



**HONG KONG'S FINANCIAL MARKET INTERACTIONS WITH THE US AND
MAINLAND CHINA IN CRISIS AND TRANQUIL TIMES**

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Abstract

This paper studies how financial markets in the US and Mainland China affected equity, money and foreign exchange markets in Hong Kong on daily basis during the current financial crisis, and how these financial linkages have changed compared with the experience in 2001. In the equity markets, the influence of the Mainland on Hong Kong has increased substantially in the current financial crisis, but it is still less important than that of the US. In the money market, correlation between HIBOR and LIBOR has picked up from the low levels observed during the tranquil period before the crisis, to almost the same level of correlation as observed during the IT bubble burst. In the foreign exchange market, the daily movements of the Hong Kong dollar/US dollar exchange rate have been rather small and mainly influenced by the short-term interest rates. Fund flows in different directions might have neutralised the impact of other markets on the foreign exchange market. A broad interpretation of these findings is that Hong Kong financial markets appear to be more aligned with the US markets in turbulent times, but relatively more integrated with the Mainland markets during the tranquil periods.

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Keywords: Financial markets interactions, Financial crisis

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The views and analysis expressed in this paper are those of the authors, and do not necessarily represent the views of the Hong Kong Monetary Authority.

Executive Summary:

- *This paper studies how financial markets in the US and Mainland affected equity, money, and foreign exchange markets in Hong Kong on daily basis during the current financial crisis, and how these financial linkages have changed compared with the experience in 2001.*
- *The linkage across equity markets during the current crisis has become more complicated than before. The main findings are: (i) the influence of the Mainland equity market on the Hong Kong equity market has increased substantially in the current financial crisis, but it is still less important than that of the US equity market; (ii) the US market started to affect Hong Kong indirectly through its influence on the Shanghai market in recent years; and (iii) shocks from the US equity market affect H-shares more than the Hong Kong-based listed companies.*
- *The role of money market linkages between Hong Kong and other economies in the current crisis has not changed much compared with when the IT bubble burst. HIBOR and LIBOR moved together in both crises, while the money market rate on the Mainland did not affect HIBOR. During the tranquil period between the two crises, HIBOR was significantly influenced by IPO activities in the Hong Kong equity market, and there was little daily correlation between HIBOR and LIBOR, even though the spread between them remained relatively narrow most of the time. This might be because the liquidity of the Hong Kong banking system during tranquil periods was heavily influenced by IPO activities in the equity market, whereas during crises it mainly reflects that the Hong Kong dollar is being used as a safe haven along with the US dollar.*
- *In the foreign exchange (FX) market, the Hong Kong-dollar exchange rate was mainly influenced by short-term interest rates. It is difficult to detect independent and significant influences from the equity market. This could be due to the two forces in the FX market going in opposite directions during the current crisis: capital outflow related to equity market collapse, and capital inflow caused by the unwinding of currency carry trades and repatriation of overseas assets by Hong Kong residents.*

I. INTRODUCTION

The financial markets in Hong Kong have been heavily influenced by what happened in the US. In recent years, the Mainland economy experienced strong growth and rapid development in its domestic financial markets. The connections between financial markets in Hong Kong and those in the US and Mainland went through substantial changes. This paper explores how financial markets in Hong Kong reacted to shocks from the US and Mainland markets during the current financial crisis and compare it with what happened before the crisis.

The paper covers a broad range of financial markets and uses daily data from 2 January 2001 to 2 April 2009 to capture spillover effects at high frequency. Eight markets are considered in this analysis, namely money markets in the US, Hong Kong and the Mainland; equity markets in the US, Hong Kong and the Mainland; and the bond market in the US and the USD/HKD FX market. While some previous studies looked at the dynamics in some of these markets,¹ there is little research to explore the interactions of the markets with a broad coverage. We adopt a Vector Autoregression (VAR) model to include these markets in one framework, which allows us to estimate cross border spillover effect for the same type of market (for example, equity market interactions across three economies) and the impact across different types of markets (for example, how interest rates in the US and Mainland affect USD/HKD exchange rate). We decide to adopt a VAR model rather than a co-integration model because there does not seem to be a long-run equilibrium relationship among the variables.² The sample is divided into three periods: the burst of the IT bubble (2 January 2001 to 31 December 2001), the tranquil period before the current financial crisis (2 January 2002 to 8 August 2007) and the current financial crisis (9 August 2007 to 2 April 2009).³ We focus on how shocks from other markets affected the equity, money and FX markets in Hong Kong during the last period, and compare the situation with what happened in the previous periods.

We find the influence of the Mainland equity market on the Hong Kong equity market has increased substantially in the current financial crisis, but it is still less important than the influence of the US equity market. The direct impact of daily shocks from the Mainland equity markets on Hong

¹ He, Leung and Ng (2008) looked at the relationship between the Mainland macro variables and the interest rate in Hong Kong. Leung and Ng (2008) studied the impact of IPOs on short-term interest rates in Hong Kong. Fong et al (2008) and Peng et al (2008) focused on the interactions of the A and H share markets.

² He, Leung and Ng (2008) conducted statistical tests and did not find evidence on the existence of a co-integration relationship between HIBOR and LIBOR.

³ There is no consensus on the exact dates of the end of the IT bubble and the beginning of the current financial crisis. We tried different ways to define the three periods and found the results to be broadly consistent.

Kong is smaller than those from the US. Moreover, the US shocks could affect the Hong Kong market indirectly through its influence on the Mainland market. This indirect channel has become significant in recent years. The reverse indirect effect from Mainland to Hong Kong through the US market is not significant.

Shocks from the US equity market affect H-share stocks more than they affect the stocks for Hong Kong-based companies during the current crisis. The VAR model indicates the response of the H-share stocks to a US equity shock could be 30 per cent larger than the response of stocks of the Hong Kong-based companies. This finding indicates a higher weight of Mainland stocks in the Hong Kong equity market could lead to a higher exposure of the Hong Kong market to the US market.

We find the role of money market linkages between Hong Kong and other economies in the current crisis did not change much compared with the period when the IT bubble burst. HIBOR and LIBOR moved together in both crises, while money market rate on the Mainland did not affect HIBOR. The HIBOR and LIBOR spread widened since 2003 due to the expectation of a renminbi appreciation and intensive IPO activities in Hong Kong, and there was little correlation between them day to day. As the renminbi exchange rate stabilised recently and IPO activities waned, global factors dominated the dynamics in HIBOR, and the HIBOR-LIBOR linkage becomes significant again during the financial crisis. In particular, during crises, the demand for Hong Kong dollar might have reflected its role as a safe haven, along with the US dollar.

Because the daily movements of the HKD/USD exchange rate have been rather small, it is difficult to note large impact from the other markets. Before the current crisis, the Hong Kong-dollar exchange rate was influenced by fund flows related to the money and equity markets in Hong Kong. During the current crisis, the Hang Seng Index is no longer significant in influencing the Hong Kong-dollar exchange rate market. This could be due to the two forces in the FX market going in opposite directions, the capital outflow related to equity market collapse, and capital inflow caused by the unwinding of carry trade and repatriation of overseas assets by Hong Kong residents.

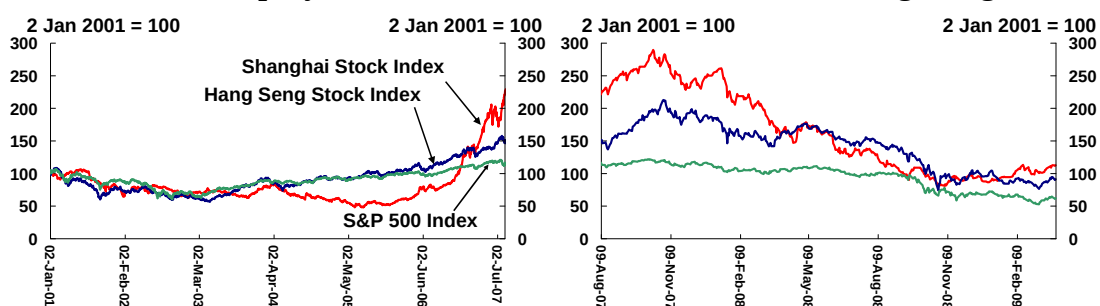
The paper is arranged as follows. Section II provides a narrative description on how financial markets in Hong Kong reacted to markets in the US and Mainland. Section III conducts an econometric analysis of the relationships among money, equity and FX markets in Hong Kong, and markets in the US and Mainland. Section IV concludes.

II. NARRATIVE DESCRIPTION OF FINANCIAL MARKET DYNAMICS IN HONG KONG AND OTHER ECONOMIES

Equity markets

The linkage between the equity market in Hong Kong and those in the US and Mainland economies have changed substantially since 2001 (Chart 1). The Hang Seng Index (HSI) broadly tracked the S&P 500 index in 2001 and 2002 during and after the burst of the IT bubble in the US, while the Shanghai stock index had limited impact on the HSI. The dynamics clearly changed in the subsequent years. The correlation between the HSI and Shanghai stock index have increased significantly since 2005.

Chart 1: Equity market indices in US, Mainland, and Hong Kong

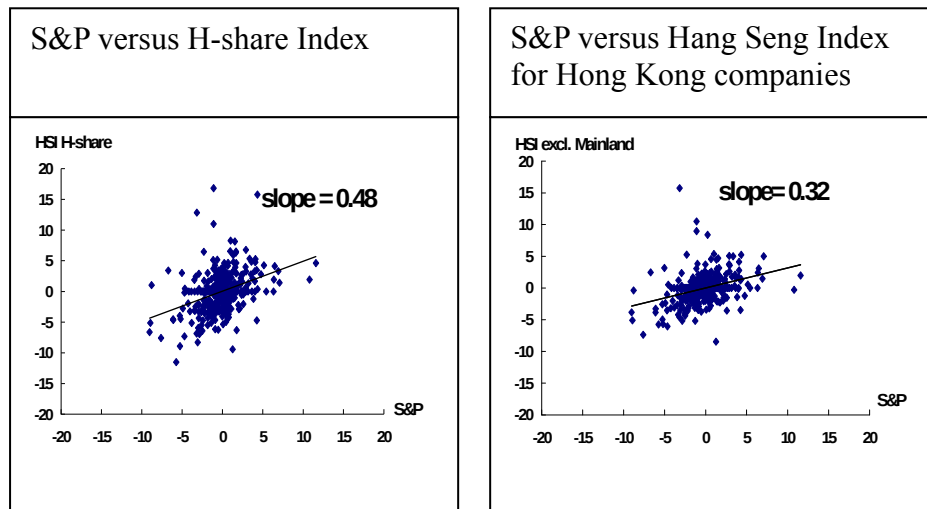


Source: CEIC.

The greater influence of the Shanghai index on the HSI is partly due to the cross-listing of many Mainland companies in Shanghai and Hong Kong. The weight of Mainland stocks in the Hang Seng Index has increased sharply in recent years. In January 2001 only two out of 33 constituent stocks in the HSI were Mainland stocks. In December 2008, 20 out of the 42 HSI constituent stocks were Mainland stocks.

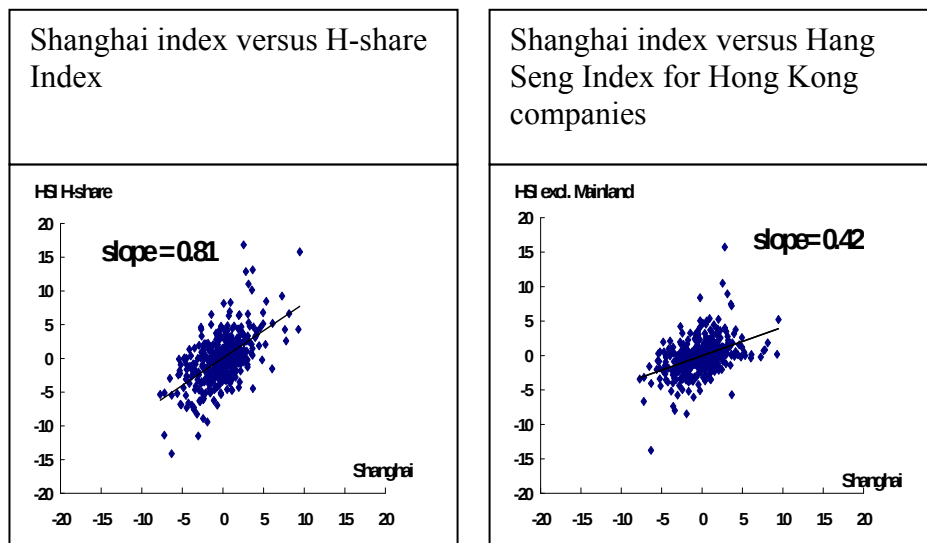
Did the change in composition of the HSI lead to a weaker spillover effect from the US to Hong Kong? This question is motivated by the fact that more stocks in the HSI are Mainland based and may be less subject to influence of the US business cycle. To verify, we look at how the US equity market is correlated with the Mainland stocks listed in Hong Kong and the non-Mainland stocks separately (Chart 2). It turns out the correlation between the US market and the H-shares (i.e. Mainland stocks listed in Hong Kong) is actually higher than that between the US market and the non-Mainland HSI constituent stocks. In terms of the correlations of the Shanghai stock index with the two groups of stocks in Hong Kong, the result is less surprising (Chart 3). The H-share index is highly correlated with the Shanghai index, while the correlation between Hong Kong stocks in the HSI and the Shanghai index is much lower.

Chart 2: Correlation between daily returns of the S&P 500 index and HSI stocks during the current financial crisis



Sources: Bloomberg and staff estimates.

Chart 3: Correlation between daily returns of the Shanghai stock index and Hang Seng Index during the current financial crisis



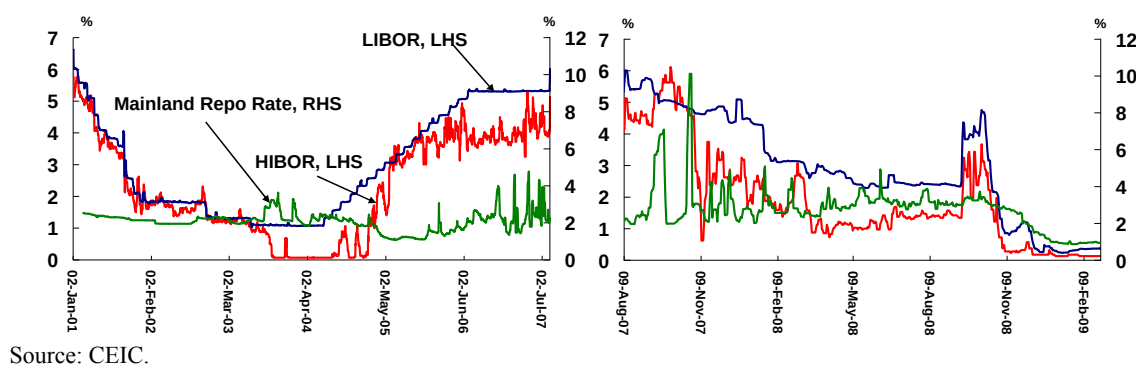
Sources: Bloomberg and staff estimates.

News related to Mainland policy actions and other major events in the Mainland equity market are important to the Hong Kong equity market. Table 1 tabulates 27 pieces of news that had reportedly influenced the Mainland equity markets, and the stock returns in Mainland and Hong Kong on the days these news broke out. Such news was controlled for in the econometric estimation in Section III.

Money markets

The linkage between the money market in Hong Kong and those in the US and Mainland China has also changed over time, but the pattern is quite different from what happened in the equity markets (Chart 4). The HIBOR and LIBOR at one-week maturity closely followed each other in 2001 and 2002. The gap between the two was small for most of the time. The linkage between the two broke down at the end of September 2003. The expectation of the RMB and Hong Kong-dollar appreciation, and the intensive IPO activities led to dynamics in HIBOR that is not related to LIBOR. The LIBOR-HIBOR relationship became strong again recently after the credit crisis started as IPO activities in Mainland China and Hong Kong waned and expectation of an RMB appreciation vanished (at least temporarily), and the global factors became dominant in shaping the dynamics in both money markets.

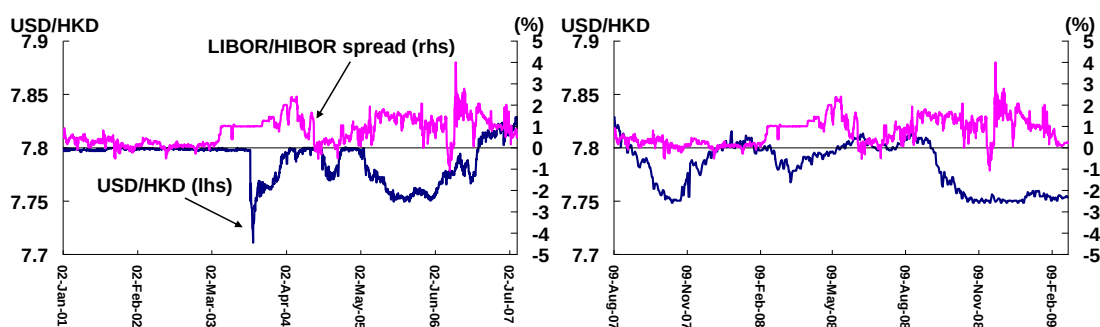
Chart 4: Money market interest rates in London, Mainland, and Hong Kong



Foreign exchange market

The Hong Kong-dollar exchange rate went through several distinctive phases since 2001 (Chart 5). The HKD/USD exchange rate was stable and close to 7.8 until October 2003. The Hong Kong dollar appreciated when market speculation about appreciation of RMB and Hong Kong dollar led to a widening of the LIBOR/HIBOR spread in October 2003. The introduction of the strong-side Convertibility Undertaking (CU) to the Hong Kong-dollar exchange rate by the Hong Kong Monetary Authority (HKMA) in May 2005 led to some stability in the HKD/USD exchange rate, but the spot rate stayed close to the strong-side CU due to capital flows caused by intensive IPO activities in 2006 and 2007 and the ongoing credit crisis.

Chart 5: Hong Kong-dollar exchange rate and LIBOR/HIBOR spread



Source: CEIC.

The narrative descriptions in this section indicate high interactions of financial markets in Hong Kong and other economies. The next section applies an econometric model to systematically explore such interactions.

III. ECONOMETRIC ESTIMATION

Data and methodology

Daily observations on eight variables are considered in the econometric estimation. They are: first differences in one-week HIBOR, one-week LIBOR, one-week repo rate in Mainland China and bond price in the US; percentage changes in the HSI, Shanghai stock index, S&P 500 index and HKD/USD exchange rate. A positive change in the exchange rate variable means appreciation of the US dollar against the Hong Kong dollar. Data are obtained from the CEIC. IPO activities in Mainland China and Hong Kong are included as explanatory variables, as their impact on the short-term interest rates has been well documented.⁴ Major Mainland news is also controlled for. Table 1 documents the news.

We adopt a VAR model as our benchmark, and make some assumptions on the time sequencing of how variables affect each other. These technical assumptions are necessary for model identification. The details on these assumptions are discussed in the Appendix. Our focus is on how interest rate, equity market and exchange rate in Hong Kong are affected by markets in other economies. Estimates from the VAR model for the current crisis period, the burst of the IT bubble, and the tranquil period between are reported in Tables 2, 3 and 4. The coefficient estimates correspond to the contemporaneous effects in the impulse response functions.

⁴ The IPO variable in the regressions measures the funds frozen for IPO subscription on the last days of the IPO subscription periods. Leung and Ng (2008) documented the effects of such IPO activities on Hong Kong interest rates.

The main findings are summarised as follows.

Equity markets

The US shocks play a more important role than the Mainland shocks. In the current crisis period (Table 2), a one per cent shock from the US equity market has a direct impact of 0.53 per cent on the HSI, while a one per cent shock from the Mainland equity market has a direct impact of 0.43 per cent on the HSI. The US shocks affect the HSI through its impact on the Mainland equity market as well. A one per cent US shock moves the Mainland equity index by 0.23 per cent on average. Major Mainland news led the HSI to move by 3.4 per cent on average, which is significant both in economic and statistical terms.

Comparing the findings from the three periods, the influence of the Mainland equity market on the HSI has clearly become more important in recent years. The Mainland equity market was largely segmented from the US equity market before current crisis (Tables 3 and 4), but the US equity market became significant to the Mainland China recently (Table 2). The impact from the Mainland equity market on the Hong Kong stocks became more important, but is still relatively less important compared with the US market in the current crisis. Moreover, the US market affects Hong Kong indirectly through its influence on the Shanghai market in the current crisis, as the S&P index is significant in the equation of Shanghai equity index, while this indirect channel was not significant before crisis.

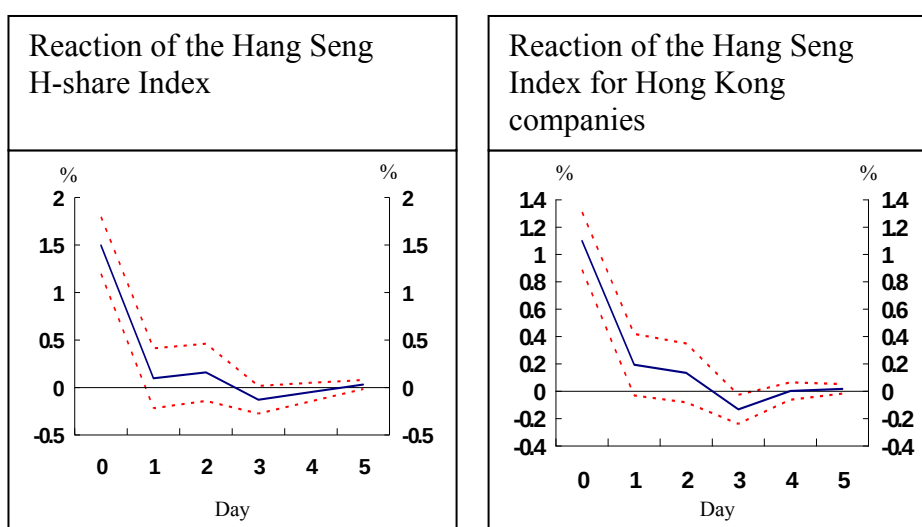
How did stocks of Hong Kong companies and Mainland companies listed in Hong Kong react to the shocks from other equity markets? There are good reasons to expect different responses from the two groups of stocks due to their differences in exposure to economic shocks. To answer this question, we construct an index to measure the equity prices for non-Mainland based companies in the HSI, and see how this index and the Hang Seng H-share Index (representing Mainland-based companies listed in Hong Kong) react to shocks from the US and Mainland equity markets. We estimate the VAR model with the HSI replaced first by the H-share Index, then by the index for the listed Hong Kong-based companies. Estimates from these two VAR models are in Tables 5 and 6.⁵ Impulse response functions to the US and Mainland equity shocks are simulated and plotted in Charts 6 and 7.

While the spillover effects of a US shock on both the H-share and the index for Hong Kong companies are positive and significant, the response of the H-share index to the US shock is about 30% larger than that from the index for Hong Kong companies (Chart 6). The difference

⁵ The adjusted Hang Seng Index in this VAR is based on non-Mainland stocks in the Hang Seng Index.

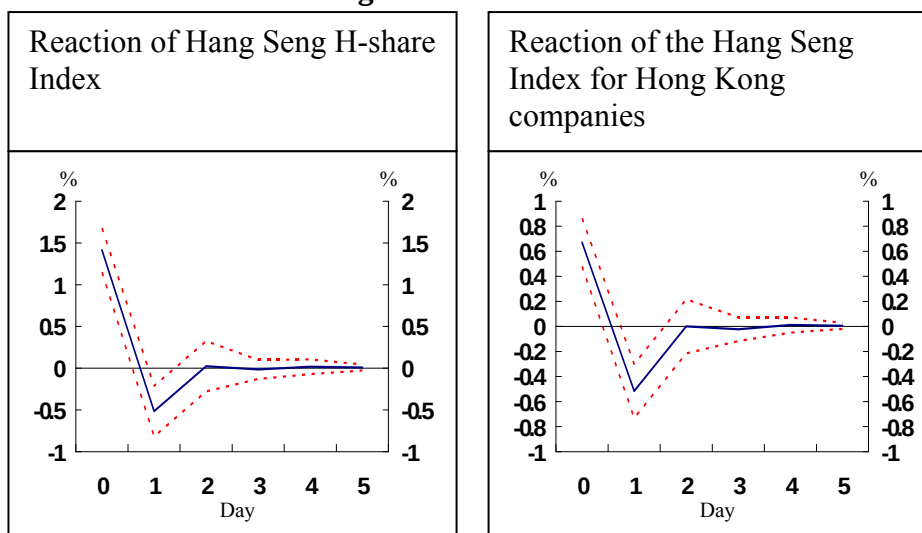
between the responses from the two indices is even larger when they face the Shanghai equity market shock (Chart 7). The different reactions to Shanghai shocks are intuitive given that H-share companies are more exposed to Mainland economic shocks. The different responses to the US shocks come from two sources. First, the US shocks have a larger direct impact on the H-share index than the index for Hong Kong companies. Comparing Table 5 with Table 6, a one-per cent decline leads the H-share index to drop by 0.61 and the index for Hong Kong companies to drop by 0.47. Second, the indirect channel of the US shock through the Shanghai market is much stronger for the H-share index.

Chart 6: Reaction of stock indices to US equity shocks during the current financial crisis



Sources: Bloomberg and staff estimates.

Chart 7: Reaction of stock indices to Mainland equity shocks during the current financial crisis



Sources: Bloomberg and staff estimates.

Money and FX markets

HIBOR and LIBOR are correlated in the current crisis, but its correlation is not as high as in 2001 when the IT bubble burst. A hike of 100 basis points in LIBOR is associated with a rise of 44 basis points in HIBOR during the ongoing crisis (Table 2). In 2001 the same shock in LIBOR led to a hike of 48 basis points in HIBOR (Table 3). There was little daily correlation between HIBOR and LIBOR during the tranquil period between the two crises (Table 4). Equity markets in Hong Kong, the US and the Mainland are not significant determinants of HIBOR in the current crisis, although IPO activities on the equity market did influence HIBOR significantly during the tranquil period before the current crisis broke out.

Under the Currency Board Arrangement, particularly after the HKMA introduced the strong-side Convertibility Undertaking to the Hong Kong-dollar exchange rate in May 2005 in addition to the existing weak-side Convertibility Undertaking, HIBOR and LIBOR should in theory move closely and their spread should follow a bounded process (Genberg et al, 2007). However, there remains a puzzle as to why the forward exchange rates of the Hong Kong dollar continue to lie outside the Convertibility Zone (Genberg and Hui, 2009). It is therefore not surprising to find little correlation between the daily movements of HIBOR and LIBOR, particularly during the episodes of strong expectation that the Hong Kong dollar would appreciate along with the renminbi and amid hectic IPO activities in Hong Kong.

The Mainland interest rate did not play a significant role in the Hong Kong money market. Despite the economic integration of Mainland and Hong Kong economies, money markets in the two economies remain segmented. While Mainland interest rate showed some correlation to large scale IPOs activities on the Mainland in recent years, the correlation was not spilled over to HIBOR directly due to the capital control. However, Mainland factors could affect HIBOR through IPOs in Hong Kong given many local IPOs were H-shares IPOs from Mainland.

The Hong Kong-dollar exchange rate is correlated with HIBOR in the current crisis period. Higher HIBOR leads to appreciation of the Hong Kong dollar, though the magnitude of variation in the dollar is very small (Table 2). This is similar to what happened in 2001, when HIBOR and LIBOR were correlated with the Hong Kong dollar. Equity markets in Hong Kong, the US, and the Mainland are not significant in the Hong Kong-dollar exchange rate equation during the current crisis or in 2001. This does not mean that equity related flows are not important for the exchange rate. It indicates that equity flows are not the dominant force in capital flows, probably because there are inflows related to flight-to-safety

purposes after the outbreak of the credit crisis. Such inflows might have worked against the equity-related capital outflows in the same period and neutralised the impact on the exchange rate.

Validity of assumptions on Hong Kong – Mainland equity market linkage

The above findings are based on the technical assumptions of the VAR model as presented in the Appendix. While most assumptions are not controversial, one assumption is particularly debatable: the Hong Kong equity market does not affect the Mainland equity market on the same day. Since the trading hours in the Mainland and Hong Kong equity markets overlap, the correlation between the two markets is consistent with causality going either way. This section tries to disentangle the direction of causality between the two markets.

We use two simple tests to check the robustness of the assumption. First, we test whether influential financial news in Hong Kong equity market affects the Mainland China market. Two simple regressions in Table 7 suggest that shocks from Hong Kong have a significant impact on the local equity market, but not the Mainland equity market.⁶ This result implies that shocks from the Hong Kong equity market have no significant impact on the Mainland market after we control for shocks from the US.

The other exercise is to employ the Granger Causality Test to see whether lagged observations from the Mainland and Hong Kong equity markets have incremental forecasting powers on each other. It is important to note that while the test cannot prove the existence of contemporaneous causality between two markets, it does give us some information about the interactions between two markets. The results in Table 8 suggest that the Hong Kong equity market has no forecasting power for the Mainland market in any periods, while the Mainland market performance has significant forecasting power for the Hong Kong equity market during the current financial crisis. This result implies that the Mainland equity market is more likely to influence the Hong Kong market rather than the other way round.

⁶ Details about these news are tabulated in Table 9. Since our focus is on the current crisis, we only identify the financial news for the current crisis period.

IV. CONCLUSION

The current financial crisis illustrates the financial linkages between the Hong Kong equity market and the US and Mainland markets. The US market continued to play an important role in the Hong Kong equity market, while the Mainland market has gained more influence on it. The financial linkage in the money markets has not changed substantially during the two episodes of crisis, with HIBOR and LIBOR having a relatively high degree of co-movements. The Mainland money market does not have a significant impact on HIBOR due to capital controls. In terms of the Hong Kong-dollar exchange, it is difficult to detect independent and large influences from other markets, partly because of the rather small daily movements of the exchange rate, and partly because of the two-way fund flows relating to the money and equity markets, both flowing into and flowing out of the Hong Kong dollar, thus neutralising their impact on the exchange rate.

The paper reveals that Mainland-based companies in the Hang Seng Index reacted to US equity market shocks in the crisis more than the Hong Kong-based companies did. Given the high weight of Mainland stocks in the Hong Kong equity market, it is useful to further explore reasons behind such difference. We leave this issue for future research.

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Table 1: Major news on Mainland equity market

Date	News	Implication for equity market	Daily change in Shanghai stock market	Daily change in Hong Kong stock market
12/06/2001	China State Council announced the “Interim measures to reduce state-held shares and raise social security funds”. 國務院正式發布《減持國有股籌資社會保障資金管理暫行辦法》。	Negative	0.38%	1.09%
24/07/2001	The “Measures to reduce state-held shares and raise social security funds” became effective. 新股發售“減持”開始。	Negative	-1.5%	-0.18%
04/09/2001	The first open-end fund in Mainland China: HuaAn Innovations Securities Investment Fund was introduced. 首隻開放式基金 — 華安創新宣布發行。	Positive	2.49%	2.15%
22/10/2001	China Securities Regulatory Commission (CSRC) announced that “Interim measures to reduce state-held shares and raise social security funds” would be abolished soon. 中國證監會緊急叫停《減持國有股籌集社會保障資金暫行辦法》。	Positive	-3.29%	-0.29%
24/10/2001	CSRC announced that state-held shares would not be sold to raise social security funds in new IPOs. 中國證監會宣布首發增發時停止國有股出售。	Positive	2.84%	0.23%
16/11//2001	The Mainland Government announced the reduction of the stock trading stamp tax. 中國政府宣布印花稅稅率下調。	Positive	1.57%	0.43%
28/11/2002	CSRC published the phased results on “Reduction of state-held shares”. 中國證監會公布國有股減持方案階	Negative	-6.33%	-0.05%

	段性成果。			
07/06/2002	China Economic Development and Trust Investment Corporation was closed because of share price manipulation. 中國經濟開發信託投資公司因為操縱股價關門。	Negative	0.54%	-0.84%
24/06/2002	CSRC issued provisional rules about raising the threshold for additional share offers. 中國證監會規範上市公司增發新股，提高增發門檻。	Positive	9.25%	0.62%
02/02/2004	The State Council issued the “Measures to promote the reform, opening and steady growth of equity markets”, which is also known as “New nine measures” on equity markets. 國務院發布《關於推進資本市場改革開放和穩定發展的若干意見》，提出“國九條”，肯定了證券市場的作用。	Positive	2.08%	-2.18%
31/08/2004	CSRC notified the suspension of new IPOs in Mainland China. 中國證監會發布通知暫停發行新股。	Positive	1.72%	-0.21%
14/09/2004	Prime Minister Wen Jiabao requested for the strict implementation of the “New nine measures” on equity markets. 溫家寶總理主持召開國務院常務會議，要求抓緊落實“國九條”。	Positive	3.18%	0.06%
23/09/2004	The first listed company was permitted by CSRC to use stock shares to offset its debts. 首例上市公司“以股抵債”方案正式實施。	Positive	3.14%	0.06%
24/01/2005	The stock trading stamp tax was cut from 0.2% to 0.1% with immediate effect. 印花稅由千分之二下調至千分之一。	Positive	1.73%	-0.70%

06/06/2005	CSRC issued the “Supplementary provisions on the share repurchase by listed companies by means of centralised bidding (Trial)”. 中國證監會推出《上市公司回購社會公眾股份管理辦法(試行)》。	Positive	2.05%	0.30%
24/08/2005	The Mainland Government published “Measures for the administration of the share-trading reform of listed companies”. 五部委聯合發布《關於上市公司股權分置改革的指導意見》	Positive	1.49%	-0.67%
03/07/2006	CSRC announced “The guidelines for the internal control of pilot securities lending and borrowing business of securities companies” would be effective soon. 中國證監會宣布將啓動《證券公司融資融券試點管理辦法》。	Positive	1.5%	0.36%
27/02/2007	Market gossip on the Mainland Government’s launch of stock market capital gains tax. 傳聞中國政府將徵收資本利得稅。	Negative	-8.84%	-1.76%
30/05/2007	The Ministry of Finance announced the increase of the stamp tax on stock trading to 0.3%. 財政部宣布印花稅上調至千分之三。	Negative	-6.5%	-0.86%
20/08/2007	The State Administration of Foreign Exchange announced the “Through train” scheme for Mainland individual investors to invest in the Hong Kong equity market. 國家外匯管理局宣布推出「港股直通車」計劃。	Positive	5.33%	5.93%
22/01/2008	Market gossip about Ping An Insurance company’s intention to further raise RMB160 billion in the stock market to increase its shareholding in Fortis Bank in Europe. 市場傳出平安保險欲再融資 1,600 億元，增持歐洲富通銀行。	Negative	-7.22%	-8.65%

25/02/2008	Market gossip about the launch of refinancing plans by firms such as the SPD Bank raised concerns over the increased liquidity pressure on the equity market. 市場傳出浦發等企業再融資計劃，加大股市對資金的憂慮。	Negative	-4.07%	-0.15%
23/04/2008	Market gossip about the reduction of the stamp tax rate from 0.3% to 0.1%. 市場傳聞印花稅將從千分之三降至千分之一。	Positive	4.15%	0.14%
19/09/2008	Stamp tax cut back to 0.1% 印花稅降至千分之一。	Positive	9.45%	9.61%
11/11/2008	The Mainland Government announced an RMB four-trillion fiscal-stimulus plan. 中國政府宣布 4 萬億經濟刺激計劃。	Positive	7.27%	3.52%
25/02/2009	The State Council approved the ten industrial revitalisation plan. 十大產業振興規劃在國務院常務會議全部通過。	Positive	0.27%	1.61%
04/03/2009	The Minister of Industry and Information Technology, Li Yizhong stated that more fiscal-stimulus measures would be launched. 工業和信息化部部長李毅中表示未來還會有刺激經濟新政策。	Positive	6.12%	2.47%

Source: Authors' compilation.

**Table 2: Estimates from VAR model during the current financial crisis
(9 August 2007 to 2 April 2009)**

	Dependent Variables						
	LIBOR	Bond US	Shanghai Index	Rate Mainland	Hang Seng Index	HIBOR	HK\$/US\$
S&P500	-0.002 (0.003)	0.015*** (0.002)	0.229*** (0.059)	0.001 (0.013)	0.529*** (0.056)	-0.010 (0.007)	0.001 (0.001)
LIBOR		0.044 (0.034)	-1.767 (1.105)	-0.192 (0.216)	-0.637 (0.953)	0.442*** (0.109)	0.037** (0.018)
Bond US			0.238 (1.456)	-0.134 (0.309)	-0.047 (1.362)	-0.005 (0.155)	0.052 (0.025)
Shanghai Index				-0.012 (0.010)	0.430*** (0.045)	0.001 (0.006)	0.001 (0.001)
Rate Mainland					-0.066 (0.212)	0.006 (0.024)	0.003 (0.004)
Hang Seng Index						-0.009 (0.006)	0.001 (0.001)
HIBOR							-0.035*** (0.007)
IPO Mainland	-0.039 (0.030)	0.014 (0.023)	-0.187 (0.654)	0.795*** (0.136)	0.161 (0.749)	-0.001 (0.070)	0.028** (0.011)
IPO HK	-0.010 (0.043)	-0.064 (0.033)	0.592 (0.934)	-0.662*** (0.194)	0.770 (1.068)	0.177 (0.100)	-0.023 (0.016)
Mainland Stock Market News	0.007 (0.036)	0.029 (0.027)	4.011*** (0.773)	-0.089 (0.160)	3.443** (0.884)	0.057 (0.083)	-0.004 (0.014)

Source: Authors' estimates.

**Table 3: Estimates from VAR model during burst of the IT bubble
(2 January 2001 to 31 December 2001)**

	Dependent Variables						
	LIBOR	Bond US	Shanghai Index	Rate Mainland	Hang Seng Index	HIBOR	HK\$/US\$
S&P500	0.006 (0.004)	0.010*** (0.003)	0.091 (0.064)	-0.001 (0.001)	0.566*** (0.073)	-0.005 (0.006)	0.001 (0.004)
LIBOR		-0.004 (0.056)	-1.226 (1.047)	0.009 (0.007)	-2.296 (1.199)	0.480*** (0.086)	0.011 (0.006)
Bond US			-0.423 (1.175)	-0.005 (0.007)	0.083 (1.339)	0.210*** (0.096)	0.009 (0.007)
Shanghai Index				-0.001 (0.001)	0.176** (0.071)	-0.006 (0.005)	-0.001 (0.001)
Rate Mainland					-8.889 (11.164)	-0.092 (0.799)	0.077 (0.054)
Hang Seng Index						-0.012*** (0.004)	0.001 (0.001)
HIBOR							-0.012*** (0.004)
IPO Mainland	22.356 (19.110)	6.078 (17.236)	-313.72 (321.38)	1.799 (2.041)	203.99 (413.14)	-0.081 (28.565)	1.358 (1.811)
IPO HK	0.618 (1.836)	-0.468 (1.656)	9.480 (30.88)	0.242 (0.196)	-8.899 (39.699)	-0.887 (2.749)	0.128 (0.174)
Mainland Stock Market News	0.034 (0.033)	0.042 (0.030)	1.872*** (0.555)	-0.001 (0.004)	1.267 (0.713)	0.063 (0.049)	0.003 (0.003)

Source: Authors' estimates.

**Table 4: Estimates from VAR model after burst of the IT bubble
and before the current financial crisis
(2 January 2002 to 9 August 2007)**

Source: Authors' estimates.

	Dependent Variables						
	LIBOR	Bond US	Shanghai Index	Rate Mainland	Hang Seng Index	HIBOR	HK\$/US\$
S&P500	0.001 (0.001)	0.017*** (0.001)	0.018 (0.039)	0.002 (0.004)	0.430*** (0.025)	-0.006 (0.004)	0.001 (0.001)
LIBOR		0.190*** (0.074)	1.261 (1.993)	0.009 (0.195)	0.231 (1.291)	0.120 (0.163)	-0.011 (0.045)
Bond US			1.025 (0.708)	0.003 (0.069)	-0.566 (0.459)	0.097 (0.058)	0.004 (0.016)
Shanghai Index				-0.003 (0.003)	0.088*** (0.017)	-0.002 (0.002)	0.001 (0.001)
Rate Mainland					-0.020 (0.173)	-0.006 (0.022)	0.011 (0.006)
Hang Seng Index						-0.006 (0.004)	-0.002*** (0.001)
HIBOR							-0.014** (0.007)
IPO Mainland	-0.006 (0.006)	-0.012 (0.017)	-0.059 (0.448)	0.277*** (0.044)	-0.010 (0.321)	0.001 (0.037)	0.012 (0.010)
IPO HK	-0.002 (0.005)	-0.013 (0.015)	0.994** (0.387)	0.089** (0.038)	0.135 (0.278)	0.153*** (0.032)	0.017 (0.009)
Mainland Stock Market News	-0.004 (0.005)	-0.026 (0.015)	4.480*** (0.384)	0.010 (0.037)	0.084 (0.275)	-0.038 (0.031)	0.012 (0.009)

**Table 5: Estimates from VAR model with the Hang Seng Index
excluding the Mainland stocks
(9 August 2007 to 2 April 2009)**

	Dependent Variables						
	LIBOR	Bond US	Shanghai Index	Rate Mainland	Hang Seng Index	HIBOR	HK\$/US\$
S&P500	-0.003 (0.003)	0.016*** (0.002)	0.258*** (0.058)	0.001 (0.013)	0.468*** (0.052)	-0.010 (0.007)	0.001 (0.001)
LIBOR		0.046 (0.033)	-1.717 (1.007)	-0.194 (0.216)	0.233 (0.886)	0.453*** (0.109)	0.037** (0.018)
Bond US			0.056 (1.441)	-0.166 (0.309)	-0.235 (1.263)	0.019 (0.155)	0.055** (0.025)
Shanghai Index				-0.011 (0.010)	0.296*** (0.042)	0.001 (0.005)	0.001 (0.001)
Rate Mainland					-0.131 (0.197)	0.001 (0.024)	0.003 (0.004)
Hang Seng Index						-0.010 (0.006)	0.002 (0.010)
HIBOR							-0.035*** (0.008)
IPO Mainland	-0.039 (0.030)	0.013 (0.023)	-0.194 (0.653)	0.798*** (0.136)	0.145 (0.663)	-0.002 (0.070)	0.028** (0.012)
IPO HK	-0.012 (0.044)	-0.062 (0.033)	0.623 (0.933)	-0.666*** (0.194)	0.475 (0.946)	0.184 (0.100)	-0.023 (0.016)
Mainland Stock Market News	0.005 (0.036)	0.031 (0.027)	4.010*** (0.772)	-0.083 (0.161)	1.703** (0.783)	0.055 (0.083)	-0.004 (0.014)

Source: Authors' estimates.

**Table 6: Estimates from VAR model with the Hang Seng H-share index
(9 August 2007 to 2 April 2009)**

	Dependent Variables						
	LIBOR	Bond US	Shanghai Index	Rate Mainland	Hang Seng Index	HIBOR	HK\$/US\$
S&P500	-0.002 (0.003)	0.015*** (0.002)	0.205*** (0.058)	0.002 (0.013)	0.607*** (0.067)	-0.010 (0.007)	0.001 (0.001)
LIBOR		0.045 (0.034)	-1.711 (1.016)	-0.192 (0.217)	-1.184 (1.172)	0.437*** (0.108)	0.039** (0.018)
Bond US			0.272 (1.457)	-0.152 (0.310)	-0.622 (1.674)	-0.021 (0.155)	0.053 (0.025)
Shanghai Index				-0.012 (0.010)	0.622*** (0.056)	0.001 (0.006)	0.001 (0.001)
Rate Mainland					-0.044 (0.261)	0.006 (0.024)	0.002 (0.004)
Hang Seng Index						-0.006 (0.004)	0.001 (0.001)
HIBOR							-0.036*** (0.008)
IPO Mainland	-0.039 (0.030)	0.016 (0.023)	-0.165 (0.653)	0.791*** (0.136)	-0.222 (0.938)	0.003 (0.070)	0.029** (0.012)
IPO HK	-0.010 (0.043)	-0.061 (0.033)	0.609 (0.929)	-0.681*** (0.194)	0.982 (1.336)	0.178 (0.099)	-0.022 (0.016)
Mainland Stock Market News	0.008 (0.036)	0.030 (0.027)	3.995*** (0.771)	-0.099 (0.161)	5.517*** (1.107)	0.062 (0.083)	-0.003 (0.014)

Source: Authors' estimates.

**Table 7: Influence of the Hong Kong news on the Mainland stock market
(9 August 2007 to 2 April 2009)**

	Dependent Variable	
	Hang Seng Index	Shanghai Index
Shanghai Index	0.498*** (0.048)	
S&P500	0.358*** (0.054)	0.252*** (0.056)
News in Hong Kong	1.617** (0.800)	0.016 (0.849)

Source: Authors' estimates.

**Table 8: Granger Causality Wald Test between the Mainland China and Hong Kong
stock market in three sample periods**

Sample Period	Hong Kong → Mainland P-Value of Wald Test	Mainland → Hong Kong P-Value of Wald Test
02/01/2001 - 31/12/2001	0.617	0.140
02/01/2002 - 09/08/2007	0.623	0.524
09/08/2007 - 02/04/2009	0.621	0.003***

Source: Authors' estimates.

Table 9: Major news on Hong Kong equity market in current crisis

Date	News	Implication for equity market	Daily Change in Shanghai Stock market	Daily Change in Hong Kong Stock market
23/10/2007	HKMA sold Hong Kong dollars against US dollars when the exchange rate reaches 7.75 at the first time since three refinements reform on the Linked Exchange Rate system. 金管局於港匯觸及 7.75 的強方兌換保證匯率情況下入市，這是金管局推出優化聯匯三招後首度入市。	Positive	1.87%	3.54%
19/05/2008	HKEx Securities Market's Closing Auction Session was launched on 26 May 2008. 香港交易所定於 2008 年 5 月 26 日在旗下證券市場實施收市競價交易時段。	Positive	-0.54%	0.48%
18/09/2008	Bank of East Asia announced that a rogue trader had disguised a HK\$93 million trading loss on "certain equity derivatives", forcing the bank to write down its previously reported first-half net profit by HK\$109 million. 東亞銀行停牌披露有交易員違規，將港幣 9 千 3 百萬元的投資虧損虛報為收益入帳，令該行損失約港幣 1 億元。	Negative	-1.72%	-0.03%
14/10/2008	The Financial Secretary announced the use of the Exchange Fund to guarantee the repayment of customer deposits held in Hong Kong with all Authorised Institutions until the end of 2010 following the principles of the existing Deposit Protection Scheme. 財政司司長宣布參照現行存款保障計劃的原則，運用外匯基金為存放於香港所有認可機構的客戶存款提供擔保，至 2010 年底止。	Positive	-2.71%	3.19%

21/10/2008	Citic Pacific announced a loss of HK\$14.7 billion due to loss incurred in leveraged forex trading. 中信泰富表示由於一筆外匯槓桿交易而導致高達 147 億港元的損失。	Negative	-0.78%	-1.84%
22/10/2008	SFC confirmed that SFC began to probe massive CITIC Pacific loss. 香港證監會確認已經對中信泰富的業務展開調查。	Negative	-3.20%	-5.18%
06/11/2008	PCCW announced detailed about its privatisation plan. 電訊盈科正式宣布其私有化的具體方案。	Negative	-2.44%	-7.08%
02/03/2009	HSBC announced the launch of the largest capital raising exercise in Hong Kong history. 滙豐控股宣布進行香港有史以來最大的集資行動。	Negative	0.51%	-3.86%
12/03/2009	HKEx announced the suspension of the Closing Auction Session (CAS) that had been introduced for less than one year. 港交所宣布撤銷實施不足一年的收市競價機制。	Positive	-0.24%	0.59%

Source: Authors' compilation.

Appendix: Assumptions on the Identification of VAR

The variables enter the VAR in the following order: S&P index, LIBOR, US bond, Shanghai stock index, Mainland repo rate, Hang Seng Index, HIBOR, and Hong Kong-dollar exchange rate. The first three variables are included with a one-day lag, as their changes on day t affects Asian variables on day $t+1$. Since the US markets are not overlapped with the Asian markets, they enter the other equations as exogenous variables. There is an issue how to rank the three variables among themselves, but since our focus is on the Hong Kong variables, the ranking among the US variables does not make a big difference.

The opening times for the Mainland and Hong Kong markets are overlapped, which means that we need to make a judgement on which market affects the other. We assume Mainland markets could affect the Hong Kong markets on the same day, but not the other way round. This is a strong assumption for the equity markets, as there could be endogenous interaction between the Hang Seng and Shanghai indices. Within each economy, we assume the equity market affects the interest rate on the same day, but the interest rate affects the equity market with one day lag. This is also a strong assumption. The last assumption is that all markets could affect the exchange rate on the same day, but exchange rate can also affect other markets with a one-day lag.