

The impact of capital market opening on China's stock liquidity -- Empirical analysis based on Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect

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Abstract. Taking the listed companies in Shanghai stock market from 2011 to 2017 and the listed companies in Shenzhen stock market from 2013 to 2019 as samples, this paper uses the ratio of the absolute value of daily return to the daily turnover to measure the stock liquidity, and uses the double difference method to test whether the capital market opening has a significant impact on the liquidity of China's stock market. The results show that the opening of the capital market is conducive to improving the liquidity of the stock market, and the effect of Shenzhen stock market is more obvious.

Key words: Shanghai Stock connect, Shenzhen Stock connect, liquidity.

1. Introduction

In order to promote the interconnection of the capital markets of the mainland and Hong Kong, China launched the Shanghai Hong Kong stock connect trading mechanism in November 2014. It has realized the mutual exchange between Shanghai Stock Exchange and Hong Kong stock exchange, and realized the two-way opening of China's capital market for the first time. As a major institutional innovation in the capital market, "Shanghai Hong Kong stock connect" conforms to the needs of investors, widens the investment channels of enterprises and residents, and is of great significance to optimize capital allocation and improve the capital market system. On the basis of the success of Shanghai Hong Kong stock connect pilot, Shenzhen Hong Kong stock connect was opened on December 5, 2016. The opening of "Shenzhen Hong Kong Link" has changed the situation that foreign investors can only invest in stocks listed on Shanghai Stock Exchange, and further deepened the reform of capital market. Under the Shanghai Hong Kong Stock Exchange and Shenzhen connect Hong Kong Stock Exchanges Mechanisms, Compliance Investors on the mainland and Hong Kong can buy and sell the underlying shares of the other Party Stock Exchange through local brokers, which has a significant impact on China's stock market.

Similar to cross listing and issuance of depository receipts in other markets, the opening of domestic capital market is also an important means to realize cross-border transactions of domestic listed enterprises and expand the capital market to integrate into the international financial market. Moreover, the opening of domestic capital market has brought foreign investors to listed companies, changed the investor base and the structure of domestic listed companies, and had a great impact on the liquidity of domestic stocks. However, there is no consistent conclusion about the impact of cross-border transactions and foreign investors on the stock liquidity of domestic listed companies. Some studies believe that cross-border trading and foreign investors' holding of stocks will improve the liquidity of stocks, but others hold opposite opinions. The main reasons for the differences are as follows: first, the economic results of cross-border transactions and foreign ownership of listed companies depend on the domestic institutional background and market environment; second, the cross-border listing of listed companies, the issuance of depository receipts and other cross-border transactions, as well as the shareholding decisions of foreign investors are endogenous. In order to accurately identify the impact of cross-border transactions and the liquidity of shares held by foreign investors, the above two factors must be fully considered. Therefore, for the specific capital market and the specific method of opening, whether it affects the stock liquidity of the domestic market is still a problem that needs empirical test.

This paper mainly studies the data of domestic listed companies before and after the implementation of the Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect policies, and uses the double difference model to explore the impact of capital market opening on the liquidity of the domestic stock market, as well as the changes in the sensitivity of stock returns to liquidity.

2. Literature Review

Since the implementation of Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect, it has been widely concerned by the academic circles. Previous studies have analyzed the impact of foreign investors' entry on China's stock market from multiple perspectives. Liu Haifei et al. (2018) found that the Shanghai Hong Kong connection can reduce volatility of the price of shares on the mainland and reduce market risk [10]; Lian Lishai et al. (2019) believe that the entry of foreign investors can improve the efficiency of stock pricing in the mainland market [9]. Qingjun et al. (2020) believe that opening up the capital market can strengthen the negative correlation between liquidity and debt default risk, and maintain market stability.

On the other hand, although domestic scholars have done a lot of research on the Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect, there are few literatures on the impact of these two policies on China's economy from the perspective of stock liquidity.

Based on the existing literature on the impact of foreign shareholders' Shareholding on the host country, on the one hand, foreign capital can bring advanced management skills, marketing experience and human resource training knowledge to domestic enterprises. In addition, foreign capital flows can diversify the shareholders of domestic companies, share the risks and increase the liquidity of stocks [1]. On the other hand, if there are no mature financial institutions and appropriate financial regulation policies, the international capital flow will expose the local stock market to international risks and make the domestic economy more vulnerable. At the same time, because foreign investors have more information about the international capital market, the holding of foreign shareholders will increase the degree of information asymmetry, and then lead to the decline of stock liquidity [7].

Therefore, Based on the comprehensive influence of the above factors, this paper attempts to explain the changes of China's stock market before and after the implementation of Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect from the perspective of stock liquidity. This paper has a certain practical significance: first, most of the domestic literature focuses on the policy of Shanghai Hong Kong stock connect, few people compare the policy of Shanghai Hong Kong stock connect with Shenzhen Hong Kong stock connect. This paper analyzes the two capital market opening systems successively implemented in China, and uses the double difference model to compare the similarities and differences in the effect of the two policies; second, it provides a reference for the future evaluation of Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect. Thirdly, China's stock market is more active than developed countries and other developing countries, such as the United States, Japan, etc., which meets the market characteristics of high participation and serious speculation of retail investors. The in-depth study of liquidity can provide a reference for the analysis of such market characteristics.

3. Hypothesis

The Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect allow ordinary investors in Hong Kong and qualified ordinary investors in the mainland to directly invest in stocks across the border. The expansion of their investor base and the two-way open trading mechanism directly bring about the growth of trading volume in the mainland stock market. Traditional theories and empirical studies show that, with other conditions unchanged, the increase of trading volume will improve stock liquidity by reducing the inventory cost of liquidity providers [12]. In addition, the

introduction of Hong Kong investors is conducive to enhancing investors' risk-taking ability, stimulating investors' competition to buy stocks, and thus increasing investors' trading demand. The opening of capital market and the holding of shares by foreign investors can also improve the quality of stock information and information environment, speed up the dissemination of information, strengthen information disclosure, so as to improve stock liquidity. However, on the other hand, compared with the mature Hong Kong stock market, the imperfect regulatory system and market system in the mainland make the mainland stock market face more event risks in the future. The existence of event risks may make some investors unwilling to enter the market, resulting in the insufficient thickness of the endogenous market and the decrease of liquidity. To sum up, the influence of Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect on liquidity is comprehensive, which needs to be concluded through empirical research. Based on this, we make a hypothesis,

H0: The opening of Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect has increased the liquidity of stocks.

H1: The opening of Shanghai Hong Kong stock connect and Shenzhen Hong Kong stock connect has decreased the liquidity of stocks.

4. Method

4.1 Sample Selection

In order to study the policy of Shanghai Hong Kong stock connect, this paper selects the companies listed on the Shanghai Stock Exchange from 2011 to 2017 as the research sample, and the sample interval is one month. The underlying stocks of Shanghai Stock connect are regarded as the control group, and the stocks not included in Shanghai Stock connect are regarded as the experimental group. In the sample, the enterprises with more financial and data missing are excluded. After screening, 3980 sample observations were obtained. In order to study the policy of Shenzhen Hong Kong link, this paper selects the companies listed in Shenzhen Stock Exchange from 2013 to 2019 as the research sample, and the sample interval is one month. The underlying stocks of Shenzhen Stock Exchange are regarded as the control group, and the stocks not included in Shenzhen Stock Exchange are regarded as the experimental group. After screening, 7948 samples were obtained. Data are from Guotai Junan database. The data processing software used in this study is stata15.0.

4.2 Measurement of Liquidity

This paper uses the method of Amihud (2002) to measure illiquidity: the ratio of the absolute value of daily return to the daily turnover [2].

$$ILLIQ_{i,t} = |R_{i,t}| / VOLD_{i,t}$$

Where $R_{i,t}$ is the daily yield of the i -th stock on the T -day, and $VOLD_{i,t}$ is the transaction amount of the i -th stock on the T -day. This ratio is the price change caused by the transaction amount per unit, reflecting the effect of the order size on the price. The larger the value of $ILLIQ$, the lower the liquidity of the stock. Since the sample interval is one month, we use the monthly average illiquidity index $ILLIQ_{i,y}$.

$ILLIQ_{i,y} = \frac{1}{D_{i,y}} \sum_{t=1}^{D_{i,y}} ILLIQ_{i,t} = \frac{1}{D_{i,y}} \sum_{t=1}^{D_{i,y}} (|R_{i,t}| / VOLD_{i,t})$, Where $D_{i,y}$ are the trading days of the i th stock in Y month.

4.3 Empirical Model

This paper uses the following double difference model to identify the impact of Shanghai Hong Kong stock connect policy on stock liquidity

$$ILLIQ_{i,y} = \alpha_i + \alpha_y + \beta Policy_{i,y} + \gamma Control_{i,y} + \epsilon_{i,y}$$

Among them, Policy_{it} is the dummy variables of whether company I is affected by the policy in year T. when company I is included in the underlying stock of Shanghai Stock connect at time y, this variable is taken as 1, otherwise it is taken as 0. α_i is industry fixed effect, α_y is time fixed effect, Control_{it} are series of control variables, and ϵ_{it} is random error terms. Regression coefficient β reflects the impact of policy on stock liquidity, which is the focus of this paper.

4.4 Control Variable

In this paper, based on Xu Shoufu (2020) and the actual situation, we set a series of control variables [15], including:

- (1) Size: the natural logarithm of the book value of the company's total assets;
- (2) Stock price (lnprice): the natural logarithm of the daily average closing price of the company's stock in a month;
- (3) Monthly stock return rate (ROR): The average value of the daily average rate of return of the company's stock every month;
- (4) Volatility: monthly standard deviation of daily return on company shares.

5. Regression Results

Variable	Obs	Mean	Std. Dev.	Min	Max
illiq_m	3,989	.0609216	.5996578	.000616	21.70564
policy	3,989	.4715468	.4992523	0	1
size	3,989	16.57852	.9648821	14.418	19.306
lnprice	3,989	2.933428	.805001	.705	5.819
volatility	3,989	.0277648	.014739	.0001	.0985
ror	3,989	.0206621	.1945084	-.547415	3.6

Figure 1. Shanghai Stock connect data statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
illiq_m	7,948	.1429421	1.92943	.000399	105.5094
policy	7,948	.1387771	.3457355	0	1
lnprice	7,948	3.240433	.6421773	.8659	5.7859
volatility	7,948	.0311452	.0157851	0	.1414
ror	7,948	.0379999	.240659	-.592526	5.728147

Figure 2. Data statistics of Shenzhen Stock connect

illiq_m	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
policy	-.0451405	.0218443	-2.07	0.039	-.0879675	-.0023134
size	-.012955	.0107459	-1.21	0.228	-.0340231	.008113
lnprice	-.0302231	.0131416	-2.30	0.022	-.0559881	-.0044581
volatility	4.152612	.7086595	5.86	0.000	2.763242	5.541983
ror	1.422844	.0435834	32.65	0.000	1.337396	1.508292
year						
2012	-.0721044	.0677309	-1.06	0.287	-.2048949	.0606861
2013	-.1383769	.0662312	-2.09	0.037	-.2682273	-.0085265
2014	-.1434733	.0653581	-2.20	0.028	-.2716118	-.0153347
2015	-.1290699	.0653134	-1.98	0.048	-.2571208	-.001019
2016	-.0479409	.0631452	-0.76	0.448	-.171741	.0758592
2017	-.0255846	.0618648	-0.41	0.679	-.1468744	.0957051
industry						
2	.0936745	.0395871	2.37	0.018	.0160616	.1712873
3	-.0175	.0426488	-0.41	0.682	-.1011155	.0661155
5	-.0093218	.0296548	-0.31	0.753	-.0674617	.0488182
6	.0809167	.0552354	1.46	0.143	-.0273757	.1892092
_cons	.3045649	.1942793	1.57	0.117	-.0763315	.6854613

Figure 3. The regression results of Shanghai Stock connect

The coefficient of the variable policy in the first column of the figure above is significantly negative, which indicates that the illiquidity index of the stock market has decreased after the implementation of the policy, indicating that the liquidity has increased.

illiq_m	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
policy	-.1866193	.0722074	-2.58	0.010	-.3281647	-.0450739
lnprize	-.0809882	.0328942	-2.46	0.014	-.1454696	-.0165068
volatility	4.626043	1.477466	3.13	0.002	1.72982	7.522265
ror	3.753405	.0810123	46.33	0.000	3.5946	3.91221
year						
2014	.0273227	.0719856	0.38	0.704	-.113788	.1684334
2015	-.0796226	.0748489	-1.06	0.287	-.2263461	.067101
2016	.1847578	.0669052	2.76	0.006	.053606	.3159096
2017	.3305046	.07261	4.55	0.000	.1881698	.4728394
industry						
2	.1657599	.1213356	1.37	0.172	-.0720899	.4036096
3	-.0022634	.2614763	-0.01	0.993	-.5148257	.5102989
4	.0506432	.2333503	0.22	0.828	-.4067848	.5080712
5	.0695646	.1170986	0.59	0.552	-.1599794	.2991086
6	.0621671	.1556208	0.40	0.690	-.2428905	.3672247
_cons	-.0783564	.148341	-0.53	0.597	-.3691439	.212431

Figure 4. Regression results of Shenzhen Stock connect

The coefficient of the variable policy in the first column of the figure above is also significantly negative. Therefore, we can think that the liquidity of the stock market has improved significantly after the opening of Shenzhen Hong Kong stock connect. In addition, we notice that the absolute value of the coefficient at this time is greater than the coefficient in the regression analysis of the impact of the opening of Shanghai Hong Kong stock connect on stock liquidity, so we can think that the promotion effect of the opening of Shenzhen Hong Kong stock connect on stock liquidity is more obvious.

6. Conclusion

Liquidity is very important in stock pricing. Low market liquidity will increase the financing cost of enterprises, which is not conducive to the development of enterprises. Compared with the early 20th century, the degree of opening up of China's stock market has increased significantly. However, on the whole, there is still a lot of room for improvement.

In promoting the opening up of the capital market, China has gradually liberalized. Whether it is the Shanghai Hong Kong Stock Exchange or the Shenzhen Hong Kong Stock Exchange, it is an important step for China, Promote the internationalisation of RMB and the opening up of capital movements. With the continuous expansion of the opening of the capital market, China's capital market will further expand the two-way capital flows. Foreign capital can invest directly in China's stock market to inject capital into the development of Chinese companies. Domestic investors also have the opportunity to gain a foothold in the international capital market in order to balance the distribution of assets. As regards whether more foreign capital flows into the domestic market or more domestic capital flows, this is a dynamic balancing process. It is difficult to estimate the net capital flow over a given period. However, through this analysis we can be sure that the liquidity of the domestic stock market has increased after the capital opening.

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