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Financial liberalization and stock market cross-correlation: MF-DCCA analysis based on Shanghai-Hong Kong Stock Connect

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HIGHLIGHTS

- Multifractality of Shanghai stock market is smaller after this connect program.
- Cross-correlation between Shanghai and Hong Kong stock markets gets stronger.
- Long-range correlation contributes to the multifractality of cross-correlation.

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ABSTRACT

Based on the implementation of Shanghai-Hong Kong Stock Connect in China, this paper examines the effects of financial liberalization on stock market comovement using both multifractal detrended fluctuation analysis (MF-DFA) and multifractal detrended cross-correlation analysis (MF-DCCA) methods. Results based on MF-DFA confirm the multifractality of Shanghai and Hong Kong stock markets, and the market efficiency of Shanghai stock market increased after the implementation of this connect program. Besides, analysis based on MF-DCCA has verified the existence of persistent cross-correlation between Shanghai and Hong Kong stock markets, and the cross-correlation gets stronger after the launch of this liberalization program. Finally, we find that fat-tail distribution is the main source of multifractality in the cross-correlations before the stock connect program, while long-range correlation contributes to the multifractality after this program.

1. Introduction

Since 1970's, emerging markets conducted a series of financial liberalization reforms to remove their capital controls and open up their financial markets, aiming to enhance the efficiency of resource allocation and international competitiveness. However, it is still controversial when it comes to the effects of financial market openness on local stock markets. Although numbers of developing countries have removed restrictions on foreign portfolio investment and achieved a substantial improvement in both financial markets and real economy, many countries still worry that the opening of financial markets to foreign investors could make them vulnerable to potential volatile swings and risk contagion, especially in the context of financial crises such as financial crisis of 1990s in Mexico and Southeast Asia, and the most recent financial crisis in 2007.

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In their eyes, as domestic stock markets integrated into global financial markets, the comovements of stock returns may become stronger and finally result in global financial crises through risk contagion.

There also exists a heated debate in literature on its costs and benefits of financial markets openness. Some doubt the consequence of financial market openness as they believe it will cause high volatility and lead to increased financial fragility and crises [1,2]. Other studies confirm the benefits from financial market openness such as attracting foreign investment [3], decreasing firms' cost [4], boosting economy growth [5], regulating domestic financial markets [6], sharing risk among cross-border as Efficient Market Hypothesis (EMH) suggests [7], and argue that high volatility is irrelevant to financial market liberalization [8,9].

As the second largest economy, China has undergone a gradual establishment and development to liberalize its financial markets. Recently, the Chinese government launched the Shanghai-Hong Kong Stock Connect on Nov 17, 2014, allowing investors both in Shanghai and Hong Kong to buy certain securities listed on the other side's stock exchange. This move is considered to be a breakthrough to open up China's domestic financial market and also an important milestone in the development of Hong Kong, since it gives global funds far easier access to shares in mainland China by removing the requirement for an investment license. However, it remains unclear whether the stock market in mainland China becomes more correlated with Hong Kong stock market and gets integrated into the global financial market after this financial liberalization reform. This is quite pivotal both to policy makers and to investors.

The implementation of Shanghai-Hong Kong Stock Connect provides us with a great opportunity to examine the effects of financial market opening for several reasons. First, the former financial markets opening-up transitional arrangements are usually unidirectional and only allow foreign investors who meet certain qualification to invest domestic securities. However, Shanghai-Hong Kong Stock Connect program endows investors both in Shanghai and Hong Kong to buy certain securities listed on the other side's stock exchange, suggesting that it allows bidirectional capital flows rather than unidirectional capital flows. Second, before the implementation of Shanghai-Hong Kong Stock Connect program, only qualified foreign institutional investors (QFII) can invest directly in mainland China's stock markets, or only qualified domestic institutional investors (QDII) can buy stocks abroad. In contrast, Shanghai-Hong Kong Stock Connect program seems to cater to retail investors rather than to institutional investors, as it allows global investors, both retail and institutional, to purchase stocks in mainland China or Hong Kong stock markets. However, since institutional investors and retail investors are quite different in scales of funds, process of investing decisions, and their trading behavior, the findings of previous studies [10–12] focusing on trading scheme such as QFII may not really apply to the case of this stock connect program.

Moreover, previous studies on financial liberalization are usually in the framework of EMH and mainly focus on the linear correlation between different stock markets [13–15]. However, the limitation of EMH lies in its ability to explain real market situations, since the financial markets display properties of multifractality [16–18]. In the realm of Fractal Market Hypothesis (FMH) proposed by Mandelbrot [19], methods such as rescaled adjusted range analysis (R/S) [20,21], detrended fluctuation analysis (DFA) [22,23] and multifractal detrended fluctuation analysis (MF-DFA) [24] are developed to analyze fractal features of financial markets [17,25–27]. Besides, the detrended cross-correlation analysis (DCCA) [28] and multifractal detrended cross-correlation analysis (MF-DCCA) [29] are proposed and widely used in literature to study non-linear cross-correlation between financial markets [30–38].

In this paper, we mainly focus on the impact of financial liberalization on stock markets comovement from the perspective of multifractality, based on the implementation of Shanghai-Hong Kong Stock Connect. We begin by employing MF-DFA method to examine the multifractal properties of Shanghai stock market and/or Hong Kong stock market, and utilize MF-DCCA to investigate the cross-correlation between the two markets. In addition, we divide our sample into two sub-periods according to the initiation date of Shanghai-Hong Kong Stock Connect, i.e. pre-program period and post-program period. By comparing the multifractality degree for a certain market in two periods, we are able to detect the effect of stock connect program on the corresponding market's efficiency separately. Moreover, by further looking into the changes of multifractal properties of cross-correlation after the implementation of such trading link, we examine the effect of this trading link on the two markets' cross-correlation. Finally, we investigate the source of multifractality in the cross-correlation between the two markets.

Our paper fulfills existing literature in the following aspects. First, to the best of our knowledge, this paper is the first one to investigate the effect of Shanghai-Hong Kong Stock Connect program on market efficiency and cross-correlation between the two markets, which is quite pivotal to both policy makers and investors. By employing MF-DFA and MF-DCCA, we show that the two stock markets exhibit stronger co-movement after the implementation of Shanghai-Hong Kong Stock Connect program.

Second, it provides further evidence of the influence of bidirectional financial market openness. We utilize the implementation of Shanghai-Hong Kong Stock Connect to investigate the potential influence of bidirectional financial market openness. Previous studies [39,40], in comparison, usually focus on financial openness schemes that are often unidirectional or restricted to qualified institutional investors. In contrast, Shanghai-Hong Kong Stock Connect is bidirectional and accessible to both retail and institutional investors. Hence, our findings help to fulfill the existing literature by thoroughly investigating the effect of this bidirectional financial liberalization.

Third, it extends literature on stock market correlation within the framework of FMH. Previous literature related to stock market correlation usually focuses on comovement of international stock markets in the setting of EMH [13–15]. However, a plethora of studies argue that financial markets display properties of multifractality and Chinese stock markets are also multifractal [16–18]. Thus, it is crucial to investigate the nonlinear correlation between two financial markets with the