

## **Liberalization and Interaction among China's Stock Markets: A Re-visit<sup>+</sup>**

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### **Abstract**

This paper studies the liberalization and interactions among five Chinese stock indices, i.e. A shares and B shares in both Shanghai and Shenzhen stock exchanges and H shares in Hong Kong Stock Exchange from 1992 to 2009. The changes of policies usually affect stock market's performance in some aspects and attract much attention. Correlation analysis among the indices and their returns has been conducted. It is found that liberalization has increased the degree of interaction among Chinese stock markets. Increase interaction between markets means that information transmission among the markets will be more active and in both directions. Hence, these activities will reduce the asymmetric information in a particular market and lead the Chinese stock markets towards market efficiency.

*Keywords:* liberalization, interaction, China, stock markets

*JEL classification:* F36, G15, G18, O16

### **1. Introduction**

Under the planned economy in the 1960s and 1970s, the government controlled the entire financial system in China. The state-owned banks provided credit and payment services to the industries and businesses. There are retail banks to let the people put their savings in the bank. With the development of open economy, China's financial industry has also been improved immensely. A modern financial system was formed in China where commercial banks are the major players, with the central bank's policies as its core, and a variety of financial institutions co-exist.

The central bank of China, namely the People's Bank of China, set the monetary policies for the country. With the modernization, besides the government banks, there are also commercial banks, independent financial institutions and capital markets. However, the financial system is still

dominated by banking (Naughton, 2007). The banks as the intermediary are taking the savings from the people and investing them in the businesses. Meanwhile, the capital markets are still undeveloped relatively where the Chinese seldom invested directly in the firms. As a commitment to World Trade Organization (WTO), foreign banks are allowed to provide services to the people in China from December 2006.

Stock market as one of the key players in today's economics has brought immeasurable impact to the modern economy. The history of modern China's stock market is still young relatively. The establishment of modern China's securities market started in 1986. In August of 1986, the transfer of the enterprise bonds began to pilot in Shenyang. In September, Shanghai started the stock trading counter.

This paper attempts to review the liberalization in China's stock markets and revisit the interaction between these markets with more updated data. The rest of the paper is organized as follows. Section 2 overviews the stock markets of China, Section 3 reviews some literatures, Section 4 describes the data and methodologies. The empirical findings are discussed in Section 5 and Section 6 concludes the paper.

## **2. Overview of Chinese Stock Markets**

The Shanghai Stock Exchange (SHSE) was opened on 19th December 1990, followed by the Shenzhen Stock Exchange (SZSE) on 3rd July 1991. At the early stage, the listed shares were mainly the Renminbi (RMB) common share which is known as A shares. Since the beginning of 1992, the RMB special share, called B shares, was listed in SHSE. As at December 2008, there are 864 companies listed in SHSE. These companies are likely state-owned companies, and many of them have monopoly powers in the domestic market. However, the number of the companies listed in SZSE has reached 740 in December 2008. Compared to the companies listed in SHSE, most of them are smaller, joint ventures and export-oriented (Kim and Shin, 2000).

With the accession to WTO, China is moving forward steadily as the stock markets are opened to international investors. At the end of April 2005, China started its equity division's reform, which means that the government authorized state-owned shares and other forms of shares that cannot be traded in the past to be listed in the stock markets. This reform set a basis of improving the stock market system and the operational mechanism. The equity division's reform not only resolves the historical issues of stock market, but also promotes the market's growth.

The changes of policies usually affect stock market's performance in some aspects and attract much attention. Since the end of 1970s, with the economic take-off and trades explosion, the Hong Kong stock market experienced great

development. The Hong Kong government has adopted a series of financial liberalization policies to attract foreign banks and large multinational financial institutions to invest in Hong Kong. Hong Kong's financial industry has entered a new era, developed rapidly and is moving towards modernization, diversification and internationalization. In March 2000, the Hong Kong Stock Exchange<sup>1</sup> (HKSE) was formed, which is a merging of the Stock Exchange of Hong Kong, Hong Kong Futures Exchange Ltd. (founded in 1976) and Hong Kong Securities Clearing Company Ltd. (founded in 1989). HKSE provides various services such as companies listing, stock trading, clearing and settlement, information services and market supervisions. In May 2000, there are seven NASDAQ shares listed and traded in HKSE, which is the first stock exchange which provides NASDAQ shares traded in Asia.

Table 1 provides some general information of SHSE, SZSE and HKSE as a comparison. It is noted that HKSE has the largest number of listed companies followed by SHSE and SZSE. This may be due to the fact that HKSE has the longest history and is more matured among the three. Furthermore, the trading volume and the index of HKSE are higher than the other two stock markets. However, HKSE has the lowest P/E ratio. The market capitalization and total value of share trading of SHSE are the highest; it is always being considered to be in a leading position in China's stock markets.

A unique feature of China's stock markets is that dual listing is not allowed but a listed company can issue two types of shares, i.e. A share and B share. China's stock markets are divided into A shares and B shares for the needs of different investors. The official name of A shares is "RMB common stock" while B shares is "RMB special stock". A shares are quoted

Table 1 Summary Statistics of Three Stock Exchanges  
(as at 31st December 2008)

	SHSE	SZSE	HKSE
Number of listed companies	864	740	1261
Market capitalization (USD millions)	1,425,354.0	353,430.0	1,328,768.5
Total value of share trading (USD millions)	2,600,208.6	1,248,721.8	1,629,782.3
Trading volume (millions)	1,620,724	781,979.4	2,245,148.7
P/E ratio	14.9	15.0	7.3
Index	1820	553	14387

Source: Data from World Federation of Exchange.

in RMB and offered to Chinese citizens who live in mainland China. On the other hand, B shares are quoted in US dollars if it is listed in SHSE and HK dollars if it is listed in SZSE. They are mainly offered to overseas investors. Trading in A shares are restricted to domestic investors only while B shares are available to foreign investors. Kim and Shin (2000) argued that this A-B shares regime was established mainly to limit foreign ownership of local enterprises which are the former stated-owned enterprises.

On 19th February 2001, the China Securities Regulatory Commission (CSRC) announced to authorize domestic residents to hold B shares' accounts with legal foreign exchange to trade B shares. Starting from March 2001, mainland Chinese can trade B shares officially. Both A shares and B shares are listed in SHSE and SZSE; namely, Shanghai A shares (SHA), Shanghai B shares (SHB), Shenzhen A shares (SZA) and Shenzhen B shares (SZB). Since June 1993, HKSE can list Chinese companies and their shares are called H shares. The Hang Seng China Enterprise Index (henceforth HSCE) is the official stock index for them (Kim and Shin, 2000). After Hong Kong's reunification with mainland China, H shares have also become an important part of China's stock markets. H shares (HKH) are the local companies that registered in mainland China and listed in HKSE. It is denominated in Hong Kong dollars.

China's stock markets are policy-based markets. The central government plays a fundamental role in the stock markets. This is one of the main features in which China's stock markets are different from other major stock markets in the world. Although A shares and B shares have different target investors, they are affected by the same macroeconomic and political factors and policies, and both contribute to China's economy.

According to the efficient market hypothesis, any information regarding firm-specific will cause the same degree of price change for both A shares and B shares simultaneously. A shares' investors are mostly individual investors with less analysis ability than B shares' investors who are dominated by institutional investors. With the higher turnover rates and trading volumes, A shares markets are more active than B shares markets. Even though individual investors in A shares markets might be less capable of obtaining and analyzing new information than those in B shares markets, A shares prices might reflect more information collectively through the active trading of A shares investors (Kim and Shin, 2000, p. 99).

At the same time, due to Hong Kong's geographical proximity and its position as an international financial center, it is interesting to study the relationship among A shares, B shares and H shares. In addition, we examine the impact of some liberalization such as the return of Hong Kong to People Republic of China (PRC) and the permission of domestic investors' entrance into B shares on these relationships.

### 3. Literature Review

We know from the literature (e.g. Bailey, 1994; Chen and Su, 1998; Fernald and Rogers, 1998) that the prices of B shares are lower than the prices of A shares, which is contrary to the other segmented markets in the world. In other stock markets, the domestic investors spend less money to get the same shares than the foreign investors. But in China, there is a discount of approximate 40 per cent on the prices of B shares. Chakravarty *et al.* (1998) argued that it is due to the information asymmetry, which means that the foreign investors have less information on Chinese stocks than domestic investors. This information asymmetry is due to language barriers, different accounting standards, and lack of reliable information about the local economy and firms. Hence, B shares were underpriced relative to A shares when the foreign investors may not be able to make aggressive investment decision due to the information asymmetry.

Generally speaking, A and B shares do not have perfect integration. There are some evidences showing that informational asymmetry is positively related to the discount between A shares and B shares (Chen and Su, 1998). Similar to B shares, there is also discount of H shares to A shares. The possible explanation including information asymmetry between domestic and foreign investors, illiquid trading of H shares and diversification benefits from investing in H shares (Li *et al.*, 2004).

On the other hand, the lead-lag relationships between China's stock markets (A shares, B shares and H shares) have been investigated by several researchers. Kim and Shin (2000) found that lead-lag relationship among the five indices after 1996 are rather distinct from the counterparty before 1996. In addition, SZB have more power to impact other indices. Qiao *et al.* (2008a) showed that the causality relation among China's stock markets is quite complicated comparing with prior studies, which means there is strong nonlinear relationship among the five segmented markets in China.

Sjö and Zhang (2000) analyzed the information diffusion between A shares and B shares. They found a unique directional relationship from B shares to A shares in the short-run, but the results are different in the long-run. There is long-run information diffusion between A and B shares. In SHSE, there is long-run effect that B shares drive A shares while A shares drive B shares in SZSE.

Ahlgren *et al.* (2003) denoted A and B shares as being long-run cointegrated with each other in general. But cointegration is different for individual firms. It is found that after relaxing the restrictions of B shares purchase, A shares' price premiums have dropped off and become stationary. Tian and Wan (2004) showed that SHB and SZB cointegrated with each other for the period of 1993-1999. But A shares have no cointegration relation after

1996. HKH Granger causes SHB and SZB while SHB Granger causes all other indices for the post-1996 period.

On the contrary, Zhang *et al.* (2006) found no long-run relationship existed in A and B shares. However, the researchers deemed structural changes (the trading rules change of B shares and Asian financial crisis) cause the standard cointegration analysis to be biased. By employing sub-samples, dummy variables and error correction term in the model, they found evidence of long-run relationship existed between A and B shares. Shen *et al.* (2007) found that only SHA and SZA have cointegration for the whole period and first sub-period while SZA and SZB are cointegrated in the third sub-period only. They considered it as being due to the openness of B shares to Chinese citizens that made the markets more efficient.

Qiao *et al.* (2008b) showed that the six pairs of stock indices (HKH-SHA, SHB-SHA, SHB-HKH, HKH-SZA, SZB-SZA, and SZB-HKH) are fractionally integrated in the long-run. Furthermore, A shares in the two stock markets are the most powerful in whatever mean and volatility spillover effects. A shares have externalities of mean and variance upon B shares and H shares. The policy of opening B shares raised the correlation between A shares and B shares both in SHSE and SZSE, as well as accelerating the integration process of A shares and H shares.

As a summary, some studies showed that long-run relationship existed between A and B shares (Ahlgren *et al.*, 2003, Zhang *et al.*, 2006), but others considered Chinese stock indices as fractionally integrated (Qiao *et al.*, 2008b). However, many studies agreed that B shares became more influential relative to the other shares (Kim and Shin, 2000; Tian and Wan, 2004, and Qiao *et al.*, 2008a). The question of whether there is integration among China's stock markets remains controversial.

#### 4. Data and Methodology

Daily stock indices of both A and B shares from the SHSE and SZSE respectively, as well as H shares from the HKSE are used in this study. All data are closing prices which range from 5th October 1992 to 30th June 2009. This starting date is believed to be the earliest date where data for the SZSE are available. The sources of SHA, SHB, SZA and SZB are from the websites of SHSE and SZSE respectively, while HKH is collected from the Yahoo Finance website <<http://finance.cn.yahoo.com/>>. Figure 1 presents the time movements of these indices.

From the figure, we can see that the flows of these five indices are quite similar. Several fluctuations happened at the same periods, such as the 1997 Asia financial crisis and the 2001 technology bubble. Especially from the end of 2006, these five indices began to boom, and reached the highest points

Figure 1 Closing Price of Five Indices from 1992 to 2009

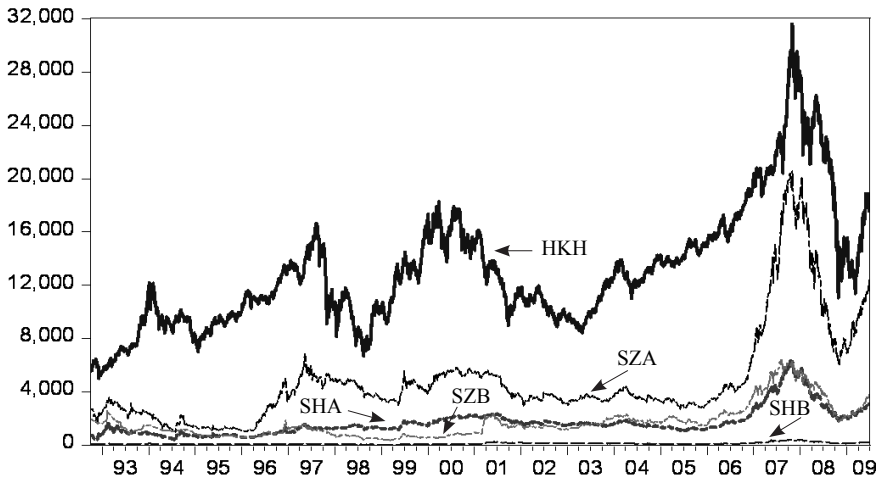


Table 2 Descriptive Statistics of the Five Indices

	HKH	SHA	SHB	SZA	SZB
Mean	13108.61	1668.95	102.60	4784.46	1684.24
Std. Dev.	4568.61	1016.03	70.25	3653.03	1247.90
Skewness	1.14	2.12	1.92	2.30	1.81
Kurtosis	4.47	8.19	6.78	8.47	6.06
Max	31638.22	6395.76	389.17	20587.72	6419.43
Min	4978.20	328.85	21.38	966.49	333.10

in the mid-2007. From the intuitive point of view, these indices show some relationships with each other.

Descriptive statistics of the five indices for the entire period are shown in Table 2. The starting points of SHA, SHB, SZA and SZB are 100 points while the datum point of HKH is 1000. Among the five indices, H shares have the highest mean and volatility while SHB has the lowest. What surprises us is that the means of SHA are just about 1669, which is lower than SZA and SZB even though between the years of 2006 and 2007, there was a big boom in China's stock markets. Furthermore, all indices have positive skewness and excess kurtosis. For the period of 13 years, SHB seems not to have moved much from its starting point of 100.

As the return of Hong Kong to PRC in July 1997 and the permission of domestic investors' entrance into B shares markets in February 2002 may affect the relationship among the stock exchanges, this study mainly focuses on investigating these two major events. The first sub-period is from 5th October 1992 to 30th June 1997; the second is from 1st July 1997 to 18th February 2001; and the third sub-period is from 19th February 2001 to 30th June 2009. All indices are transformed into natural logarithm before the analysis.

Investors are more concerned about the returns of their investment instead of the stock prices themselves. Hence, we also examine the relationship of the returns of these five Chinese indices. A summary of the descriptive statistics of the returns for the three sub-periods is reported in Table 3.

In the first period, all the four indices, except SZB, enjoyed the positive daily mean returns where HKH has the highest mean and SZB has the lowest. HKH also enjoyed the lowest standard deviation while SHA has the highest. Based on the modern portfolio theory, HKH outperformed the others in this period with the highest return and lowest risk.

Table 3 Descriptive Statistics of Stock Returns for Three Sub-periods

Period 1	HKH	SHA	SHB	SZA	SZB
Mean (%)	0.08	0.05	0.02	0.06	0.03
Std. Dev.	0.01	0.04	0.02	0.03	0.02
Skewness	-0.40	1.44	0.57	0.84	-0.65
Kurtosis	6.60	15.75	12.10	13.43	21.42
Period 2	HKH	SHA	SHB	SZA	SZB
Mean (%)	0.00	0.05	0.00	0.01	0.04
Std. Dev.	0.02	0.02	0.03	0.02	0.03
Skewness	0.24	-0.11	0.35	0.08	0.41
Kurtosis	10.37	8.44	5.36	7.64	6.10
Period 3	HKH	SHA	SHB	SZA	SZB
Mean (%)	0.01	0.02	0.04	0.04	0.07
Std. Dev.	0.02	0.02	0.02	0.02	0.02
Skewness	0.05	-0.04	0.01	-0.06	0.01
Kurtosis	12.65	7.41	7.51	6.69	6.80

Note: The first sample period is from 5th October 1992 to 30th June 1997; the second period is from 1st July 1997 to 18th February 2001; the third period is from 19th February 2001 to 30th June 2009.



In period 2, all returns decreased significantly mainly due to the impact of the Asian financial crisis. Both indices in SZSE and B shares in SHSE experienced negative mean returns. SHA is the only index that has been affected the least by the crisis or in other words its performance is quite stable.

In the third period, all indices have been recovered from the crisis and the mean returns become positive. Surprisingly, SZB has improved significantly with the highest mean returns. Both B shares are better performed than their counterparts, A shares in the respective market. Nevertheless, they also bear the higher risk. Furthermore, the negative skewness and excess kurtosis show that the returns are not normally distributed in average.

**5. Correlation and Interaction**

To reveal the correlation among the five Chinese stock indices, we conduct the correlation analysis among the indices and their returns. The results for three sub-periods are shown in Tables 4 and 5.

It is found that all correlation coefficients for the stock indices are significant in all three sub-periods. The correlation between HKH with other four indices has increased significantly from period 1 to period 2. In addition,

Table 4 Correlation Analysis of Stock Indices for Three Sub-periods

	HKH	SHA	SHB	SZA
Period 1				
SHA	0.15***	–		
SHB	-0.12***	0.47***	–	
SZA	0.23***	0.85***	0.41***	–
SZB	-0.30***	0.55***	0.77***	0.68***
Period 2				
SHA	0.63***	–		
SHB	0.52***	0.44***	–	
SZA	0.54***	0.68***	0.83***	–
SZB	0.46***	0.29***	0.96***	0.78***
Period 3				
SHA	0.74***	–		
SHB	0.50***	0.92***	–	
SZA	0.80***	0.97***	0.84***	–
SZB	0.91***	0.87***	0.67***	0.90***

Note: \*\*\* denotes significance at the 1% level.

Table 5 Correlation Analysis of Stock Returns for Three Sub-periods

	HKH	SHA	SHB	SZA
Period 1				
SHA	0.00	–		
SHB	0.14 <sup>***</sup>	0.24 <sup>***</sup>	–	
SZA	0.05 <sup>*</sup>	0.67 <sup>***</sup>	0.24 <sup>***</sup>	–
SZB	0.03	0.20 <sup>***</sup>	0.34 <sup>***</sup>	0.22 <sup>***</sup>
Period 2				
SHA	0.06 <sup>**</sup>	–		
SHB	0.27 <sup>***</sup>	0.45 <sup>***</sup>	–	
SZA	0.08 <sup>**</sup>	0.92 <sup>***</sup>	0.43 <sup>***</sup>	–
SZB	0.20 <sup>***</sup>	0.44 <sup>***</sup>	0.68 <sup>***</sup>	0.44 <sup>***</sup>
Period 3				
SHA	0.33 <sup>***</sup>	–		
SHB	0.28 <sup>***</sup>	0.74 <sup>***</sup>	–	
SZA	0.32 <sup>***</sup>	0.93 <sup>***</sup>	0.73 <sup>***</sup>	–
SZB	0.32 <sup>***</sup>	0.70 <sup>***</sup>	0.81 <sup>***</sup>	0.72 <sup>***</sup>

Note: \* (\*\*) (\*\*\*) denotes significance at the 10% (5%) (1%) level.

they are all with positive direction in period 2. This result clearly infers that the interaction between Hong Kong stock market and the stock markets in mainland China has been improved significantly after the reunion on 1st July 1997.

We also found that the correlation between A shares and B shares have been improved significantly from period 2 to period 3. The coefficients are close to perfect correlation with positive direction for the two pairs (SHA-SHB and SZA-SZB). Hence, it is confirmed with statistical evidence that the liberalization policies such as the relaxed restriction of local investors to trade B shares have improved the interaction between stock markets.

Table 5 reports the correlation coefficients for stock returns. In period 1, stock returns of HKH do not show strong correlation with others. However, they are more correlated in period 2 especially with B shares. The correlation coefficients of stock returns between A shares and B shares also increased significantly from period 2 to period 3. This evidence again supports our hypothesis that liberalization improves the interaction between segmented markets.

Our result is consistent with the previous studies in the literature. Kim and Shin (2000) explained that liberalization in the Chinese stock markets brought a bulky number of investors, domestic as well as foreign; this increased the

trading activities and interaction among stock markets. On the other hand, Zhang *et al.* (2006) argued that allowing domestic investors to invest in B share may brought more noise traders to the B shares' market. Shen *et al.* (2007) also indicated that liberalization strengthens the relationship between A shares and B shares, as they found that A shares are led by B shares since B shares is opened up to the Chinese investors.

## 6. Conclusion

Same as its economy, China's stock markets have been developed rapidly for a decade. This study re-examines the interaction among five Chinese stock indices: both A shares and B shares in SHSE and SZSE and H shares in the HKSE.

We summarize our findings into following: (1) the interaction among stock markets in China was little in the early stage. Trading in SHSE and SZSE were not active and the two stock markets were less efficient. (2) After the return of Hong Kong to PRC, the relationship between HKSE and the stock markets in mainland China has become closer. During the Asian financial crisis, HKSE suffered a huge bearish downturn. As the stock markets in mainland China are relatively less opened, the impact of the crisis are not as great as in HKSE. (3) Since the government allowed the purchase of B shares by local investors, the interaction of A and B shares has tighten. It obviously concludes that the participation of Chinese citizens into B shares promotes information diffusion between A shares and B shares, as well as both the stock exchanges.

Increase interaction between markets means that information transmission among the markets will be more active and in both directions. These transmission activities will reduce the asymmetric information in a particular market and lead the Chinese stock markets towards market efficiency. On the other hand, improvement in market integration means diversification investment among these five markets may not be as effective as the pre-liberalization stage as the abnormal profit and risk hedging will be reduced. Nevertheless, China's stock markets are policy-based, where the central government plays a fundamental role in the stock markets. Therefore, investors must take serious account of the government policies when analyzing China's stock markets.

## Notes

- + The author would like to thank Liu Yang for superb research assistance.
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