One Security, Two Prices:
Evidence on Stock Market Bubbles from the Shanghai-Hong Kong Stock Connect Program

Shantaram Hegde

Department of Finance
2100 Hillside Road
University of Connecticut
Storrs, CT 06269-1041
E-mail: shantaram.hegde@uconn.edu

Jin Peng*

Department of Finance
2100 Hillside Road
University of Connecticut
Storrs, CT 06269-1041
E-mail: jin.peng@business.uconn.edu

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Abstract

In this paper, a unique data sample from cross-listed stocks in two segmented but partially connected markets allows us to examine the implications of the bubble theories while controlling for fundamentals. We study price, volume, volatility and liquidity changes surrounding the launch of the Stock Connect program on 17 November 2014, which links trading in A shares listed on the Shanghai Stock Exchange (SSE) to their 'twin' (cross-listed) H shares traded on the Hong Kong Stock Exchange (SEHK). The price and price discovery gaps of the A-H shares should be larger after the Stock Connect if the speculative trading in Shanghai market explains most of the price differences. On the other hand, there should be a price convergence effect after the Stock Connect if the efficient market theories explain a fraction of the price disparity since information asymmetry and limits of arbitrage are reduced. Our analyses indicate a persistent, sharp increase in the price, volume, volatility, and liquidity of A shares relative to H shares, which dominates a general increase in the speed of convergence in these variables between the cross-listed shares lasting up to 15 months after the launch of the Connect program. These findings are consistent with the theoretical predictions of speculative demand shocks due to market overconfidence and trading bubbles.

Key words: Demand Shock, Speculative Bubbles, Cross-listed Stock, Law of One Price, Information Asymmetry, Limits of Arbitrage, Regulatory Restrictions, Price Discovery

JEL Classification: G12, G14, G15, G18

1. Introduction

Formulation of speculative bubbles in stock markets has attracted much attention in the literature at different historical stages. Peter Garber (2000) tries to explain for the three famous bubbles including the Dutch tulip mania, the Mississippi bubble, and the South Sea bubble from their fundamental values. Pastor and Veronesi (2006) explore the Internet bubble in the late 1990s. Lamont and Thaler (2003), Cochrane (2002) and Ofek and Richardson (2003) show high prices and trading volume in the technology industry. Miller (1977), Harrison and Kreps (1978), Morris (1996), Chen, Hong and Stein (2002), Scheinkman and Xiong (2003), Hong, Scheinkman, and Xiong (2006), Mei, Scheinkman, and Xiong (2009) claim that bubbles arise due to the joint effect of heterogeneous beliefs and short-sale constraints. The process includes both the optimism effect and the resale option effect. The price is biased upwards because it only reflects the beliefs of the optimistic investors as the pessimistic groups stay out of the market when the ability to short is limited, which is called the optimism effect. In addition, investors have the option to find a more optimistic buyer to sell their stocks to in the future, thus willing to pay a higher current price for the potential resale profit, which is labeled as the resale option effect.

The analysis of the bubbles is complicated since the fundamental value of financial assets is hard to measure. Academic literature has depended on laboratory experiments or special settings. In this paper, the cross-listed stocks in Chinese markets and the Shanghai-Hong Kong Stock Connect provide us a natural setting to verify the bubbles in the Mainland markets and to test the speculative theories. Securities of the same Chinese company are listed as A shares listed on the Shanghai Stock Exchange (SSE) and as H shares traded on the Hong Kong Stock Exchange (SEHK). The dual-shares have the same cashflow and control rights but A shares trade at a large price premium over H shares, mainly due to speculative bubbles in the Mainland stock market.

The A-H price premium and the bubbles in the Shanghai market arise from two major differences between the Shanghai and the Hong Kong market. First of all, short selling and margin trading constraints are tighter in the Mainland market compared to in the Hong Kong market. The China Securities Regulatory Commission (CSRC) did not permit margin trading and securities lending only until 2010 for the first time, according to the Fact Book on the SSE website. Under the program, CSRC approved 90 blue-chip securities for margin trading and securities lending including 50 from the Shanghai Stock Exchange (SSE) and 40 from the Shenzhen Stock Exchange (SZSE). The scope was enlarged to 180 individual stocks and 4 ETFs on December 5th, 2011 and extended to 400 on September 16th, 2013. Eligible list includes 400 stocks and 6 ETFs in early 2016. In the Hong Kong market, it has been more free and flexible to conduct short selling for a longer time. As early as January 1994, in line with the reform of the securities borrowing and lending regime, the Hong Kong Stock Exchange introduced a pilot scheme for regulated short selling. By January 27, 2003, 163 common stocks could be sold short. In early 2016, there are 876 stocks eligible for short selling. Secondly, over 70% of the investors in the Hong Kong market are mainly pessimistic institutional investors according to the fact book from the Hong Kong Stock Exchange website while more than 99% of Mainland investors are optimistic individual according to the China Securities Depository and Clearing Corporation statistical yearbook. The overconfidence and disagreements among the Mainland investors dominated by individuals drive up the speculative bubbles in the Shanghai stock market as documented in the literature.

Prior literature show that the speculative stock price bubbles exist in Chinese markets due to heterogeneous beliefs and short-sale constraints, which leads to steeper downward sloping demand curves (Hong, Scheinkman and Xiong (2006), Mei, Scheinkman, and Xiong (2009), Xiong and

Yu (2011), and Liu, Wang and Wei (2016)). In our setting, the slope of downward sloping demand curve in the Shanghai market should be steeper than the one in the Hong Kong market due to tighter short-sale constraints and sharper heterogeneous beliefs among retail investors in Mainland. In this environment, the price-to-demand shock sensitivity should be larger for A shares listed on SSE subject to more trading restrictions than that of H shares traded on SEHK. When there is a positive demand shock, a less divergence of opinion is needed in the future for reselling the stocks, resulting in a higher resale option value. The bubble component of the stock prices becomes larger as the resale option value increases with the demand shocks. Thus, we expect the market integration initiative via the Shanghai-Hong Kong Stock Connect program to introduce a speculative demand shock for both markets (The Connect brings more HK and foreign investors to SSE and Mainland buyers to SEHK) but the price appreciation effect for A shares should be larger relative to H shares due to the steeper demand curve and higher price-to-demand sensitivity, and formulate the following Speculative Demand Hypothesis: The launch of the Connect program increases speculative demand shocks in mainland China and Hong Kong, resulting in higher prices, trading turnover, volatility and liquidity in both markets but more for A shares listed on SSE relative to their 'twin' H shares listed on SEHK.

Some of the past studies, on the other hand, indicate that the price gaps between A and H shares are mainly due to information asymmetry and limits to arbitrage. For example, Shan, Paul and Ralf (2015), Chakravarty et al. (1998), Peng (2014), Fernald and Rogers (2002), and Chung, Hui and Li (2013) argue that the information access and processing abilities between Mainland and overseas investors are different, resulting in different valuations of the same firm due to asymmetric information and lack of channel for arbitrage. After the market integration, differences in the information access should be significantly reduced between the two markets as the investor groups

merge and there should be much less limits to arbitrage due to the channel provided by the Connect, leading to price convergence. However, the Stock Connect program is not a perfectly free channel for arbitraging the price gaps between the fundamentally identical A and H shares which are traded in two vastly different market centers with their own regulatory regimes and trading structures. In fact, there are still many regulatory restrictions embedded in the Connect program. For example, Mainland mutual funds were not allowed to enter the Stock Connect until May 27th, 2015. Meanwhile, investors need to have a portfolio of 500,000 yuan (about $80,000 as the minimum capital requirement) to participate in the scheme. Moreover, only eligible stocks can be traded via the Connect and trading will be suspended when "net buy" exceeds the aggregate or daily quota amount. Other restrictions include lengthy application process, complicated currency exchange process, margin trading restrictions, stock borrowing and lending (SBL) restrictions, covered short selling restrictions and so on.

In light of the many participant restrictions and trading constraints built into the Connect program, we construct the following "Price Convergence – Restricted Arbitrage Hypothesis": The introduction of the Connect program increases the speed of convergence in price, turnover, volatility and trading liquidity between A and H shares, but the program restrictions are likely to weaken the increase in convergence speed.

According to Scheinkman and Xiong (2003), Amihud and Mendelson (1986) and other papers, when price increases due to speculative bubbles, turnover, volatility and liquidity will all increase. In order to verify that the speculative trading of the domestic investors pushes up the A-share prices and explains the A-H price premium, we also develop our "Gap Correlation" hypothesis that the price gaps between A and H shares should be positively correlated with their turnover, volatility, and liquidity gaps.

Our findings are consistent with our hypotheses. First, we document that price, turnover, volatility and liquidity all increased in the Shanghai market more than in the Hong Kong market after the Stock Connect, confirming the Speculative Demand Hypothesis. Second, our tests also show that the speed of convergence in price and liquidity for the cross-listed stocks is improved by the market integration, especially by the regulatory relaxations, while the effect is not as strong in turnover and volatility. The price convergence effect due to the Connect program seems to play in role but is weakened by the program restrictions and is dominated by the speculative demand effect. The price gaps and the price discovery gaps of the cross-listed stocks end up growing bigger after the Connect but the rate of growth is decreasing, especially when the restrictions on the Connect program are loosened. Third, our results indicate that there is a significant positive correlation between the A-H share price gaps and their turnover, volatility, or liquidity gaps.

Liu, Wang and Wei (2016) is a closely related working paper compared to ours but our paper contributes in many ways quite differently from their work. For example, their paper focuses on the stock value change after the Connect in one single market, the Shanghai stock market. However, the Shanghai market should be more sensitive to price-demand change because of more constraints and more speculative trading compared to the Hong Kong market. Thus, rather than looking at the Shanghai market alone, we compare the two different financial markets by testing twin stocks and find that all the price discovery measures increased more in Shanghai than in Hong Kong after the Connect, resulting in larger price gaps and larger gaps of other price discovery measures. In addition, we report very robust results in both short term and long term scope up to 15 months after the Connect while Liu, Wang and Wei (2016) only find significant results in short-term windows within 20 days after the program. More importantly, we use serial correlation test to examine the impact of the Connect on

price convergence effect and find that the convergence speed of price and liquidity increased, especially when policy restrictions are loosened.

The remainder of this paper is organized as follows. Section 2 introduces the institutional background. Section 3 details the literature review and the hypothesis development. Section 4 explains the empirical methodology and reports the summary statistics. Section 5 discusses the results of the univariate tests and the serial correlation tests. Section 6 concludes.

2. Institutional Background

From the year 1993, many Chinese-located companies could list A-shares on the Shanghai Stock Exchange (SSE) and cross -list them as H-shares on the Stock Exchange of Hong Kong Limited (SEHK). However, the two markets were segmented because domestic Chinese investors could only trade A shares on SSE, while HK and overseas investors had very limited access to A shares. Even though Qualified Domestic Institutional Investors (QDIIs) were allowed to trade H shares from 2006 and Qualified Foreign Institutional Investor (QFII) could trade A shares from 2002, restrictions such as minimum capital requirements for investors and daily (or periodic) trading quotas were still very tight. A shares and H shares have the same voting rights and dividend payments, so they should have the same price due to the law of one price in the absence of frictions and barriers to intermarket trading between SSE and SEHK. However, SSE is an emerging stock market accessible to a far larger and rapidly growing pool of individual and institutional investors in mainland China and is subject to more rigorous capital controls and regulatory interventions. In sharp contrast, SEHK is relatively more mature and less regulated market open to and dominated by foreign investors, but it is less accessible to mainland investors. For

example, short-selling and margin trading have been allowed and active in the Hong Kong market since 1994 but have not been permitted in the Mainland market until 2010. Even after the government approves the short-sale and margin trade in the Shanghai market several years ago, there are restrictions such as the 500,000 RMB minimum capital requirement and the short-selling tools are not being used as much. the Hong Kong trading rules have implemented the same-day turnaround trading model “T+0” and there can be unlimited times of buying and selling on the same day while the Mainland market has the "T+1" trading system, which requires Mainland investors to hold their stocks for at least a day before selling again. Also, in Hong Kong's system, one can open an account with several brokers and several custody accounts, whereas in mainland China there is a designated broker and a single custody account. More productions like futures and options are available on the Hong Kong market but not as much on the Shanghai market. Trading will be suspended if any stock on the Shanghai market has a change of over 10% in their prices on the same day but there is no such restriction on Hong Kong market. Different market structure, investor group and information access have resulted in a persistent price premium for A shares over H shares, which is one of the most intriguing puzzles in the Mainland and Hong Kong financial markets. An aggregate measure of this price discrepancy can be seen in the Hang Seng AH Premium Index, an index that tracks the price premium of A shares over the cross-listed H shares for companies. This index has been above 100, for most of its history, indicating that A shares have been trading at a premium over the equivalent H shares. The Hang Seng AH Premium Index has ranged from 90 to 150 historically and the average value is 110.
In April 2014, the Chinese government announced a new policy, which aims at promoting the connection between the Mainland and Hong Kong markets. The scheme was launched on November 17th, 2014. Through this new scheme, both Hong Kong and overseas investors are allowed to

trade eligible A shares listed on SSE through the Shanghai-Hong Kong Stock Connect while mainland investors who satisfy the eligibility criteria were able to trade eligible H-Shares listed on SEHK through the Shanghai-Hong Kong Stock Connect ("the Connect"). Investors who hold an aggregate balance of not less than RMB 500,000 in their securities and cash accounts are permitted to trade in the Connect program. Eligible SSE-listed shares in the Connect include all constituent stocks from time to time of the SSE 180 Index and SSE 380 Index, and all SSE-listed A shares with the corresponding H shares listed on SEHK. Eligible SEHK-listed securities in the Connect are the constituent stocks of the Hang Seng Composite Large Cap Index and Hang Seng Composite Midcap Index, and all H shares with the corresponding A shares listed on SSE. The SH-HK Stock Connect creates for the first time a feasible, controllable and expandable channel for mutual market access between the Mainland and Hong Kong by a broad range of investors.

Compared to the exiting channels such as QFII[1] through which international investors can invest in the Chinese Capital Market, or QDII[2] through which mainland Chinese investors can invest in the Hong Kong stock market, the Shanghai-Hong Kong Stock Connect has lower transaction costs, higher trading quota and less restrictions in many ways. For example, according to the Investor Q&A brochure from the official website of the Shanghai-Hong Kong Stock Connect, in terms of eligible investors, QDII and QFII schemes are only for selected institutional investors but the Shanghai-Hong Kong Stock Connect is also open to individual investors.[3] In terms of quota, under

[1] Qualified Foreign Institutional Investor (QFII) Scheme is a transitional arrangement that allows institutional investors who meet certain qualification to invest in a limited scope of cross-border securities products, in the context of incomplete free flow of capital accounts.

[2] Qualified Domestic Institutional Investor, also known as QDII, is a scheme relating to the capital market set up to allow financial institutions to invest in offshore markets such as securities and bonds.

[3] Available at: http://www.hkex.com.hk/eng/market/sec_tradinfra/chinaconnect/Documents/Investor_FAQ_En.pdf

QDII, QFII and RQFII[4] schemes, quota is assigned to approved institutions respectively while the quota of the Stock Connect applies to the whole market rather than individual investors. Moreover, the SH-HK Stock Connect does not supplant other schemes such as QDII, QFII or RQFII, instead it co-exists with these schemes. Therefore, the establishment of Connect has truly bolstered integration between the Shanghai and Hong Kong market.

3. Literature Review and Hypothesis

Our paper contributes to the literature on demand shocks and their interaction with speculative trading. Mei, Scheinkman and Xiong (2009) and Xiong and Yu (2011) show that there exist speculative bubbles in Mainland China. Their arguments are based on the many papers that discuss on the joint effects of short-sales constraints and heterogeneous beliefs on stock prices and the positive association between trading volume and prices, such as Miller (1977), Harrison and Kreps (1978), Chen, Hong and Stein (2002), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006). When short-sale constraints exist, heterogeneous beliefs create speculative motives for investors. An asset owner can not only collect future asset cash flow, but also has the option to resell the asset to more optimistic investors than himself, thus making an additional profit. Thus, the more diverse the investors opinions are, the higher the trading turnover, the resale option value and the price. Hong, Scheinkman, and Xiong (2006) theoretically argues that speculative trading leads to steeper demand curves and higher price-to-demand sensitivity. Liu, Wang and Wei (2016) empirically documents that the connected stocks experienced increase in value, turnover and volatility within 20 days after the announcement of the Stock Connect compared to unconnected

[4] RQFII is the renminbi qualified foreign institutional investor scheme. Launched in December 2011 it allowed a small number Chinese financial firms to establish renminbi-denominated funds in Hong Kong for investment in the mainland.

stocks, which should be caused by the demand shocks from the Connect and the speculative trading environment in Shanghai. Our paper expands the testing window up to 15 months after the Connect launch day and compares more price discovery measures between the Shanghai and Hong Kong market by using 68 pairs of cross-listed stocks. We also discuss the change of the price gaps of A-H cross-listed stocks, which have been treated as a puzzle in Chinese market for a long time. We expect a larger impact from the speculative demand shocks on stock prices, turnover, volatility and liquidity in A shares listed in the Shanghai market compared to H shares traded in the Hong Kong market in both short term and long term windows.

Our paper also adds to the earlier studies on information asymmetry and limits to arbitrage. Previous literature has discussed much about price differences between securities with identical fundamentals to analyze the non-fundamental determinates of asset pricing. Many studies on price discovery find that the home market tends to lead price discovery for cross-listed stocks, such as Lieberman et al. (1999), Eun and Sabherwal (2003), Pascual et al. (2006), and Frijns et al. (2010). However, past studies specifically researching on Chinese equity market still show that the Hong Kong stock market leads the Shanghai stock market in price discovery for cross-listed A-H shares and the price discrepancy cannot be eliminated due to limits to arbitrage. Information asymmetry between domestic and foreign investors appear to lead to the price disparity between the A- and H-share Chinese markets. As Shan, Paul and Ralf (2015) put it, mainland investors have greater familiarity with mainland-based firms while foreign investors are more likely to be sophisticated institutional investors with greater knowledge of financial statement analysis and modern asset pricing models. Foreign non-Chinese investors also have a comparative advantage over domestic Chinese investors in the processing and utilization of firm-specific information because of stricter accounting standards, better investor protection, and less insider trading and because they receive

price-sensitive news more quickly than domestic investors. Thus, the cross-listed H-shares traded by foreign investors incorporate significantly more firm-specific information than their A-share counterparts traded by domestic Chinese investors. Investor sophistication appears to dominate investor familiarity in price discovery. Chakravarty et al. (1998) argue that the information received by onshore and offshore investors is different, and hence they will have different valuations of the same firm due to asymmetric information. Peng (2014) concludes that foreign institution fund flows in the Chinese A-share markets have a strong impact on future equity returns because of informational advantage. Fernald and Rogers (2002) conjecture that the apparently low expected returns of Chinese investors primarily reflect the lack of investment alternatives in China. Other factors may also be at work, such as a low domestic equity premium, expectations of a Chinese currency devaluation, or a sizeable home bias in foreign investment. Chung, Hui and Li (2013) revisit this price disparity puzzle focusing on parameter uncertainty. They state that in the presence of information asymmetry and market segmentation, investors have different views on a firm's asset volatility, and hence different valuations of the same reference firm. However, after the Stock Connect, the segmentation of investor base will gradually decrease since both mainland and HK investors are allowed to trade on both markets, which will lead to a price convergence effect of the two markets.

Another reason for the price gap is the huge imbalance between supply and demand of investment targets in mainland China. Chinese investors had limited access to any financial markets outside the Mainland China before the Connect and newfound investible wealth of the arising middle class in China lead to a high demand for stocks. Again, the Connect provides the growing investor group from mainland China access to new investment choices and the potential to diversify out of Mainland Chinese stocks over time.

The Stock Connect truly opens door for investors from both sides to go into the other market and this channel is unprecedented. Some other older trading policies like QFII, RQFII and QDII, are also channels through which international investors can invest in the Chinese capital market, domestic investors can trade in the Hong Kong market, and they share some similarities with the Stock Connect. However, the Stock Connect loosens many trading restrictions compared to the other channels and brings a much larger degree of market integration. For example, the Stock Connect allows SSE members, institutional investors and individual investors for HK Stock Connect trades and allows all Hong Kong and over-seas investors for Shanghai Stock Connect trades. However, other previous channels like QFII and RQFII select qualified institutional investors more strictly and do not accept individual investors. The quota of the Stock Connect applies to market as a whole while the QFII quota is allocated to each institutional investor and the RQFII quota is allocated to offshore regions. The eligible products for QFII and RQFII are RMB denominated products approved by CSRC and the Stock Connect expands the selected A and H share to a much longer list.

In a word, all reasons listed above such as information asymmetry and investment limitation are pushing the A-H premiums up and the old channels such as QFII were not good enough to arbitrage away the price gap. However, after the establishment of the Stock Connect, there should be less difference between the investor groups trading A-shares and H-shares since the Stock Connect has made both markets accessible to Hong Kong and Mainland investors. Hong Kong and foreign investors are mainly institutional investors with better information sources and processing abilities so they should lead mainland investors who are mainly individual investors in both markets. The difference in firm-specific information between A- and H-shares should be significantly reduced as the investor groups merge and there should be much less limits to arbitrage due to the channel

provided by the Connect, leading to a price convergence effect. In fact, Hang Seng AH Premium Index has been showing an A-H premium for a long time in the past and even reached a maximum value of 213% during the mainland China bull market in 2006-2007. However, in the 2015 mainland China bull market, the maximum value of the index was only 154% because of the Shanghai-Hong Kong Stock Connect.

At the same time, the convergence effect of the Stock Connect might not be as successful as hoped due to some regulatory restrictions. For example, investors need to have a portfolio of 500,000 yuan, or just over $80,000, to participate in the scheme. This regulation excludes a lot of investors and traders. Also, there are still operational issues for the Stock Connect to overcome. Constraints include participant qualification restriction, lengthy application requirements, limited stock choices, and complicated currency exchange process. Mutual funds were not allowed to participate in the Connect until six months after the Connect launch day. Mainland investors may lose 2 to 4 percentage during the currency exchange process. Aggregate and daily quota are strictly enforced so that markets will be suspended when "net buy" exceeds the quota amount. From the official website of the Connect Program, we can find other restrictions on margin trading restrictions, stock borrowing & lending (SBL) restrictions, covered short selling restrictions and so on.[5]

Thus, we formulate the following two hypotheses.

Hypothesis 1 (Speculative Demand Hypothesis):

[5]See at the website: http://english.sse.com.cn/investors/shhkconnect/faq/

The launch of the Connect program increases speculative demand shocks in mainland China, resulting in higher prices, trading turnover, volatility and liquidity for A shares listed on SSE relative to their 'twin' H shares listed on SEHK.

Hypothesis 2 (Price Convergence – Restricted Arbitrage Hypothesis):

The introduction of the Connect program increases the speed of convergence in price, turnover, volatility and trading liquidity between A and H shares, but the program restrictions are likely to weaken the convergence effect.

Lastly, this paper also contributes to the inter-listing, cross-listing and market integration literature. With the globalization of financial markets, an increasing number of firms has been listing their stocks on foreign exchanges. At the same time, stocks are also cross-listed in different stock exchanges within the same country. The impact of market integration on the stock markets has been examined in many existing works. For example, Foerster (1993), Domowitz et al. (1997), and Sofianos(1997) all documented increase in trading volume and liquidity after the global inter-listing. Hegde, Lin and Varshney(2010) found that cross listing on the NYSE and NASDAQ lowers transaction costs and improves liquidity for both markets by increasing trading volume and narrowing big-ask spreads. In our paper, cross listing on the Shanghai and Hong Kong stock exchange has been there for a while but the establishment of the Stock Connect truly brought market integration to the Chinese markets. The Mainland financial market is not entirely open to the outside world while the Hong Kong market is very well connected to the global market. Under such special circumstances, the new policy helps the Mainland stock market being connected to not only the Hong Kong market but also the whole stock market outside the country. Overseas funds gain access to the Chinese capital markets after the Connect and A-shares are added in the MSCI index recently. Thus, the Shanghai market should be getting closer

to the Hong Kong market not only in terms of pricing but also in other market performance measures. When the price gaps between the two markets are changing after the Connect, the price discovery measure gaps should be changing in the same direction too. Scheinkman and Xiong (2003) uses a continuous-time model to show the positive relation between trade frequency and speculative component of stock price. Fundamental uncertainty, proxied by volatility, stimulates investors' heterogeneous beliefs. They argue that resale option value increases as investors' overconfidence and asset volatility becomes larger. Investors also trade more frequently in that case and the speculative price bubble becomes larger. Price increase is accompanied by higher turnover and return volatility, which are both related to speculative trading. Amihud and Mendelson (1986) find that the observed market return increases with the stock's relative bid-ask spread. This positive relation reflects the compensation required by investors for their trading costs. It is reasonable to expect that investors would pay lower prices for stocks with greater illiquidity. We thus expect that the greater the difference in illiquidity between the A-share and foreign-share markets, the higher is the A-share premium.

Thus, we have the following hypothesis 3.

Hypothesis 3 (Gap Correlation Hypothesis):

Finally, we hypothesize that the price gaps between A and H shares should be positively correlated with the turnover, volatility, and liquidity gaps of the two markets.

4. Methodology

A. ***Univariate Test and Serial Correlation Test on Price Gaps and other Gaps***

For the first and second hypothesis in our paper, we start from univariate test to examine the change of price gaps and other price discovery gaps before and after the Connect Program. Then, we

follow Peng, Miao and Chow to (2007) to estimate the speed of price convergence using panel data on price gaps and other gaps between A and H shares of cross-listed companies before and after the Stock Connect program. Data is from Bloomberg Terminal database and we use the following serial correlation model:

$$\Delta q_{i.t} = \alpha_i + \beta q_{i,t-1} + \sum_{n=1}^{N} \varphi_n \Delta q_{i,t-n} + \varepsilon_{i,t} \qquad (1)$$

Where Δ is the first difference operator and $q_{i.t}$ is the logarithm of the A-H (contemporaneous) share price differential for the cross-listed stock i at time t, defined as:

$$q_i = \ln (Price_A/Price_H) = ln\ (Price_A) - \ln(Price_H) \qquad (2)$$

$$\Delta q_{i.t} = q_{i,t} - q_{i,t-1} \qquad (3)$$

The length of lags N, used to account for possible serial correlation in the error term as in a univariate augmented Dickey-Fuller test, can be determined by Campbell and Perron (1991)'s top-down t-test approach, which involves initially specifying a sufficiently long length of lags to the extent permitted by data and then sequentially eliminating the lags that are not significant. Central to the test of convergence is the estimated value of β. If $\beta \geq 0$, the price gap $q_{i,t}$ is non-stationary, implying persistent or explosive price divergence. A negative value of β suggests price convergence, and its magnitude indicates the speed of convergence.

In order to test out the price convergence effect after the Connect program and the restricted arbitrage effect due to the regulatory restrictions, we add four time dummies to augment model (1) as shown below:

$$\Delta q_{i.t} = \alpha_0 + \alpha_1 CD_{i,t} + \alpha_2 MID_{i,t} + \alpha_3 MID2_{i,t} + \alpha_4 MC_{i,t} + \beta_0 q_{i,t-1} + \beta_1 CD_{i,t} \times q_{i,t-1} +$$

$$\beta_2 MID_{i,t} \times q_{i,t-1} + \beta_3 MID2_{i,t} \times q_{i,t-1} + \beta_4 MC_{i,t} \times q_{i,t-1} + \gamma_0 CV_{i,t-1} + \sum_{n=1}^{N} \varphi_n \Delta q_{i,t-n} + \varepsilon_{i,t}$$

(4)

where $CD_{i,t}$ is a time dummy and equals 1 for post-Connect period (After the Connect Launch Date 11/27/2014) and 0 otherwise; $MID_{i,t}$ is another time dummy and equals 1 for post-Market Intervention period (After the Date 3/27/2015, mainland mutual funds are allowed to enter the Stock Connect, which boosts the quota usage dramatically); $MID2_{i,t}$ is a time dummy and equals 1 for the time period after the Second Market Intervention period (After the Date 7/1/2015, CSRC relaxes collateral rules and allows margin loans to be extended in Shanghai Market only) and 0 otherwise; $MC_{i,t}$ is a time dummy and equals 1 for Market Crash period of Shanghai and Hong Kong Stock Market (from 6/12/2015 to 9/1/1015) and 0 otherwise. $CV_{i,t-1}$ stands for firm characteristics: log market capitalization (SIZE), market to book ratio (M/B), return-on-assets (ROA), and leverage (LEV). Two important regulatory differences between SSE and SEHK lie in margin rules and short-sale constraints. The above tests use the MID2 dummy for the relaxation of margin trading. If there were regulations tightening margin rules, they should be considered as well. Moreover, the hypothesis development section emphasizes the role of short-sale restrictions in causing price bubbles, but the tests above do not include a variable for changes in short-sale rules.

When Model (4) is used for testing other (non-price) gaps, q stands for the A and H stock turnover (TR) gap (TRG= ln(TRA/TRH), A denotes A shares and H stands for H shares), the A and H 10-day stock return volatility (VOL) gap (VOLG = ln(VOLA/VOLH)), the A and H stock liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)), or the A and H stock information asymmetry (IA) gap (IAG = ln (IAA/IAH)).

Hang Seng AH Premium Index includes 58 largest and the most liquid AH companies. Only 50 of these companies are within the list of eligible stocks in the SH-HK Stock Connect since the

other eight A-shares are listed in Shenzhen Stock Exchange instead of Shanghai Stock Exchange. Besides the 50 pairs of A-H cross-listed stocks in the Hang Seng AH Premium Index, there are another 18 pairs of A-H stocks that are in the Stock Connect but not in the Index and we add these 18 pairs to the 50 pairs. We end up having 68 cross-listed firms. Each of these 68 companies has 2 shares, one traded on Shanghai Stock Exchange and the other one traded on Hong Kong Stock Exchange. In total, we have 136 shares, 68 on Shanghai Stock Exchange and 68 on Hong Kong Stock Exchange. Since Shanghai and Hong Kong Stock Exchanges have some differences in trading days, we delete those days when only one Stock Exchange is trading. We use Python to get almost four-year daily opening prices of the 68 cross-listed stocks from May 22nd, 2012 to February 19th, 2016 from Bloomberg. Then we use Stata to run the speed of price convergence model mentioned above, comparing the price gap change and the price convergence speed before and after the Connect. In fact, Shanghai Stock Exchange (SSE)'s trading time is from 9:30 am to 15:00 pm (GMT+8) while Hong Kong Stock Exchange (SEHK)'s trading time lasts from 9:30 am to 16:10 pm (GMT+8). In other words, SEHK's trading period starts at the same time as SSE but ends more than one hour later than SSE. In order to mitigate the problem of asynchronous trading, we use daily opening price instead of daily closing price when calculating price gaps.

Table 1 lists the 68 cross-listed firms' stock codes and company names. Panel A shows the 50 pairs that are in the Hang Seng AH Premium Index and Panel B includes the other 18 pairs that are not in the Index.

Table 2 documents the summary statistics for the stock prices. Panel A reports the mean, standard deviation, minimum, 25^{th} percentile, median, 75^{th} percentile and maximum of the daily opening price of A shares, "Pa", of the 68 A-H cross-listed firms from 5/22/2012 to 2/19/2016 before and after the Connect launch during the sample period, and another 6 shorter time windows are shown

in the appendix. Panel B reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the daily opening price of H shares, "Ph", of the 68 A-H cross-listed Firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period. Results for another 6 shorter time windows are reported in the appendix. All values are in Chinese Renminbi (RMB). Median A share price increases from RMB 4.46 before to RMB 8.95 after the Connect. The corresponding median H share prices are RMB 3.97 and RMB 5.02 (based on spot exchange rates between RMB and HK$), respectively. These median values indicate that A shares command a premium (i.e., overpriced) of RMB 0.49 from the pre-Connect period, which grows to RMB 3.93 during the post-Connect period. Conventional 'law of one price' arguments for fundamentally identical assets would suggest that an arbitrage involving buying the 'cheaper' H shares and simultaneously selling the 'overpriced' A shares would have been profitable (subject to trading costs and taxes) during both the pre- and post-Connect periods.

B. Gap Correlation Test between Price Discovery Gaps and Price Gaps

For the Hypothesis 3, we conduct a gap correlation test between price gaps and other price discovery gaps. The model is as below:

$$q_{i.t} = \alpha_0 + \beta_0 q_{i,t-1} + \beta_1 TRG_{i,t} + \beta_2 VOLG_{i,t} + \beta_3 LIQG_{i,t} + \beta_4 IAG_{i,t} + \gamma_0 CV_{i,t-1} + \sum_{n=1}^{N} \varphi_n \Delta q_{i,t-n} + \varepsilon_{i,t}, \qquad (5)$$

where q = ln ($\text{Price}_\text{A}/\text{Price}_\text{H}$) = ln ($\text{Price}_\text{A}$) − ln($\text{Price}_\text{H}$); TRG means the A-H turnover (TR) gap (TRG= ln(TRA/TRH)); VOLG means the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH)); LIQG means the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)); IAG means the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH)); $CV_{i,t-1}$ stands for firm characteristics: log market capitalization (SIZE), market to book ratio (M/B), return-on-assets

(ROA), leverage (LEV). Gap correlation test results of the impact of the price discovery gaps on the price gaps of A-H cross-listed stocks are shown in Table 10.

Daily turnover is calculated as the total value amount traded in RMB representing all trade prices multiplied by the number of shares relating to each price. For the volatility measure, we use 10-day volatility, which measures the risk of price moves for a security calculated from the standard deviation of day to day logarithmic historical price changes and equals the annualized standard deviation of the relative price change for the 10 most recent trading days closing price, expressed as a percentage. The liquidity measure here is quoted bid-ask spread, which equals ask price minus bid price. Higher spread indicates less liquidity. Information asymmetry measure is calculated as "Amihud's illiquidity = 1,000,000 × (absolute return) / (absolute daily closing price × daily volume)". All historical prices and volume used in this paper are adjusted to reflect spin-off, stock splits/consolidations, stock dividends/bonus, rights offerings/entitlement.

5. Results

A. Univariate Test and Serial Correlation Test on Price Gaps and other Gaps

Table 3 reports the summary statistics and univariate test results on the price gaps. Panel A reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the daily opening price gap "q" [q = ln $(Price_A/Price_H) = ln\ (Price_A) - \ln(Price_H)$] of the 68 A-H cross-listed firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period. Panel B shows the results of the univariate test on the daily opening stock prices of A shares and H shares and the price gaps between the A-H shares. In the appendix, we also report summary statistics and univariate tests for the price gaps 3 days surrounding the launch of Connect

in 2014, one week before and one week after the launch of Connect in 2014, one month before and one month after the launch of Connect in 2014, three months before and three months after the launch of Connect in 2014, six months before and six months after the launch of Connect in 2014, and one year before and one year after the launch of Connect in 2014. From Panel A, we find that the median price premium of A shares over H shares grows dramatically from 14% to 53% from the pre-Connect to the post-Connect period. Column 2 of Panel B shows that the median increase in A share prices in the emerging market of SSE from the pre- to the post-Connect window is 56%, more than twice of 25% for their 'twin' H shares traded in the developed SEHK over the same time intervals, see column 3. In column 4 we notice that the A share price premium over H share prices grows substantially by 75% after the Connect. Overall, all results in Table 3 show that mean and median price gap "q" increase after the Stock Connect and the larger average price gap is more due to a dramatic increase in A share prices in the less developed (and more controlled) SSE than the H share prices in the relatively more developed (and more open) SEHK. These results support our hypothesis 1 that the demand shocks brought in by the Stock Connect lead to a larger increase in price in SSE compared to SEHK due to speculative bubbles in the Shanghai market and steeper demand curve. It also verifies Hypothesis 2 that the price convergence effect from the Stock Connect should be weakened by the regulatory interventions associated with the Connect and leads to a higher price gap at the aggregate level after the Connect even though the gap increasing speed should be decreased. The speculative demand effect and arbitrage restrictions appear to dominate the price convergence effect.

In order to take a closer look at the price convergence effect and how it is overcome by the regulatory restrictions, we conduct a serial correlation test on the price gaps for the 68 cross-listed

stocks. Table 4 shows the results of the integrated serial correlation test, which indicates the impact of the Stock Connect and regulatory interventions on price convergence of A-H cross-listed stocks. In column (1), the β_0 coefficient for $q_{i,t-1}$ is negative and significant, indicating that there is a price convergence effect in our test window around the Stock Connect launch day. An 100% increase in price gap leads to a 0.27% decrease in the one period price gap change. The β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ is negative and significant, indicating that the mean speed of price convergence increases by 0.13% in the absolute value after the establishment of the Stock Connect, which supports our Hypothesis 2 that there exists a price convergence effect after the Stock Connect. The α_1 coefficient for $CD_{i,t}$ is positive and significant, indicating that average q increases post-Connect, which is consistent with our univariate test results and again supports our Hypothesis 1 that the speculative demand shocks increase Shanghai prices more than Hong Kong prices and result in a larger price gap. This also proves Hypothesis 2 again that the regulatory interventions are weakening the price convergence effect.

In column (2), we add time dummy MID which equals to 1 if it is after the market intervention date 3/27/2015 when mainland mutual funds are allowed to enter the Stock Connect. We expect this loosening regulatory intervention, similar to the launch of the Connect program, to strengthen the price convergence effect and increase the speed of price convergence. Consistent with this argument, the β_2 coefficient for $MID_{i,t} \times q_{i,t-1}$ is negative and significant, indicating that the arrival of mainland mutual funds into Connect increases the mean speed of convergence by 0.35% post-Connect. The β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ becomes positive and significant after adding MID, showing that the price convergence speed actually dropped by 0.24% before the loosening of the participant restriction. The price convergence effect appears to be offset by the regulatory restrictions at first and is playing a better role when the restrictions are not too

strong. The α_2 coefficient for $MID_{i,t}$ is negative and significant, indicating that the arrival of mainland mutual funds into Connect lowers the average price gap "q" by 0.32%.

In Column (3), we add control variables including 4 different types of firm characteristics: log market capitalization (SIZE), market to book ratio (M/B), return-on-assets (ROA), leverage (LEV). The results are very similar to Column (2). In Column (4), year fixed effects are added to capture macroeconomic factors and time dummies are removed to avoid multicollinearity problem. The results still remain the same and very robust.

In Column (5) and (6), additional two time dummies are added: $MID2_{i,t}$ equals 1 after 7/1/2015 when CSRC relaxes collateral rules and allows margin loans to be extended in Shanghai market only and 0 otherwise. $MC_{i,t}$ is a time dummy equal to 1 for market crash period of Shanghai and Hong Kong stock markets (from 6/12/2015 to 9/1/1015) and equal to 0 otherwise. The β_3 coefficient for $MID2_{i,t} \times q_{i,t-1}$ is positive but weakly significant, indicating that the second market intervention (less restriction on funding) lowers the speed of convergence by 0.24%, which means that capital requirement weakens the price convergence effect to a high degree after the second market intervention. The α_3 coefficient for $MID2_{i,t}$ is positive but weakly significant, indicating a small increase of 0.13% in the average price gap. The lower speed and larger gap might also be due to speculative demand shocks in Shanghai markets since the easing of collateral rule applies only to Shanghai Stock Exchange trades. The β_4 coefficient for $MC_{i,t} \times q_{i,t-1}$ is also positive and significant, indicating that the speed of price convergence slows down by 0.69% during the crash period, perhaps due to the shackles or restrictions associated with Connect. This coefficient is similar to that of $CD_{i,t} \times q_{i,t-1}$. The α_4 coefficient for $MC_{i,t}$ is negative and significant, implying that the during the stock market crash window (about 2.5 months) the

level of price gap decreases by 0.27%. Since the crash window falls within the post-Connect period, this drop in the average price gap seems to be due to the Connect program.

We not only examine the price gaps of the 68 cross-listed stocks, but also test other price discovery gaps of the 68 pairs of stocks. Similar univariate tests and serial correlation tests are conducted for the turnover, volatility, liquidity and information asymmetry gaps (gaps are calculated as the difference in logarithm values of trading turnover, volatility, liquidity, or information asymmetry of stocks cross-listed on SSE and SEHK) and the results are reported from Table 5 to Table 9.

Table 5 documents the summary statistics and the univariate test results on the turnover gap. Panel A reports the mean, standard deviation, minimum, 25^{th} percentile, median, 75^{th} percentile and maximum of the A-H turnover (TR) gap (TRG= ln(TRA/TRH)) of the 68 A-H cross-listed firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period. Panel B shows the results of the univariate test on the A-H turnover (TR) gap (TRG= ln(TRA/TRH)); Similar to the price gap, results show that the turnover measure in the two markets both increased after the Connect but the increase is higher in Shanghai market, leading to a larger turnover gap after the Connect program. At the median, the excess turnover in the A shares traded on the emerging SSE over their twin H shares listed on the relatively more developed SEHK is 14% during the pre-Connect sample period, but increases sharply to 197% over the post-Connect window. Column 2 of Panel B shows a sharp jump of 196% at the median in trading turnover in A shares as compared to 53% in H shares on SEHK. This indicates that after the Connect trading in the cross-listed stocks in the emerging Shanghai market where is dominated by mainland individual investors is far more active than the Hong Kong stock market where foreign and domestic institutions participate more actively.

Table 6 shows the summary statistics and the univariate test results on the volatility gap. Panel A reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH)) of the 68 A-H cross-listed firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period. Panel B shows the results of the Univariate Test on the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH)); Similar to price and turnover, results indicate that volatility measure increases after the Connect for both markets and there is a larger increase in the Shanghai market. A bigger volatility gap is found after the Connect, meaning that Shanghai market is even more volatile than HK market than ever before. At the median level, the volatility in the A shares traded on the emerging SSE is 11% below that of their twin H shares listed on the relatively more developed SEHK during the pre-Connect sample period. But the median price volatility in A shares increases sharply to 28% above that of H shares over the post-Connect window. Further scrutiny shows that the median increase in volatility in H shares over the pre- and post-Connect window is 33% whereas the corresponding increase in A shares price volatility in the emerging SSE is 69%.

Table 7 shows the summary statistics and the univariate test results on the liquidity (measured by percent bid-ask spread) gap between A and H shares. Panel A reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)) of the 68 A-H cross-listed firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period. Panel B shows the results of the univariate test on the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)). Negative gaps mean that the Shanghai market has a lower mean bid-ask spread than the Hong Kong market and is thus more liquid. Median bid-ask spread increases (correspondingly, trading liquidity decreases) for both markets after the Connect but it increases much more in the Hong Kong market and the increase degree is

7% for A shares and 22% for H shares. So, the liquidity gap in A and H shares increased after the Connect, indicating that the Shanghai market is much less illiquid than the Hong Kong market after the Connect. This improvement in the relative liquidity of A shares is consistent with the sharp increase in relative their trading turnover in SSE over that of H shares in SEHK, but it is inconsistent with the dramatic increase in their volatility.

Table 8 shows the summary statistics and the univariate test results on the information asymmetry gap. Panel A reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH)) of the 68 A-H cross-listed firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period. Panel B shows the results of the univariate test on the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH)). Recall that information asymmetry is measured by Amihud's illiquidity. Negative information asymmetry gaps between A and H shares mean that the Shanghai market has less information asymmetry and is more information efficient than the Hong Kong market. During the pre-Connect sample period, the median information asymmetry in A shares is 66% below that of H shares, which grows to 173% during the post-Connect interval. After the Connect, information asymmetry decreases in both markets but it declines more in the Shanghai market, a decline of 119% at the median in A shares as compared to just 19% in H shares. As a result, the gap increases after the Connect, and the Shanghai market seems to be more information efficient than the Hong Kong market after the Connect.

Table 9 shows the results of the integrated serial correlation test on the price discovery gaps, which indicates the impact of the Stock Connect and regulatory interventions on the price discovery convergence of A-H cross-listed stocks. Panel A is for the A-H turnover gap. In column

(1), the β_0 coefficient for $q_{i,t-1}$ is negative and significant (-0.0622, significant at 1%), indicating that there is a turnover convergence effect in our test window around the Stock Connect launch day. The β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ is insignificant, indicating that the mean speed of turnover convergence does not change much after the establishment of the Stock Connect. The α_1 coefficient for $CD_{i,t}$ is positive and significant (0.0756, significant at 1%), indicating that the average turnover gap increases post-Connect. This is consistent with the univariate test results that the Connect increases the average trading turnover more in A shares in the emerging SSE relative to H shares in the more developed SEHK. In column (2), we add time dummy MID and it is documented that the β_2 coefficient for $MID_{i,t} \times q_{i,t-1}$ is negative and significant (-0.0035 at 1% significance), indicating that the arrival of mainland mutual funds into Connect increases the mean speed of turnover convergence post-Connect. The α_2 coefficient for $MID_{i,t}$ is negative and significant (-0.0916 at 1% significance), showing that the arrival of mainland mutual funds lowers the average turnover gap "TRG". In Column (3), we find results very similar to Column (2) after adding firm characteristics as control variables. In Column (4), year fixed effects are included and the results are still robust. In Column (5) and (6), $MID2_{i,t}$ and $MC_{i,t}$ are added as additional time dummies. The β_3 coefficient for $MID2_{i,t} \times q_{i,t-1}$ is positive as 0.0096 but insignificant, indicating that the second market intervention (less restriction on funding stock trades in the mainland) does not affect much the speed of convergence. The α_3 coefficient for $MID2_{i,t}$ is negative and significant (-0.0676 at 1% significance), indicating a smaller turnover gap due to less capital restriction. The β_4 coefficient for $MC_{i,t} \times q_{i,t-1}$ is positive and significant (0.0425 at 1% significance), indicating that the speed of turnover convergence slows down during the crash period. This suggests much more increase in trading turnover in A shares over H shares during the market crash of 2015. This coefficient is similar to that of $CD_{i,t} \times q_{i,t-1}$. The

α_4 coefficient for $MC_{i,t}$ is positive and significant, implying that during the stock market crash window the level of turnover gap increased.

Panel B shows the results for the A-H volatility gap. In column (1), the β_0 coefficient for $q_{i,t-1}$ is negative and significant (-0.1244 at 1% significance level), indicating that there is a volatility convergence effect. The β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ is positive and significant (0.0122 at 10% significance level), indicating that the mean speed of volatility convergence decreases after the establishment of the Stock Connect. The α_1 coefficient for $CD_{i,t}$ is positive and significant (0.0404 at 1% significance), indicating that the average volatility gap increases post-Connect. A shares turn more volatile after the advent of Connect. In column (2), we add time dummy MID and the β_2 coefficient for $MID_{i,t} \times q_{i,t-1}$ is negative (-0.0097) and insignificant, indicating that the arrival of mainland mutual funds into Connect increases the mean speed of volatility convergence post-Connect. The α_2 coefficient for $MID_{i,t}$ is also negative and significant (-0.0102 at 1% significance), indicating that the arrival of mainland mutual funds into Connect lowers the average volatility gap "VOLG". In Column (3), we add control variables and in Column (4), year fixed effects are added. The results are similar. In Column (5) and (6), $MID2_{i,t}$ and $MC_{i,t}$ are added. The β_3 coefficient for $MID2_{i,t} \times q_{i,t-1}$ is negative and significant (-0.0312 at 1% significance), indicating that the second market intervention of loosening funding restrictions increased the speed of volatility convergence between A shares on SSE and H shares on SEHK. The α_3 coefficient for $MID2_{i,t}$ is negative and insignificant (-0.0012), indicating a decline in volatility gap due to less restrictive collateral rules. The β_4 coefficient for $MC_{i,t} \times q_{i,t-1}$ is different in sign for the last two columns and the α_4 coefficient for $MC_{i,t}$ is positive and significant (0.0587 at 1% significance), implying that during the stock market crash window the level of volatility gap increased.

Panel C shows the results for the A-H liquidity gap. In column (1), the β_0 coefficient for $q_{i,t-1}$ is negative and significant (-0.2389 at 1% significance level), indicating that there is a liquidity convergence effect. The β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ is negative and significant (-0.0323 at 5% significance level), indicating that the mean speed of price convergence increases after the Stock Connect due to stronger price convergence effect post-Connect, which supports our Hypothesis 2. The α_1 coefficient for $CD_{i,t}$ is negative and significant (-0.0469 at 1% significance level), indicating that the absolute value of the average gap decreases post-Connect. In column (2), we add time dummy MID. The β_2 coefficient for $MID_{i,t} \times q_{i,t-1}$ and the α_2 coefficient for $MID_{i,t}$ are both insignificant while the rest of results remain the same. In Column (3) and Column (4), the results turn out to be similar except that the β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ becomes positive and less significant. In Column (5) and (6), the β_3 coefficient for $MID2_{i,t} \times q_{i,t-1}$ is negative (-0.0280) and insignificant, indicating that the less funding restrictions does not change much the speed of convergence. The α_3 coefficient for $MID2_{i,t}$ is positive and significant (-.0414 at 5% significance level), indicating a larger liquidity gap after the funding conditions were improved. The β_4 coefficient for $MC_{i,t} \times q_{i,t-1}$ and the α_4 coefficient for $MC_{i,t}$ are both insignificant.

Panel D shows the results for the A-H information asymmetry gap. In column (1), the β_0 coefficient for $q_{i,t-1}$ is negative and significant (-0.1970 at 1% significance level), indicating that there is an information convergence effect. The β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ is negative and significant (-0.0497 at 1% significance level), indicating that the mean speed of information convergence increases after the Stock Connect, which supports our Hypothesis 2. The α_1 coefficient for $CD_{i,t}$ is negative and significant (-0.2982 at 1% significance level), indicating that the absolute value of the average gap decreases post-Connect. In column (2), the β_2 coefficient for $MID_{i,t} \times q_{i,t-1}$ and

the α_2 coefficient for $MID_{i,t}$ are both insignificant. In column (3) and (4), the results are similar except that the β_1 coefficient for $CD_{i,t} \times q_{i,t-1}$ becomes less significant in column (4). In column (5) and (6), the β_3 coefficient for $MID2_{i,t} \times q_{i,t-1}$ is positive but weakly significant (-0.0385 at 5% significance level), indicating that the second market intervention deceased the speed of convergence of information asymmetry associated with A and H shares. The α_3 coefficient for $MID2_{i,t}$ is positive and significant (0.1801 at 1% significance level), indicating a larger information gap due to less capital restriction. The β_4 coefficient for $MC_{i,t} \times q_{i,t-1}$ is positive but weakly significant (0.0266 at 10% significance level), indicating that the speed of information convergence slows down during the crash period, perhaps due to the restrictions associated with the Connect. The α_4 coefficient for $MC_{i,t}$ is insignificant.

B. ***Gap Correlation Test between Price Gaps and Turnover, Volatility, Liquidity or Information Asymmetry Gaps***

Table 10 shows the test results of the correlation between the price gaps and the trading turnover, volatility, liquidity or information asymmetry gaps of the A-H cross-listed stocks. The β_0 coefficient for $q_{i,t-1}$ is positive and significant for all columns (all are higher than 0.9 at 1% significance level), indicating that price gaps one-period ahead are positively correlated to price gaps in current period. The β_1 coefficient for $TRG_{i,t}$ is positive and significant for all columns, indicating that turnover gaps are positively correlated to price gaps. The β_2 coefficient for $VOLG_{i,t}$ is positive and significant, indicating volatility gaps are positively correlated to price gaps. The β_3 coefficient for $LIQG_{i,t}$ is positive and significant, indicating that liquidity gaps are positively correlated to price gaps. All the results above are consistent with our Hypothesis 3. The β_4 coefficient for

$IAG_{i,t}$ is negative and significant, indicating that information asymmetry gaps are negatively correlated to price gaps, which is puzzling to our knowledge and we will leave further analysis to future work.

6. Conclusion

In this paper, we try to examine whether the price gaps in the cross-listed stocks in the Shanghai and Hong Kong markets are shrinking due to the price convergence effect caused by the launch of the Stock Connect or still expanding due to the speculative demand shocks and the regulatory restrictions on the Connect. We also test how the gaps of the price discovery measures change after the Connect and how they co-move with the price gaps. Using the serial correlation model, we find that price convergence effect due to the Connect program seems to play as expected but is weakened in presence of strong regulatory regime and large demand shocks. The price gaps of cross-listed stocks still persist after the Connect but are increasing at a slower speed, especially when the restrictions on the Connect program are loosened. Similar patterns are found in the turnover, volatility, and liquidity gaps of the two markets and these price discovery measures are also documented to be positively correlated with the price gaps.

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Table 1: Company Names and Stock Codes for the 68 pairs of Shanghai and Hong Kong Cross-listed Shares

Panel A: Company Names and Stock Codes for the 50 pairs of Shanghai and Hong Kong Cross-listed Shares that are in the Hang Seng AH Premium Index		
Company Name	**A Share Stock Code**	**H Share Stock Code**
CMOC	603993 CG Equity	3993 HK Equity
CITIC Bank	601998 CG Equity	998 HK Equity
BBMG	601992 CG Equity	2009 HK Equity
Datang Power	601991 CG Equity	991 HK Equity
Bank of China	601988 CG Equity	3988 HK Equity
CCB	601939 CG Equity	939 HK Equity
China COSCO	601919 CG Equity	1919 HK Equity
Zijin mining	601899 CG Equity	2899 HK Equity
China Coal	601898 CG Equity	1898 HK Equity
CSCL	601866 CG Equity	2866 HK Equity
PetroChina	601857 CG Equity	857 HK Equity
CEB Bank	601818 CG Equity	6818 HK Equity
China Oilfield	601808 CG Equity	2883 HK Equity
China Comm Cons	601800 CG Equity	1800 HK Equity
CRRC	601766 CG Equity	1766 HK Equity
SH Electric	601727 CG Equity	2727 HK Equity
GreatWall Motor	601633 CG Equity	2333 HK Equity
China Life	601628 CG Equity	2628 HK Equity
MCC	601618 CG Equity	1618 HK Equity
Shanghai Pharma	601607 CG Equity	2607 HK Equity
CPIC	601601 CG Equity	2601 HK Equity
CHALCO	601600 CG Equity	2600 HK Equity
ICBC	601398 CG Equity	1398 HK Equity
China Railway	601390 CG Equity	390 HK Equity
NCI	601336 CG Equity	1336 HK Equity
Guangshen Rail	601333 CG Equity	525 HK Equity
Bankcomm	601328 CG Equity	3328 HK Equity
Ping An	601318 CG Equity	2318 HK Equity
ABC	601288 CG Equity	1288 HK Equity
GAC Group	601238 CG Equity	2238 HK Equity
China Rail Cons	601186 CG Equity	1186 HK Equity
Air China	601111 CG Equity	753 HK Equity
China Shenhau	601088 CG Equity	1088 HK Equity
Dongfang Elec	600875 CG Equity	1072 HK Equity
Haitong Securities	600837 CG Equity	6837 HK Equity
Shanghai Pechem	600688 CG Equity	338 HK Equity
Tsingtao Brew	600600 CG Equity	168 HK Equity
Anhui Conch	600585 CG Equity	914 HK Equity
Jiangxi Copper	600362 CG Equity	358 HK Equity
Baiyunshan Pharm	600332 CG Equity	874 HK Equity
Fosun Pharma	600196 CG Equity	2196 HK Equity
Yanzhou Coal	600188 CG Equity	1171 HK Equity
China East Air	600115 CG Equity	670 HK Equity
CM Bank	600036 CG Equity	3968 HK Equity
CITIC Sec	600030 CG Equity	6030 HK Equity
China South Air	600029 CG Equity	1055 HK Equity

Table 1: Company Names and Stock Codes for the 68 pairs of Shanghai and Hong Kong Cross-listed Shares

Panel B: Company Names and Stock Codes for the 18 pairs of Shanghai and Hong Kong Cross-listed Shares that are not in the Hang Seng AH Premium Index		
Company Name	**A Share Stock Code**	**H Share Stock Code**
China Ship Dev	600026 CG Equity	1138 HK Equity
Chongqing Iron	601005 CG Equity	1053 HK Equity
Sinopec SSC	600871 CG Equity	1033 HK Equity
Beijing N Star	601588 CG Equity	588 HK Equity
Dalian Port	601880 CG Equity	2880 HK Equity
Anhuiexpressway	600012 CG Equity	995 HK Equity
Tianjin Capital	600874 CG Equity	1065 HK Equity
ZMJ	601717 CG Equity	564 HK Equity
Shenzhenexpress	600548 CG Equity	548 HK Equity
Kunming Machine	600806 CG Equity	300 HK Equity
Nanjing Panda	600775 CG Equity	553 HK Equity
Luoyang Glass	600876 CG Equity	1108 HK Equity
COMEC	600685 CG Equity	317 HK Equity
Jingcheng MAC	600860 CG Equity	187 HK Equity
Maanshan Iron	600808 CG Equity	323 HK Equity
Jiangsu Express	600377 CG Equity	177 HK Equity
Sichuan Express	601107 CG Equity	107 HK Equity
First Tractor	601038 CG Equity	38 HK Equity
China Ship Dev	600026 CG Equity	1138 HK Equity
Chongqing Iron	601005 CG Equity	1053 HK Equity
Sinopec SSC	600871 CG Equity	1033 HK Equity
Beijing N Star	601588 CG Equity	588 HK Equity
Dalian Port	601880 CG Equity	2880 HK Equity
Anhuiexpressway	600012 CG Equity	995 HK Equity
Tianjin Capital	600874 CG Equity	1065 HK Equity
ZMJ	601717 CG Equity	564 HK Equity

Table 2: Summary Statistics for the Stock Prices

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the Daily Opening Price of A shares "Pa" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period, and another 6 time windows are in the appendix. All values are in Chinese RMB currency.

In Panel B, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the Daily Opening Price of H shares "Ph" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period, and another 6 time windows are in the appendix. All values are in Chinese RMB currency.

Panel A: Summary Statistics of the Daily Opening Price of A shares "Pa" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
Pa	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	9.23	8.56	.89	3.53	5.79	12.30	74.11
Before Connect	7.48	6.92	.89	3.10	4.46	9.72	47.53
After Connect	12.75	10.27	1.57	5.55	8.95	16.47	74.12

Panel B: Summary Statistics of the Daily Opening Price of H shares "Ph" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
Ph	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	7.39	7.94	.48	2.51	4.34	8.85	53.51
Before Connect	6.92	7.63	.48	2.29	3.97	8.62	53.51
After Connect	8.35	8.44	.70	3.10	5.02	9.42	49.61

Table 3: Summary Statistics and Univariate Test Results on the Price Gaps

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the Daily Opening Price Gap "q" [q = ln $(Price_A/Price_H) = ln\,(Price_A) - \ln(Price_H)$] of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period.

Panel B shows the results of the Univariate Test on the Daily Opening Stock Prices of A shares and H shares and the Price Gaps between the A-H shares.

In the Appendix, we also report summary statistics and univariate tests for the price gap 3 days surrounding the launch of Connect in 2014, one-week before and one week after the launch of Connect in 2014, one month before and one month after the launch of Connect in 2014, three months before and three months after the launch of Connect in 2014, six months before and six months after the launch of Connect in 2014, and one year before and one year after the launch of Connect in 2014.

Panel A: Summary Statistics of the Daily Opening Price Gap "q=ln(Pa/Ph)" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
q	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	.33	.46	-.60	-.04	.26	.61	2.23
Before Connect	.22	.44	-.60	-.5	.14	.45	1.75
After Connect	.55	.41	-.34	.22	.53	.84	2.23

Panel B: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares before and after the Connect from 5/22/2012 to 2/19/2016			
	Difference of post- and pre-Connect A Share Prices "ln(post-Pa/pre-Pa)"	**Difference of post- and pre-Connect H Share Prices "ln(post-Ph/pre-Ph)"**	**Difference of post- and pre-Connect Price Gaps "ln(post-q/pre-q)"**
Mean	$.6^{***}$	$.25^{***}$	$.74^{***}$
Median	$.58^{***}$	$.25^{***}$	$.75^{***}$
STD.	.34	.31	1.30

Table 4: Results of the Integrated Serial Correlation Test on Price Convergence

This table shows the results of the Integrated Serial Correlation Test, which indicates the impact of the Stock Connect and Regulatory Interventions on Price Convergence of A-H cross-listed stocks. The model is as below:

$$\Delta q_{i.t} = \alpha_0 + \alpha_1 CD_{i,t} + \alpha_2 MID_{i,t} + \alpha_3 MID2_{i,t} + \alpha_4 MC_{i,t} + \beta_0 q_{i,t-1} + \beta_1 CD_{i,t} \times q_{i,t-1} + \beta_2 MID_{i,t} \times$$

$$q_{i,t-1} + \beta_3 MID2_{i,t} \times q_{i,t-1} + \beta_4 MC_{i,t} \times q_{i,t-1} + \gamma_0 CV_{i,t-1} + \sum_{n=1}^{N} \varphi_n \Delta q_{i,t-n} + \varepsilon_{i,t}$$

Where $q = \ln(\text{Price}_A/\text{Price}_H) = \ln(\text{Price}_A) - \ln(\text{Price}_H)$, $\Delta q_{i.t} = q_{i,t} - q_{i,t-1}$;

$CD_{i,t}$ is a time dummy and equals 1 for post-Connect period (After the Connect Launch Date 11/27/2014) and 0 otherwise; $MID_{i,t}$ is another time dummy and equals 1 for post-Market Intervention period (After the Date 3/27/2015, mainland mutual funds are allowed to enter the Stock Connect, which boosts the quota usage dramatically) and 0 otherwise; $MID2_{i,t}$ is a time dummy and equals 1 for the time period after the Second Market Intervention period (After the Date 7/1/2015, CSRC relaxes collateral rules and allows margin loans to be extended in Shanghai Market only); $MC_{i,t}$ is a time dummy and equals 1 for Market Crash period of Shanghai and Hong Kong Stock Market (from 6/12/2015 to 9/1/1015) and 0 otherwise.

$CV_{i,t-1}$ stands for firm characteristics: log market capitalization (SIZE), market to book ratio (M/B), return-on-assets (ROA), leverage (LEV).

	$\Delta q_{i.t}$					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$q_{i,t-1}$	$-.0027^{***}$ (.0002)	$-.0027^{***}$ (.0002)	$-.0045^{***}$ (.0005)	$-.0123^{***}$ (.0014)	$-.0045^{***}$ (.0005)	$-.0131^{***}$ (.0015)
$CD_{i,t} \times q_{i,t-1}$	$-.0013^{*}$ (.0007)	$.0024^{***}$ (.0009)	.0011 (.0008)	$.0042^{***}$ (.0010)	.0011 (.0008)	$.0037^{***}$ (.0010)
$MID_{i,t} \times q_{i,t-1}$		$-.0035^{***}$ (.0011)	$-.0005$ (.0008)	$-.0042^{***}$ (.0007)	$-.0038^{**}$ (.0016)	$-.0099^{***}$ (.0011)
$MID2_{i,t} \times q_{i,t-1}$					$.0024^{*}$ (.0014)	$.0070^{***}$ (.0011)
$MC_{i,t} \times q_{i,t-1}$					$.0069^{***}$ (.0018)	$.0041^{***}$ (.0013)
Intercept	.0001 (.0001)	.0001 (.0001)	$.0067^{***}$ (.0015)	$-.0499^{***}$ (.0010)	$.0067^{***}$ (.0015)	$-.0586^{***}$ (.0113)
$CD_{i,t}$	$.0039^{***}$ (.0005)	$.0056^{***}$ (.0006)	$.0053^{***}$ (.0005)		$.0053^{***}$ (.0005)	
$MID_{i,t}$		$-.0032^{***}$ (.0006)	$-.0029^{***}$ (.0005)		$-.0031^{***}$ (.0008)	
$MID2_{i,t}$					$.0013^{*}$ (.0007)	
$MC_{i,t}$					$-.0027^{**}$ (.0011)	
$SIZE_{i,t-1}$			$-.0005^{***}$ (.0001)	$.0047^{***}$ (.0010)	$-.0005^{***}$ (.0001)	$.0055^{***}$ (.0010)
$MB_{i,t-1}$			-0.0000 (0.0000)	$-.0000^{***}$ (.0000)	-0.0000 (0.0000)	$-.0000^{**}$ (.0000)
$ROA_{i,t-1}$			$-.0001^{**}$ (.0001)	$-.0004^{**}$ (.0001)	$-.0001^{**}$ (.0000)	$-.0004^{***}$ (.0001)
$LEV_{i,t-1}$			-0.0000 (.0000)	.0003 (.0002)	$-.0001^{*}$ (.0000)	.0003 (.0002)
Year FE				Included		Included
No. of obs.	57,409	57,409	50,026	50,026	50,026	50026
Adjusted R^2	0.0144	0.0162	0.0184	0.0216	0.0192	0.0232

Table 5: Summary Statistics and Univariate Test Results on the Turnover Gap

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H turnover (TR) gap (TRG= ln(TRA/TRH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period.

Panel B shows the results of the Univariate Test on the A-H turnover (TR) gap (TRG= ln(TRA/TRH));

Panel A: Summary Statistics of the A-H turnover (TR) gap (TRG= ln(TRA/TRH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
TRG	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	1.16	1.53	-4.13	.09	.57	2.24	8.04
Before Connect	.63	1.45	-4.13	-.36	.14	1.62	8.04
After Connect	1.95	1.28	-3.35	1.11	1.97	2.80	7.43

Panel B: Univariate Test Results on the Turnover of A and H shares and their Gap between the 68 pairs of A-H Cross-listed Shares before and after the Connect from 5/22/2012 to 2/19/2016			
	Difference of post- and pre-Connect A Share Turnover "ln (post-TRA /pre- TRA)"	**Difference of post- and pre-Connect H Share Turnover "ln (post-TRH /pre- TRH)"**	**Difference of post- and pre-Connect Turnover Gaps "ln (post-TRG /pre-TRG)"**
Mean	1.98***	.58***	1.01***
Median	1.96***	.53***	.71***
STD.	.70	.51	1.13

Table 6: Summary Statistics and Univariate Test Results on the Volatility Gap

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period.

Panel B shows the results of the Univariate Test on the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH));

Panel A: Summary Statistics of the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
VOLG	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	.02	.53	.53	-.32	.04	.38	2.31
Before Connect	-.12	.49	-2.53	-.44	-.11	.20	1.85
After Connect	.24	.49	-1.69	-.06	.28	.57	2.31

Panel B: Univariate Test Results on the Volatility of A and H shares and their Gap between the 68 pairs of A-H Cross-listed Shares before and after the Connect from 5/22/2012 to 2/19/2016			
	Difference of post- and pre-Connect A Share Volatility "ln (post-VOLA /pre- VOLA)"	**Difference of post- and pre-Connect H Share Volatility "ln (post-VOLH /pre- VOLH)"**	**Difference of post- and pre-Connect Volatility Gaps "ln (post-VOLG /pre- VOLG)"**
Mean	.69***	.33***	1.32***
Median	.69***	.33***	1.19***
STD.	.24	.18	1.26

Table 7: Summary Statistics and Univariate Test Results on the Liquidity Gap

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period. Liquidity here is measured by bid-ask spread.

Panel B shows the results of the Univariate Test on the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)); Liquidity here is measured by bid-ask spread. Higher spread stands for less liquidity.

Panel A: Summary Statistics of the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
LIQG	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	-.72	.82	-4.38	-1.39	-.69	0	3.71
Before Connect	-.68	.79	-4.09	-1.10	-.69	0	3.52
After Connect	-.77	.85	-4.38	-1.39	-.69	0	3.71

Panel B: Univariate Test Results on the Liquidity of A and H shares and their Gap between the 68 pairs of A-H Cross-listed Shares before and after the Connect from 5/22/2012 to 2/19/2016			
	Difference of post- and pre-Connect A Share Liquidity "ln (post-LIQA /pre- LIQA)"	**Difference of post- and pre-Connect H Share Liquidity "ln (post-LIQH /pre- LIQH)"**	**Difference of post- and pre-Connect Liquidity Gaps "ln (post-LIQG /pre-LIQG)"**
Mean	.11***	.22***	.30***
Median	.07***	.22***	.21***
STD.	.17	.21	.39

Table 8: Summary Statistics and Univariate Test Results on the Information Asymmetry Gap

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period. Information asymmetry here is measured by Amihud illiquidity.

Panel B shows the results of the Univariate Test on the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH)). Information asymmetry here is measured by Amihud illiquidity.

Panel A: Summary Statistics of the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH)) of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
IAG	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	-1.12	1.75	-10.02	-2.28	-1.09	.05	6.39
Before Connect	-.70	1.68	-8.99	-1.81	-.66	.41	6.39
After Connect	-1.74	1.65	-10.02	-2.80	-1.73	-.64	4.55

Panel B: Univariate Test Results on the Information Asymmetry of A and H shares and their Gap between the 68 pairs of A-H Cross-listed Shares before and after the Connect from 5/22/2012 to 2/19/2016			
	Difference of post- and pre-Connect A Share Information Asymmetry "ln (post-IAA /pre- IAA)"	**Difference of post- and pre-Connect H Share Information Asymmetry "ln (post-IAH /pre-IAH)"**	**Difference of post- and pre-Connect Information Asymmetry Gaps "ln (post-IAG /pre- IAG)"**
Mean	-1.19^{***}	$-.29^{***}$	$.72^{***}$
Median	-1.19^{***}	$-.19^{***}$	$.65^{***}$
STD.	.62	.67	.92

Table 9: Results of the Integrated Serial Correlation Test on the Price Discovery Gaps

This table shows the results of the Integrated Serial Correlation Test on the Price Discovery Gaps, which indicates the impact of the Stock Connect on the Price Discovery Measure Convergence of A-H cross-listed stocks. The model is as below:

$$\Delta q_{i.t} = \alpha_0 + \alpha_1 CD_{i,t} + \alpha_2 MID_{i,t} + \alpha_3 MID2_{i,t} + \alpha_4 MC_{i,t} + \beta_0 q_{i,t-1} + \beta_1 CD_{i,t} \times q_{i,t-1} + \beta_2 MID_{i,t} \times$$

$$q_{i,t-1} + \beta_3 MID2_{i,t} \times q_{i,t-1} + \beta_4 MC_{i,t} \times q_{i,t-1} + \gamma_0 CV_{i,t-1} + \sum_{n=1}^{N} \varphi_n \Delta q_{i,t-n} + \varepsilon_{i,t}$$

Where q means the A-H turnover (TR) gap (TRG= ln(TRA/TRH)) in Panel A;

q means the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH)) in Panel B;

q means the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH)) in Panel C;

q means the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH));

$\Delta q_{i.t} = q_{i,t} - q_{i,t-1}$ in all panels.

$CD_{i,t}$ is a time dummy and equals 1 for post-Connect period (After the Connect Launch Date 11/27/2014) and 0 otherwise; $MID_{i,t}$ is another time dummy and equals 1 for post-Market Intervention period (After the Date 3/27/2015, mainland mutual funds are allowed to enter the Stock Connect, which boosts the quota usage dramatically) and 0 otherwise; $MID2_{i,t}$ is a time dummy and equals 1 for the time period after the Second Market Intervention period (After the Date 7/1/2015, CSRC relaxes collateral rules and allows margin loans to be extended in Shanghai Market only) and 0 otherwise; $MC_{i,t}$ is a time dummy and equals 1 for Market Crash period of Shanghai and Hong Kong Stock Market (from 6/12/2015 to 9/1/1015) and 0 otherwise.

$CV_{i,t-1}$ stands for firm characteristics: log market capitalization (SIZE), market to book ratio (M/B), return-on-assets (ROA), leverage (LEV).

Panel A (TRG)	$\Delta q_{i.t}$					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$q_{i,t-1}$	$-.0622^{***}$ (.0075)	$-.0621^{***}$ (.0075)	$-.0913^{***}$ (.0090)	$-.1888^{***}$ (.0122)	$-.0925^{***}$ (.0093)	$-.1898^{***}$ (.0122)
$CD_{i,t} \times q_{i,t-1}$	.0044 (.0048)	$-.0107$ (.0091)	$-.0077$ (.0096)	$.0356^{***}$ (.0076)	$-.0075$ (.0096)	$.0358^{***}$ (.0078)
$MID_{i,t} \times q_{i,t-1}$		$-.0035^{***}$ (.0011)	$.0191^{**}$ (.0088)	$-.0299^{***}$ (.0051)	.0068 (.0090)	$-.0377^{***}$ (.0060)
$MID2_{i,t} \times q_{i,t-1}$					.0096 (.0065)	.0027 (.0071)
$MC_{i,t} \times q_{i,t-1}$					.0012 (.0057)	$.0191^{***}$ (.0036)
Intercept	$.0410^{***}$ (.0112)	$.0409^{***}$ (.0001)	$.5816^{***}$ (.0841)	-1.3810^{***} (.4212)	$.6026^{***}$ (.0876)	-1.3900^{***} (.4372)
$CD_{i,t}$	$.0756^{***}$ (.0117)	$.1428^{***}$ (.0206)	$.1950^{***}$ (.0243)		$.1971^{***}$ (.0246)	
$MID_{i,t}$		$-.0916^{***}$ (.0184)	$-.0776^{***}$ (.0005)		$-.0291$ (.0207)	
$MID2_{i,t}$					$-.0676^{***}$ (.0172)	
$MC_{i,t}$					$.0425^{***}$ (.0139)	
$SIZE_{i,t-1}$			$-.0490^{***}$ (.0082)	$.1387^{***}$ (.0393)	$-.0509^{***}$ (.0085)	$.1395^{***}$ (.0408)
$MB_{i,t-1}$			$-.0001$ (.0001)	$-.0007^{***}$ (.0002)	$-.0002^{**}$ (.0001)	$-.0007^{***}$ (.0002)
$ROA_{i,t-1}$			$-.0020$ (.0025)	$-.0097^{*}$ (.0053)	$-.0021$ (.0025)	$-.0098^{*}$ (.0053)
$LEV_{i,t-1}$			.0025 (.0021)	.0038 (.0092)	.0027 (.0021)	.0040 (.0092)
Year FE				Included		Included
No. of obs.	41,377	41,377	41,080	41080	41,080	41080
Adjusted R^2	0.1938	0.1945	0.2017	0.2239	0.2022	0.2242

Panel B (VOLG)	$\Delta q_{i.t}$					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$q_{i,t-1}$	$-.1244^{***}$ (.0036)	$-.1244^{***}$ (.0036)	$-.1258^{***}$ (.0035)	$-.1337^{***}$ (.0033)	$-.1262^{***}$ (.0036)	$-.1340^{***}$ (.0033)
$CD_{i,t} \times q_{i,t-1}$	$.0122^{*}$ (.0057)	$.0187^{***}$ (.0065)	$.0204^{***}$ (.0067)	$.0321^{***}$ (.0069)	$.0208^{***}$ (.0068)	$.0333^{***}$ (.0071)
$MID_{i,t} \times q_{i,t-1}$		$-.0097$ (.0077)	$-.0097$ (.0077)	$-.0218^{***}$ (.0072)	$.0082$ (.0091)	$-.0075$ (.0094)
$MID2_{i,t} \times q_{i,t-1}$					$-.0312^{***}$ (.0095)	$-.0330^{***}$ (.0092)
$MC_{i,t} \times q_{i,t-1}$					$-.0380^{***}$ (.0143)	$.0306^{***}$ (.0109)
Intercept	$-.0147^{***}$ (.0024)	$-.0147^{***}$ (.0024)	$-.0054$ (.0161)	$-.3376^{***}$ (.0716)	$-.0007$ (.0160)	$-.3293^{***}$ (.0702)
$CD_{i,t}$	$.0404^{***}$ (.0029)	$.0476^{***}$ (.0041)	$.0489^{***}$ (.0043)		$.0491^{***}$ (.0043)	
$MID_{i,t}$		$-.0102^{***}$ (.0036)	$-.0097^{***}$ (.0035)		$-.0169^{***}$ (.0039)	
$MID2_{i,t}$					$-.0012$ (.0047)	
$MC_{i,t}$					$.0587^{***}$ (.0065)	
$SIZE_{i,t-1}$			$-.0015$ (.0017)	$.0297^{***}$ (.0068)	$-.0020$ (.0017)	$.0287^{***}$ (.0067)
$MB_{i,t-1}$			$.0000$ (.0000)	$-.0000$ (.0000)	$-.0000$ (.0000)	$-.0000$ (.0000)
$ROA_{i,t-1}$			$.0009^{**}$ (.0004)	$-.0012$ (.0014)	$.0094^{*}$ (.0045)	$-.0011$ (.0014)
$LEV_{i,t-1}$			$.0007$ (.0005)	.0019 (.0019)	$.0007$ (.0005)	.0021 (.0019)
Year FE				Included		Included
No. of obs.	41,377	41,377	41,080	41080	41,080	41080
Adjusted R^2	0.0577	0.0580	0.0583	0.0618	0.0604	0.0623

Panel C (LIQG)	$\Delta q_{i.t}$					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$q_{i,t-1}$	$-.2389^{***}$ (.0229)	$-.2389^{***}$ (.0229)	$-.2770^{***}$ (.0257)	$-.7474^{***}$ (.0187)	$-.2778^{***}$ (.0259)	$-.7508^{***}$ (.0184)
$CD_{i,t} \times q_{i,t-1}$	$-.0323^{**}$ (.0127)	$-.0313^{*}$ (.0175)	$.0303^{*}$ (.0177)	.0067 (.0189)	$-.0304^{*}$ (.0177)	.0070 (.0189)
$MID_{i,t} \times q_{i,t-1}$		$-.0015$ (.0153)	.0030 (.0139)	.0084 (.0159)	.0201 (.0196)	$.0611^{***}$ (.0204)
$MID2_{i,t} \times q_{i,t-1}$					$-.0280$ (.0220)	$-.0849^{***}$ (.0228)
$MC_{i,t} \times q_{i,t-1}$					$-.0107$ (.0154)	$-.0057$ (.0155)
Intercept	$-.1626^{***}$ (.0171)	$-.1626^{***}$ (.0171)	$-.1506$ (.1345)	1.1332^{***} (.3775)	$-.1592$ (.1351)	$.9510^{**}$ (.3841)
$CD_{i,t}$	$-.0469^{***}$ (.0103)	$-.0462^{***}$ (.0121)	$-.0541^{***}$ (.0145)		$-.0547^{***}$ (.0146)	
$MID_{i,t}$		$-.0009$ (.0116)	.0002 (.0127)		$-.0278$ (.0196)	
$MID2_{i,t}$					$.0414^{**}$ (.0202)	
$MC_{i,t}$					$-.0157$ (.0136)	
$SIZE_{i,t-1}$			.0036 (.0140)	$-.1469^{***}$ (.0334)	.0045 (.0141)	$-.1303^{***}$ (.0341)
$MB_{i,t-1}$			$-.0003$ (.0002)	$.0004^{**}$ (.0002)	$-.0002$ (.0001)	$.0004^{***}$ (.0002)
$ROA_{i,t-1}$			$-.0200^{***}$ (.0046)	$-.0050$ (.0045)	$-.0202^{***}$ (.0046)	$-.0054$ (.0045)
$LEV_{i,t-1}$			$-.0030$ (.0046)	-.0006 (.0070)	$-.0032$ (.0046)	-.0005 (.0070)
Year FE				Included		Included
No. of obs.	41,377	41,377	41,080	41080	41,080	41080
Adjusted R^2	0.3670	0.3670	0.3729	0.4502	0.3733	0.4512

Panel D (IAG)	$\Delta q_{i.t}$					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$q_{i,t-1}$	$-.1970^{***}$ (.0229)	$-.1970^{***}$ (.0229)	$-.2890^{***}$ (.0248)	$-.5819^{***}$ (.0033)	$-.2908^{***}$ (.0252)	$-.5822^{***}$ (.0242)
$CD_{i,t} \times q_{i,t-1}$	$-.0497^{***}$ (.0126)	$-.0580^{***}$ (.0157)	$-.0518^{***}$ (.0159)	$-.0075$ (.0069)	$-.0518^{***}$ (.0160)	$-.0080$ (.0161)
$MID_{i,t} \times q_{i,t-1}$		$.0115$ (.0135)	$.0183$ (.0077)	$-.0210$ (.0072)	$-.0179$ (.0148)	$-.0405^{***}$ (.0124)
$MID2_{i,t} \times q_{i,t-1}$					$.0385^{**}$ (.0174)	$.0212$ (.0162)
$MC_{i,t} \times q_{i,t-1}$					$.0266^{**}$ (.0132)	$.0210^{*}$ (.0110)
Intercept	$-.1385^{***}$ (.0333)	$-.1385^{***}$ (.0333)	-1.8978^{***} (.2576)	3.1638^{***} (1.1271)	-1.9272^{***} (.2641)	3.2313^{***} (1.1546)
$CD_{i,t}$	$-.2982^{***}$ (.0346)	$-.3213^{***}$ (.0423)	$-.4583^{***}$ (.0463)		$-.4612^{***}$ (.0470)	
$MID_{i,t}$		$.0326$ (.0284)	$-.0056$ (.0294)		$-.1331^{***}$ (.0375)	
$MID2_{i,t}$					$.1801^{***}$ (.0514)	
$MC_{i,t}$					$-.0223$ (.0301)	
$SIZE_{i,t-1}$			$.1548^{***}$ (.0253)	$-.3344^{***}$ (.1040)	$.1576^{***}$ (.0259)	$-.3408^{***}$ (.1064)
$MB_{i,t-1}$			$.0007^{**}$ (.0003)	$.0025^{***}$ (.0005)	$.0009^{***}$ (.0003)	$.0025^{***}$ (.0005)
$ROA_{i,t-1}$			$.0147$ (.0010)	$.0286^{**}$ (.0123)	$.0148$ (.0101)	$.0287^{**}$ (.0123)
$LEV_{i,t-1}$			$-.0048$ (.0071)	.0023 (.0228)	$-.0051$ (.0072)	.0026 (.0228)
Year FE				Included		Included
No. of obs.	41,377	41,377	41,080	41080	41,080	41080
Adjusted R^2	0.3623	0.3623	0.3774	0.4254	0.3779	0.4256

Table 10: Correlation Test Results of the impact of the Price Discovery Gaps on Price Gaps

This table shows Correlation Test Results of the impact of the Price Discovery Gaps on the Price Gaps of A-H cross-listed stocks. The model is as below:

$$q_{i.t} = \alpha_0 + \beta_0 q_{i,t-1} + \beta_1 TRG_{i,t} + \beta_2 VOLG_{i,t} + \beta_3 LIQG_{i,t} + \beta_4 IAG_{i,t} + \gamma_0 CV_{i,t-1} + \sum_{n=1}^{N} \varphi_n \Delta q_{i,t-n} + \varepsilon_{i,t}$$

Where q = ln $(\text{Price}_\text{A}/\text{Price}_\text{H}) = \ln(\text{Price}_\text{A}) - \ln(\text{Price}_\text{H})$,

TRG means the A-H turnover (TR) gap (TRG= ln(TRA/TRH));

VOLG means the A-H 10-day volatility (VOL) gap (VOLG = ln(VOLA/VOLH));

LIQG means the A-H liquidity (LIQ) gap (LIQG = ln (LIQA/LIQH));

IAG means the A-H information asymmetry (IA) gap (IAG = ln (IAA/IAH));

$CV_{i,t-1}$ stands for firm characteristics: log market capitalization (SIZE), market to book ratio (M/B), return-on-assets (ROA), leverage (LEV).

	$q_{i.t}$			
	(1)	**(2)**	**(3)**	**(4)**
$q_{i,t-1}$		.9928***	.9926***	.9712***
		(.0008)	(.0009)	(.0029)
$TRG_{i,t}$	.1463***	.0017***	.0018***	.0042***
	(0153)	(.0003)	(.0003)	(.0003)
$VOLG_{i,t}$	.0196	.0020***	.0019***	.0016***
	(.0268)	(.0003)	(.0004)	(.0004)
$LIQG_{i,t}$	.1394***	.0016***	.0016***	.0015***
	(.0237)	(.0003)	(.0003)	(.0003)
$IAG_{i,t}$	−.0165**	−.0006***	−.0006***	−.0011***
	(.0079)	(.0001)	(.0001)	(.0001)
$Intercept$	.2210***	.0013***	−.0028	−.0746***
	(.0408)	(.0004)	(.0021)	(.0144)
$SIZE_{i,t-1}$			.0004**	.0010***
			(.0002)	(.0014)
$MB_{i,t-1}$			.0000***	.0000
			(.0003)	(.0000)
$ROA_{i,t-1}$			−.0001	−.0003
			(.0010)	(.0002)
$LEV_{i,t-1}$			−.0002**	.0006**
			(.0001)	(.0002)
Year FE				Included
No. of obs.	41,523	41,523	41,207	41207
Adjusted R^2	0.3598	0.9954	0.9953	0.9848

Appendix: Definition of Variables

Variable Name	Definition
Adjusted Daily Opening Price	The official opening price is the price at which a security is first traded on a given trading day and here is adjusted to reflect spin-off, stock splits/consolidations, stock dividends/bonus, rights offerings/ entitlement.
Daily Turnover	Total amount traded in RMB. This value represents all trade prices, multiplied by the number of shares relating to each price.
10-day Volatility	Measure of risk of price moves for a security calculated from the standard deviation of day to day logarithmic historical price changes
Liquidity	Quoted bid-ask spread = ask price - bid price.
Ask Price	Lowest price a dealer will accept to sell a security.
Bid price	Highest price an investor will accept to pay for a security.
Information Asymmetry	Amihud's illiquidity = 1,000,000 × (absolute return) / (absolute daily closing price × daily volume)
Daily Volume	The total number of shares traded on a security on the current day
Daily Opening Price of A shares "Pa"	Daily Opening Price of A shares
Daily Opening Price of H shares "Ph"	Daily Opening Price of H shares "Ph"
Daily Opening Price Gap "q"	$q = \ln(\text{Price}_A/\text{Price}_H) = \ln(\text{Price}_A) - \ln(\text{Price}_H)$
$\Delta q_{i.t}$	$\Delta q_{i.t} = q_{i,t} - q_{i,t-1}$
A-H turnover (TR) gap "TRG"	A-H turnover (TR) gap "TRG" = ln(TRA/TRH)
A-H 10-day volatility (VOL) gap "VOLG"	A-H 10-day volatility (VOL) gap "VOLG" = ln(VOLA/VOLH)
A-H liquidity (LIQ) gap "LIQG"	A-H liquidity (LIQ) gap "LIQG" = ln (LIQA/LIQH) Liquidity here is measured by bid-ask spread.
A-H information asymmetry (IA) gap "IAG"	A-H information asymmetry (IA) gap "IAG" = ln (IAA/IAH) Information asymmetry here is measured by Amihud illiquidity.
$CD_{i,t}$	$CD_{i,t}$ is a time dummy and equals to 1 for post-Connect period (After the Connect Launch Date 11/27/2014) and 0 otherwise.

$\mathbf{MID_{i,t}}$	$MID_{i,t}$ is another time dummy and equals to 1 for post-Market Intervention period (After the Date 3/27/2015, mainland mutual funds are allowed to enter the Stock Connect, which boosts the quota usage dramatically).
$\mathbf{MID2_{i,t}}$	$MID2_{i,t}$ is a time dummy and equals to 1 for the time period after the Second Market Intervention period (After the Date 7/1/2015, CSRC relaxes collateral rules and allows margin loans to be extended in Shanghai Market only.).
$\mathbf{MC_{i,t}}$	$MC_{i,t}$ is a time dummy and equals to 1 for Market Crash period of Shanghai and Hong Kong Stock Market (from 6/12/2015 to 9/1/1015) and 0 otherwise;
Log Market Capitalization (SIZE)	Logarithm of total current market value of all of a company's outstanding shares stated in the pricing currency. Capitalization is a measure of corporate size.
Market to Book ratio (M/B)	Ratio of the stock price to the book value per share.
Return-on-Assets (ROA)	Return on Assets = (Net Income / Average Total Assets) × 100
Leverage (LEV)	The average assets to average equity

Appendix: Summary Statistics for the Stock Price and Price Gap

In Panel A, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the Daily Opening Price Gap "q" [q = ln $(Price_A/Price_H) = ln\,(Price_A) - \ln(Price_H)$] of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period, 3 days surrounding the launch of Connect in 2014, one-week before and one week after the launch of Connect in 2014, one month before and one month after the launch of Connect in 2014, three months before and three months after the launch of Connect in 2014, six months before and six months after the launch of Connect in 2014, and one year before and one year after the launch of Connect in 2014.

In Panel B, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the Daily Opening Price of A shares "Pa" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016 before and after the Connect during the sample period and all the other 6 time windows.

In Panel C, this table reports the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the Daily Opening Price of H shares "Ph" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016, before and after the Connect during the sample period, and all the other 6 time windows.

Panel A: Summary Statistics of the Daily Opening Price Gap "q" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
q	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	.33	.46	-.60	-.04	.26	.61	2.23
Before Connect	.22	.44	-.60	-.5	.14	.45	1.75
After Connect	.55	.41	-.34	.22	.53	.84	2.23
(-3, 0)	.18	.25	-.18	-.08	.20	.44	.56
(0, +3)	.22	.29	-.21	-.09	.21	.46	.83
(-7, 0)	.20	.27	-.23	-.08	.22	.44	.73
(0, +7)	.22	.29	-.21	-.09	.21	.46	.84
(-30, 0)	.21	.31	-.26	-.11	.22	.44	.86
(0, +30)	.30	.33	-.24	-.01	.31	.57	1.04
(-90, 0)	.16	.30	-.33	-.13	.16	.40	.86
(0, +90)	.41	.35	-.34	.10	.42	.66	1.46
(-180, 0)	.12	.31	-.45	-.17	.10	.34	1.28
(0, +180)	.45	.36	-.34	.14	.47	1.44	1.47
(-360, 0)	.15	.37	-.60	-.18	.12	1.59	1.60
(0, +360)	.52	.40	-.34	.19	.51	.83	2.18

Panel B: Summary Statistics of the Daily Opening Price of A shares "Pa" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
Pa	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Pe-riod	9.23	8.56	.89	3.53	5.79	12.30	74.11
Before Connect	7.48	6.92	.89	3.10	4.46	9.72	47.53
After Connect	12.75	10.27	1.57	5.55	8.95	16.47	74.12
(-3, 0)	8.65	7.35	1.88	3.82	5.74	11.46	38.14
(0, +3)	8.60	7.38	1.88	3.60	5.64	11.10	39.87
(-7, 0)	8.66	7.37	1.88	3.70	5.75	11.15	38.20
(0, +7)	8.58	7.36	1.88	5.64	5.64	11.12	39.87
(-30, 0)	8.17	7.05	1.48	3.55	5.29	10.04	38.41
(0, +30)	9.54	8.24	1.88	4.03	6.11	12.60	42.89
(-90, 0)	7.91	6.99	1.24	3.33	5.01	9.85	39.55
(0, +90)	10.72	9.05	1.88	4.65	7.04	13.65	50.78
(-180, 0)	7.46	6.88	.98	3.08	4.59	9.45	42.06
(0, +180)	12.28	10.33	1.88	5.21	8.02	16.07	63.75
(-360, 0)	7.34	6.92	.96	2.92	4.35	9.45	47.53
(0, +360)	13.04	10.55	1.88	5.7	9.1	16.98	74.12

Panel C: Summary Statistics of the Daily Opening Price of H shares "Ph" of the 68 A-H Cross-listed Firms from 5/22/2012 to 2/19/2016							
Ph	**Mean**	**STD.**	**Min**	**Quartile 1**	**Median**	**Quartile 3**	**Max**
Total Period	7.39	7.94	.48	2.51	4.34	8.85	53.51
Before Connect	6.92	7.63	.48	2.29	3.97	8.62	53.51
After Connect	8.35	8.44	.70	3.10	5.02	9.42	49.61
(-3, 0)	7.86	7.78	1.18	3.02	4.63	4.63	43.44
(0, +3)	7.64	7.68	.98	2.85	4.42	42.47	44.28
(-7, 0)	7.75	7.65	1.02	2.87	4.54	10.96	44.51
(0, +7)	7.61	7.66	.98	2.82	4.41	10.47	44.28
(-30, 0)	7.42	7.64	.84	2.79	4.21	9.80	45.09
(0, +30)	7.88	8.12	.92	2.90	4.49	10.39	44.98
(-90, 0)	7.44	7.77	.79	2.76	4.32	8.92	48.04
(0, +90)	8.06	8.39	.88	2.96	4.64	10.24	44.98
(-180, 0)	7.36	7.97	.60	2.60	4.13	8.77	50.42
(0, +180)	8.78	8.99	.88	3.15	5.02	10.82	46.05
(-360, 0)	7.20	8.02	.56	2.41	3.96	8.99	53.51
(0, +360)	8.71	8.76	.73	3.18	5.15	10.32	49.61

Appendix: Univariate Test Results on the Stock Prices and the Price Gaps

The results of the Univariate Test on the Daily Opening Stock Prices of A shares and H shares and the Price Gaps between the A-H shares are shown as below for 7 different windows.

Panel A: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares before and after the Connect from 5/22/2012 to 2/19/2016				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
Pre-Connect	**Mean**	7.48	6.92	.22
	Median	4.46	3.97	.14
	STD.	6.92	7.63	.44
Post-Connect	**Mean**	12.75	8.35	.55
	Median	8.95	5.02	.53
	STD.	10.27	8.44	.41
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	$.6^{***}$	$.25^{***}$	$.74^{***}$
	Median	$.58^{***}$	$.25^{***}$	$.75^{***}$
	STD.	.34	.31	1.30

Panel B: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares 3 days before and after the Connect				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
(-3, 0)	**Mean**	8.65	7.86	.18
	Median	5.74	4.63	.20
	STD.	7.35	7.78	.25
(0, +3)	**Mean**	8.60	7.64	.22
	Median	5.64	4.42	.21
	STD.	7.38	7.68	.29
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	$-.01^{***}$	$-.05^{***}$	$.11^{***}$
	Median	$-.01^{***}$	$-.03^{***}$	$.12^{***}$
	STD.	.03	.04	.19

Panel C: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares one week before and after the Connect				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
(-7, 0)	**Mean**	8.66	7.75	.20
	Median	5.75	4.54	.22
	STD.	7.37	7.65	.27
(0, +7)	**Mean**	8.58	7.61	.22
	Median	5.64	4.41	.21
	STD.	7.36	7.66	.29d
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	$-.01^{***}$	$-.03^{***}$	$.05^{*}$
	Median	$-.01^{***}$	$-.02^{***}$	$.04^{**}$
	STD.	.02	.04	.19

Panel D: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares one month before and after the Connect				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
(-30, 0)	**Mean**	8.17	7.42	.21
	Median	5.29	4.21	.22
	STD.	7.05	7.64	.31
(0, +30)	**Mean**	9.54	7.88	.30
	Median	6.11	4.49	.31
	STD.	8.24	8.12	.33
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	$.15^{***}$	$.05^{***}$	.06
	Median	$.14^{***}$	$.04^{***}$	.15
	STD.	.09	.09	.74

Panel E: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares three months before and after the Connect				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
(-90, 0)	**Mean**	7.91	7.44	.16
	Median	5.01	4.32	.16
	STD.	6.99	7.77	.30
(0, +90)	**Mean**	10.72	8.06	.41
	Median	7.04	4.64	.42
	STD.	9.05	8.39	.35
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	.33***	.08***	.39***
	Median	.32***	.16***	.41***
	STD.	.19	.09	.90

Panel F: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares six months before and after the Connect				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
(-180, 0)	**Mean**	7.46	7.36	.12
	Median	4.59	4.13	.10
	STD.	6.88	7.97	.31
(0, +180)	**Mean**	12.28	8.78	.45
	Median	8.02	5.02	.47
	STD.	10.33	8.99	.36
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	.53***	.20***	.26
	Median	.48***	.21***	.69***
	STD.	.26	.19	1.42

Panel G: Univariate Test Results on the Prices and Price Gaps of 68 pairs of A-H Cross-listed Shares one year before and after the Connect				
		Price of A share "Pa"	**Price of H share "Ph"**	**Price Gap "q=ln(Pa/Ph)"**
(-360, 0)	**Mean**	7.34	7.20	.15
	Median	4.35	3.96	.12
	STD.	6.92	8.02	.37
(0, +360)	**Mean**	13.04	8.02	.52
	Median	9.1	5.15	.51
	STD.	10.55	8.76	.40
		"ln(post-Pa/pre-Pa)"	**"ln(post-Ph/pre-Ph)"**	**"ln(post-q/pre-q)"**
Difference	**Mean**	.64***	.24***	.64***
	Median	.57***	25***	.76***
	STD.	.31	.25	1.22