the information set on which capital market pricing is based should also be global. The liquidity of a good financial market must be quite sufficient. If the stock market shows insufficient liquidity, the market is lacking in popularity and will lead to abnormal transactions. The United States is the most developed economy in the world, which has a great influence on the global stock market, while China is the largest emerging market in the world, and the influence of Chinese stock market on international stock market is increasing day by day. China and the United States are the two major economies that attract the most attention in the world today, and the trade issues between the two countries have also been widely concerned by all countries in the world. Based on the trade balance algorithm, this paper studies the spillover effects of the same resource industries in China and the United States stock markets, in order to help the government prevent financial risks and make appropriate investment decisions for investors.

KEYWORDS: Capital market, Stock market, Trade balance algorithm, Spillover effect

1. Introduction

As China's economy becomes more and more open, the pace of integrating the capital market with the international market continues to accelerate. The establishment of a good liquidity market is a guarantee for the healthy operation of the financial markets of various countries. Since the 1980s, with the gradual advancement of financial globalization, financial crises based on the disappearance of liquidity have frequently occurred [1]. The stock market and the futures market are important components of the financial market. There is both competition and mutual promotion between the two [2]. Market information can be quickly transmitted between different financial markets in a short time. The benefits and risks of different financial markets also affect each other with the transmission of information. The scope of capital allocation is gradually expanding globally, and the process of global financial market integration is showing an unstoppable trend [3]. Due to the socialization of production, the deepening of the international division of labor and the development of information technology, market information can be quickly transmitted between different markets in a short period of time [4]. As one of the world's largest emerging securities markets, the rapidly developing mainland China stock market is playing an increasingly important role in domestic financing, improving resource allocation, promoting the reform of state-owned enterprises, and capital market construction [5]. Different financial markets are intertwined with factors such as rewards and risks, and the scope of capital allocation has gradually expanded beyond national boundaries to a global scale. The process of global financial market integration is showing an unstoppable trend [6]. China and the United States are the two most watched economies in the world today, and the trade issues between the two countries have also received extensive attention from countries around the world.

Under the conditions of an open economy, the stock market, as the core part of the financial market, internally assumes the function of optimizing the allocation of social capital. Under the background of economic globalization, the internal economic imbalance of any country will cause the external economic imbalance, which will affect the countries with close economic relations with it, and cause global financial turbulence [7]. In the context of global financial integration, the correlation between international stock markets is constantly increasing, and market risks can quickly spread across the stock markets of various countries. The relationship between the Chinese stock market and the US market in the development of the stock market attracts attention, and the relationship between the stock market is mainly observed by information transmission and spillover effects [8]. China's exports to the United States are mostly low-end cheap products, which will have a more obvious impact on the labor-intensive sunset industry in the United States during the economic recession, and it is also more likely to cause the United States to restrict and reject Chinese products [9]. Therefore, how to correctly view and deal with the Sino-US trade imbalance and analyze its causes has

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important historical and practical significance. Based on the trade balance algorithm, this paper studies the spillover effects between the same resource industries in the Chinese and American stock markets, hoping to help the government prevent financial risks and make appropriate investment decisions for investors.

2. Analysis on the Formation Mechanism of Volatility Spillover in Chinese and American Stock Markets

2.1 Financial Policy Perspective

Monetary policy is a kind of financial policy, which refers to the general name of various guidelines, policies and measures adopted by the central bank of a country to control or adjust the money supply and credit quantity in order to achieve its specific economic goals. Rational investors generally follow two criteria when making investment decisions, namely, maximizing profits or minimizing risks. Under the same conditions, rational investors will invest in assets with the greatest return or the least risk. With the increasing openness of the economy, the economic dependence of all countries is becoming stronger and stronger, especially among countries with strong economic dependence, there is a significant spillover effect of monetary policy. When the price of a resource industry in China's stock market is impacted, investors will sell this asset share in order to spread the portfolio risk, and at the same time buy the asset share of another resource industry in the US stock market, so that the price change of this resource industry in China's stock market will be transmitted to another resource industry in the US stock market. If the correlation coefficient between the yield of one resource industry in Chinese stock market and that of another resource industry in American stock market is small, investors will build them into a portfolio according to the portfolio selection theory, because this portfolio has the least risk. Figure 1 shows the transmission path of monetary policy.

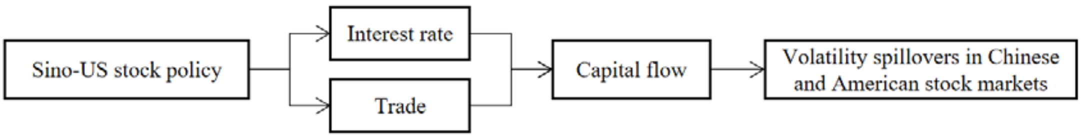

Fig.1 Transmission Path of Monetary Policy

Driven by the constantly improving capital market, the high-tech industry represented by Silicon Valley has quietly emerged, prompting the American economy to achieve industrial upgrading. The influence of interest rate changes in the United States on the international market is obvious. With the advancement of interest rate marketization in China, the financial dependence between China and the United States has gradually increased. The change of one country's interest rate will inevitably lead to the cross-border flow of capital between the two countries, and then affect the change of interest rate in another country, which will eventually lead to fluctuations in the returns of the two countries' stock markets. American stock market is a model of mature capital market in the world, while Chinese stock market is the representative of the emerging capital market which is constantly reforming and developing. The reform and opening-up policy implemented in the late 1970s initiated the transformation of China's economy from a planned system to a market system, and also promoted the emergence and development of the capital market in China [10]. While commodities are circulating across international markets, capitals of various countries will also be transferred between international markets. Through trade cooperation between the two countries, capital flows in the two countries. When more capital flows into the country, there will be more funds to participate in the stock market, thus improving the liquidity of the stock market.

2.2 Investor Perspective

Investors' trading behavior in the stock market is an important factor that directly affects the fluctuation of the stock market. Especially in the current era of advanced communication technology and continuous innovation of financial derivatives, the psychological expectations of investors are playing an increasingly important role in the stock market. In an open capital market, the prices of the stock market resource industry will be affected by exchange rates, commodity prices, and investor expectations. In the era of economic globalization, the stock market has become extremely sensitive due to the rapid transmission of information. The moment a piece of information is released on the market, the stock market responds quickly, resulting in greater risks to the stock market. The rapid growth of institutional investors has improved the investor structure of the capital market and changed the mainstream investment model of the capital market. The long-term value investment concept has begun to be widely recognized in the Chinese capital market. When the U.S. economy changes, the U.S. stock market will cause corresponding fluctuations, and Chinese investors who have received the information that the U.S. economy has changed will renew Chinese listed companies through changes in the U.S. economic situation. It is estimated that this will change the investment strategy of Chinese investors. According to the portfolio selection theory, investors should choose assets with small or even negative correlation coefficients to construct investment portfolios [11]. The correlation coefficients of certain resource commodities between the Chinese and American stock markets are relatively small, so investors can allocate funds among resource commodity industries with small correlation coefficients to reduce risks. The stock markets of the two countries are related to the volatility of the stock markets of the two countries due to the change of investors' strategic behaviors. The stronger the ability of investors in the two cities to re-expect due to economic changes, the more significant the transmission effect of this volatility.

3. The Transmission Effect of Liquidity Spillover in Chinese and American Stock Markets

In financial market, the research on the correlation between market and financial products has always been the focus of scholars' attention. When a variable is impacted, the impulse response function can not only reflect the impact on its current and future values, but also reflect the impact on the current and future values of other variables. The scale of bond market is increasing, the market trading rules are gradually improved, the futures market is recovering, the opening-up of China's capital market is advancing, and the internationalization process has made new progress. With the continuous advancement of securities marketization, the openness of the stock market is also increasing, and the factors affecting stock fluctuations are becoming more and more complex. The American market is already a mature market, and the influence of its stock market on China's stock market is self-evident. With the rapid development of economy, China's correlation with American stock market is getting stronger and stronger, and it is converging with the market environment faced by American stock market. The change of stock market in either country will cause the change of investment environment and investment confidence in the other country's stock market.

Assuming that the innovation sequence $\{e_t\}$ of k asset liquidity obeys the mean value of 0, the covariance matrix is the multivariate normal distribution of H_t, and these k assets are also independent and identically distributed white noise processes, namely: r_t is The information set at time t, the dynamic correlation structure is set as:

$$r_t = u_t + e_t \quad (1)$$

$$e_t | \Omega_{t-1} \sim N(0, H_t) \quad (2)$$

$$H_t = D_t R_t D_t \quad (3)$$

$$Q_t = \left(1 - \sum_{m=1}^{M} a_m - \sum_{n=1}^{N} \beta_n\right)\overline{Q} + \sum_{m=1}^{M} a_m\left(\varepsilon_{t-m}\varepsilon_{t-m}^{'}\right) + \sum_{n=1}^{N} \beta_n Q_{t-n} \quad (4)$$

$\overline{Q} = T^{-1}\sum_{t=1}^{T}\varepsilon_t\varepsilon_t^{'}$ is an unconditional variance matrix of standardized residuals. $R_t = \left(Q_t^*\right)^{-1} Q_t \left(Q_t^*\right)^{-1}$, Q_t^* is the number on the diagonal of Q_t.

$$Q_t^* = \begin{bmatrix} \sqrt{q_{11}} & 0 & \dots & 0 \\ 0 & \sqrt{q_{22}} & & \\ \dots & \dots & \dots & \dots \\ 0 & 0 & \dots & \sqrt{q_{kk}} \end{bmatrix} \quad (5)$$

R_t is the dynamic correlation coefficient matrix, $D_t = diag\left(\sqrt{h_{it}}\right)$,

$D_t = diag\left(\sqrt{h_{it}}\right) h_{ii,t} = \omega_i + \sum_{p=1}^{p_i} a_{ip} e_{it-1}^2 + \sum_{q=1}^{Q_i} \beta_{iq} h_{it-q}$. $\varepsilon_t^{'} = D_t^{-1} e_t$ represents the standardized residual, a_m and β_n are called the coefficients of the model, $\overline{Q}$ is the unconditional variance of the matrix representing the standard residual, the elements in R_t are: $\rho_{ij,t} / \sqrt{q_{ii,t} q_{jj,t}}$, and the Q_t matrix is composed of $q_{ii,t}$, $q_{jj,t}$.

The Chinese securities market is constantly developing and improving, and the development structure of the US securities market has become more and more similar. The Chinese and US securities markets have gradually formed a corresponding relationship. Investors with different identities have different effects on the volatility of the stock market. The participation of different investors in the stock market also increases the risk of return in the stock market. In order to further promote the reform, opening up and stable development of the capital market, the State Council issued a release in every year and month. Since then, China's capital market has carried out a series of reforms and various basic systems have been further improved. With the economic development of the Chinese and American stock markets, more and more investors are entering the two stock markets to trade at the same time, which has gradually increased the volatility spillover between the Chinese and American stock markets [12]. In the context of global economic and financial integration, the correlation between different stock markets will continue to increase. The yield and volatility of one country’s stock market will affect other stock markets, and the spillover of such returns and volatility may be asymmetric. With the deepening of the marketization of securities, the speed of receiving market information by the securities market has become faster, and the content obtained has become more abundant. When the securities market of other countries fluctuates, its information will be transmitted to my country's securities market more quickly, so that my country's stock market will respond to this information accordingly.

4. Conclusions

Under the conditions of an open economy, the stock market, as the core part of the financial market, internally assumes the function of optimizing the allocation of social capital. This article analyzes the formation mechanism and transmission mechanism of the volatility spillover effect of the Chinese and American stock markets from different perspectives, and analyzes the current situation and characteristics of the volatility spillover effect of the Chinese and American stock markets. From the perspective of income spillover effects, there is inconsistency in the mutual income spillover effects between the Chinese and American stock markets. The US stock market has a significant positive impact on China, while the Chinese stock market has an insignificant spillover effect on the US stock market. Through trade cooperation between the two countries, capital flows between the two countries. When more capital flows into the country, there will be more capital to participate in the stock market, which will increase the liquidity of the stock market. Investors with different identities have different effects on the volatility of the stock market. The participation of different investors in the stock market also increases the risk of return in the stock market. China's remarkable progress in global economic status and the construction of the basic system of the stock market has increased the spillover effect of the Chinese stock market on the US stock market. The degree of integration between my country’s capital market and the world’s capital market is increasing.

References

[1] Yang Xin. A Comparative Study on the Spillover Effects of Sino-US Stock Market and Futures Market. Fujian Finance, vol. 398, no. 06, pp. 26-33, 2018.

[2] Sha Nan. Research on the Asymmetric Prediction Ability and Spillover Effects of Jumping Risks in Sino-US Stock Markets. Quarterly Journal of Finance, vol. 012, no. 002, pp. 117-140, 2018.

[3] Xie Jiaquan. Research on the structural transformation of risk spillovers in the Chinese and American stock markets under the background of the stock market disaster. Operations Research and Management, vol. 026, no. 002, pp. 127-134, 2017.

[4] Yang Baochen, Zhao Liang. Non-linear dynamic characteristics of liquidity spillover effects between China's stock market and bond market. Technical Economy, vol. 034, no. 009, pp. 61-67, 2015.

[5] JBissoondoyal-Bheenick E, Brooks R, Chi W, et al. Volatility spillover between the US, Chinese and Australian stock markets. Australian Journal of Management, vol. 43, no. 2, pp. 263-285, 2018.

[6] Liu Zhenwei. The agglomeration and spillover effects of cultural industries in China and the United States. Statistics and Decision, vol. 034, no. 019, pp. 154-157, 2018.

[7] Sun Y, Hsiao C, Li Q. Volatility Spillover Effect: A Semiparametric Analysis of Non-Cointegrated Process. Econometric Reviews, vol. 34, no. 1-5, pp. 127-145, 2015.

[8] Wu Qingyan. Research on Technology Spillover Effects of Intra-industry Trade in Manufacturing Industries between China and the United States. Modern Commercial Industry, vol. 37, no. 21, pp. 39-41, 2016.

[9] Balcilar M, Hammoudeh S, Toparli E A. On the risk spillover across the oil market, stock market, and the oil related CDS sectors: A volatility impulse response approach. Energy Economics, vol. 74, no. 8, pp. 813-827, 2018.

[10] Apergis N, Voliotis D. Spillover effects between lit and dark stock markets: Evidence from a panel of London

Stock Exchange transactions. International Review of Financial Analysis, vol. 41, no. 10, pp. 101-106, 2015.

[11] El Ghini, Ahmed, Saidi, Youssef. Return and volatility spillovers in the Moroccan stock market during the financial crisis. Empirical Economics, vol. 52, no. 4, pp. 1481-1504, 2017.

[12] Deng Chuang, Xu Man. Research on the Spillover Effect and Transmission Mechanism of China-US Financial Cycle Fluctuations. Contemporary Finance, no. 10, pp. 58-70, 2019.