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Mutual Fund Flows in Asian Equity Markets

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Abstract

International mutual funds are one of the key suppliers of liquidity in Asian equity markets. This paper uses weekly country fund flow data into eleven Asian equity markets over the period 2002-2009. The data includes Japan country funds and funds under the Asia ex-Japan category. During this period, we find positive cumulative inflow into seven countries (China, Hong Kong, India, Indonesia, Philippines, Singapore, and Taiwan) and negative cumulative outflow in four countries (Japan, Korea, Malaysia, and Thailand). There is evidence that higher market return attracts more incoming flow in the following week. This result is robust after controlling for regional returns, interest rates, and exchange rates. Perturbations of investor net purchase into China funds have a more positive and lasting impact on flow innovations into other country funds. Innovations of investor net purchase into Japanese funds generate only a strong concurrent impact.

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I. INTRODUCTION

Research examining the role of foreign portfolio flows in emerging equity markets took off after the Asian crisis, circa 1997. Today the role of foreign portfolio flows remains an interesting issue of academic and policy debate in Asia given the growing dominance of China and India equity markets in the region, an ever-growing boom in international mutual funds, and the sheer volatility of flows as investors may enter and exit funds at any time. This paper explores the weekly pattern of emerging market mutual fund flows in Asia between 2002-2009 and examines the determinants of their aggregate flows and their hierarchy of fund flows from large to small markets.

Unlike most existing literature that uses aggregate foreign portfolio flows into equity markets, we focus on a proprietary data set from the Emerging Portfolio Fund Research Inc (EPFR) that maintains investors' weekly net purchase and sale of country funds. As of the third quarter of 2009, we compile a total of 1,063 funds from 116 fund families, which includes Japan country funds and funds under the Asia ex-Japan category. The data does not include flows from Global Emerging Market Funds or other International Funds. This study provides two contributions. First, it provides a timely overview of the most recent an important subset of total fund flow patterns in Asia, which has been the key source of growth in world equities. Thus far, little is known about the behavior of investor flows into these mutual funds.[1]
Second, it provides an analysis of hierarchy of investor flows into mutual funds in Asia. We conjecture that flows are likely move first into important markets like China and Japan which are the barometer of Asian growth before trickling down to smaller markets.

[1] Borensztein and Gelos (2000) use data from EPFR to detect monthly herding. This study benefits from a longer time series, higher weekly frequency, and a much larger sample due to the relentless growth in emerging market funds of recent years.

We find that weekly fluctuations in investment flows into emerging market funds are high and yet they are fairly persistent. This finding is similar to Kaminsky et al. (2001) who provide an overview of emerging market fund activities during emerging market crises in 1990s and document high fluctuations in fund injections and redemptions. We find that higher market return is associated with increased investments in mutual funds in the following week. Finally, we discover that flows into Japan and China have strong contemporaneous impact on flows into other Asia mutual funds. In addition, an increase in flows into Japan and China in earlier weeks can predict reductions in flows into other Asian countries. Although the economic impact from Japan flows are greater at the contemporaneous level, impulse response functions reveal that shocks from inflows into China mutual funds have a permanent positive impact on inflows into other Asian funds.

The paper is organized as follows. Section 2 provides a brief literature survey followed by a description of our data source and a report of mutual fund key statistics in sections 3 and 4. In section 5, we analyze the determinants of fund flows. Next, in section 6 we explore on the ordering of mutual fund flows between large and small markets. Section 7 concludes.

II. LITERATURE SURVEY

Earlier research on foreign portfolio flows can be segmented into several key areas. The first involves literature assessing the general behavior of foreign portfolio flows to equity markets. Barth and Zhang (1999) investigate the role of foreign equity flows during Asian financial crisis in 1977 and find that international placements and private equity investments are stable sources of finance. Foreign investors, who control the majority of free floats and have longer investment horizon, have suffered significant losses. Hedge funds, however, have gained significantly during the study period. Chai-Anant and Ho (2008) examines similar six Asian emerging markets from foreign investors' daily transactions and their relationship with local market returns and exchange rate changes. Their result confirms that equity market returns matter for net equity purchases and vice versa. Foreign investors often move in or out of

multiple Asian markets simultaneously and more so on the way in than the way out. Others, for example Bekaert et al. (2002) and Clark and Berko (1996) find an association between equity price movements and foreign flows.

The second segment explores the role of foreign investors as informed or positive feedback traders. On one hand, foreign investors are perceived to have better information processing ability and are capable of anticipating price movements (Choe et al. (1999), Griffin et al. (2004), Seascholes (2004). On the other, they are perceived to herd after stock returns. Richards (2002) analyses aggregate daily trading of all foreign investors in six Asian emerging equity markets and finds that foreigners are net buyers in these markets on the day after their markets or the US market rise. This suggests information transmission from recent returns, rather than portfolio-rebalancing and larger price impact from trades by foreign investors. Wongswan (2006) reports large and significant association between macroeconomic announcements from developed-economy (such as the US and Japan) to equity volatility and trading volume from emerging-economy (such as Korea and Thailand). Froot and Ramadorai (2008) find trend chasing behavior in closed-end country funds.

The third area focuses on how foreign portfolio flows may increase market volatility given the sheer size of foreign investment flows and their positive feedback tendency. But thus far evidence have shown little support whether the study is based on a large market like Japan (Hamao and Mei (2001), Karolyi (2002)) or small Asian markets like Indonesia (Bonser et al. (2002)) or Thailand (Pavabutr and Yan (2007)).

III. DATA DESCRIPTION

This research uses weekly stock market data between 2002- 2009 from Datastream and emerging market fund data from Emerging Portfolio Fund Research Inc (EPFR). EPFR is a US-based data vendor who collects fund flows and asset allocation data from financial institutions around the world. The aggregate fund flow data comes from mutual funds that are registered for

sale in most major developed market jurisdictions and offshore domiciles, including, US, UK, Canada, Luxembourg, Switzerland, Australia, Hong Kong, Channel Islands, Germany, Austria, France, and many others. Panel A of Table 1 provides the total number of mutual fund data available from the EPFR database in Asia ex-Japan and in Japan as well as the number of dedicated country funds over the sample period. A limited number of hedged funds are in the sample. Not included in our computations are Global Emerging Market Funds and other International Funds. We do not separate funds that are indexed based ETFs and non-ETFs.

Despite the recent market down turn, the number of fund families in Asia ex Japan has grown from 76 in 2003 to 112 in 2009 mainly driven by growth from China and India. Likewise, the average end-of-week asset size per fund in China funds grew from USD 97 million in 2003 to USD 215 million in 2009 whereas Indian funds grew from USD 64 million in 2003 to USD 103 million in 2009 shown in Panel B of Table 1. As part of "Greater China," Hong Kong and Taiwan experienced spill-over of growth and wealth from the mainland. Mutual fund activities in the rest of Asia including Japan are more subdued. Thailand in particular is the only country in our sample where the average end of week fund size has shrunk from USD 46 million in 2003 to only USD 22 million in 2009.

IV. MUTUAL FUND STATISTICS

Figure 1 demonstrates cumulative flow in USD millions into Asia ex-Japan and Japan funds during the total period. Equity flows into Japan lead flows going to other Asian countries and funds going out. At the end of December 2009, Japan exhibits cumulative outflow where in other Asian markets report net inflow.

Table 2 presents cumulative weekly foreign equity flows during January 2002 to December 2009 from 11 different countries. The data is also divided into two sub-periods to separate the crisis period which starts during 2007. The first period is from January 2002 to December 2006 and the second period covers January 2007 to December 2009.

For the total period, seven countries (China, Hong Kong, India, Indonesia, the Philippines, Singapore, and Taiwan) exhibit cumulative inflow and four countries (Japan, Korea, Malaysia and Thailand) report cumulative outflow. All countries, except for Korea and Malaysia, have cumulative net inflow during the first sub-period before the crisis. During and after the crisis, there is cumulative inflow to four countries (Hong Kong, Indonesia, Korea, and Taiwan) and cumulative outflow from seven countries (China, India, Japan, Malaysia, the Philippines, Singapore and Thailand). There is high cumulative equity flow into China and India during the same period. Largest amount of inflow goes to Japan during the first sub-period and also outflow coming out in the second sub-period. Taiwan is the only country exhibiting cumulative net inflow for all periods and Malaysia is the only country showing cumulative net outflow for all periods.

Table 3, Panel A reports weekly correlation of foreign equity flows by region. There is a higher positive correlation (0.61) between Asia ex-Japan and Emerging Europe markets. Markets by region have positive correlation, except for Asia ex-Japan and Middle East and Africa. Weekly correlation of foreign equity flows to individual Asian markets is shown in Table 2, Panel B.

China and India have the highest correlation among Asian markets at 0.659. Thailand is positively correlated with other Asian Markets, except for Malaysia (-0.10) and exhibits relatively higher correlation with India (0.346) and Taiwan (0.291).

Table 4 reports the summary statistics of weekly foreign equity flows by country. Weekly foreign equity flows are very volatile albeit fairly persistent. For example, net investment flows into Japan funds has autocorrelation of above 0.60 in both first and second week lags. For the entire sample period, India and China exhibit the highest average weekly foreign equity flows of approximately USD 11 million and USD 9 million, respectively. The average net foreign equity flow into these two countries are particularly high in the first sub-period with average net weekly flow of USD 25 million and USD 24 million. This trend is reversed in the second sub-period during which average net foreign equity moved out at a rate of USD 15 million and USD 19 million per week. In contrast, Japan and Korea experience the largest average weekly foreign equity outflow of USD 92 million and USD 26 million over the same period. Despite

having a net weekly inflow of close to USD 92 million in the first sub-period, Japan realized a large negative outflow as high USD 205 million in the second sub-period. In the meantime, average weekly net foreign equity flow into Thailand is USD -0.83 million for the entire sample period this is predominantly a consequence of the large weekly outflows in the second sub-period which is around USD 3.05 million.

V. DETERMINANTS OF MUTUAL FUND FLOWS

A. Bivariate Model

Numerous empirical work document positive feedback trading by foreign equity flows, which means that high market return begets high foreign flows.[2] We conduct a bivariate vector autoregressive model between flow and return to account for endogeneity between market return r_t and on scaled weekly investment in USD into country x mutual fund f_t. The scaling is done by dividing the weekly investment amount by country x market capitalization in USD. The two-equation structural model has the following identification,

$$Y_t = \delta + \Phi_1 Y_{t-1} + \ldots + \Phi_p Y_{t-p} + \varepsilon_t \qquad (1)$$

and define

$$Y_t = \begin{bmatrix} f_t \\ r_t \end{bmatrix}, \quad \delta_t = \begin{bmatrix} \delta_1 \\ \delta_2 \end{bmatrix}, \quad \phi_t = \begin{bmatrix} \phi_1 \\ \phi_2 \end{bmatrix}, \quad \varepsilon_t = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix}$$

with the following residual structure

$$\sum_{\varepsilon} \begin{bmatrix} \mathrm{var}(\varepsilon_{1t}) & 0 \\ 0 & \mathrm{var}(\varepsilon_{2t}) \end{bmatrix}$$

[2] Choe, Kho, and Stulz (1999) and Kim and Wei (2002) report strong positive feedback activity in Korea. Bonser-Neal, et al. (2002) examine foreign trading behavior in the Indonesian market between 1995-2000 and find that foreign investors exhibit herding behavior. Richards (2005) study a broad range of Asian markets during the crisis and find positive feedback trading.

Table 5 reports the bivariate VAR coefficients up to four weekly lags based on the Akaike Information Criteria (AIC) statistics 4 for weekly and the persistence of weekly fund flow. For all countries, we find that previous week local return have a significant impact on contemporaneous mutual fund flows. China equity returns have the largest coefficients with a 1% change in contemporaneous and previous week increase in return leading to a 3% increase in flows into China-focused funds. Investor flows are persistent, in particular flows into China and Japan country funds shows persistence up to the third week

B. Multivariate Model

In this subsection, we include some exogenous factors that may determine foreign flows, such as regional returns and exchange rate. To do so, we extend equation (1) and re-estimate the structural model,

$$Y_t = \delta + \sum_{i=1}^{p} \Phi_i Y_{t-i} + \sum_{i=1}^{s} \Pi_i X_{t-i} + \varepsilon_t \qquad (2)$$

where

$$X_t = \begin{bmatrix} x_{1t} \\ x_{2t} \\ x_{3t} \end{bmatrix}$$

is a vector of regional returns, change in 3-month US treasury bill yield, and change in exchange rate of local currency to US dollars.

Table 6 shows that a positive Asian ex Japan regional return at distant lags seems to predict a positive flows into all markets except Hong Kong, Malaysia, Singapore, and Taiwan. This may reflect that regional return momentum induces more investment flows into individual country funds. We also find that a reduction in bond yields attracts more flows. Investor flows into China and Japan funds are more sensitive to reduction in yields. We do not find evidence that currency movements affects investment flows.

A final point to note for this part is that, although regional market returns are important in explaining country fund flows, country fund flows are dominated by movements in local returns noted by the size of the coefficients on the VAR models. For example, a 1% increase in local market return in the previous week increases investment flows into Thai country funds by 0.07%, but a 1% increase in regional market return in 2, 3, and 4 weeks earlier raises investment flows by only 0.001%.

VI. IS THERE A HIERARCHY OF MUTUAL FUND FLOWS?

To date Japan remains the largest and most developed market in Asia. But the recent decade has seen explosive growth in the Chinese economy and with that the growth in its capital market. In this section, we examine the impact of mutual fund flows into Japan and China on the rest of Asia. To do so, we use various specifications of the VAR model.

Beginning with a bivariate model between country fund flows with China and with Japan, we assume that flows into China (Japan) funds have contemporaneous affect on each country's mutual fund flows, but not vice versa. The two-equation structural model has the following identification,

$$B_0 Y_t = \Gamma_B + B_L Y_{t-i} + \varepsilon_t \qquad (3)$$

where

$$B_0 = \begin{bmatrix} 1 & -b_1 \\ 0 & 1 \end{bmatrix}, \quad B_L = \begin{bmatrix} \phi_{11}(L) & \phi_{12}(L) \\ \phi_{21}(L) & \phi_{22}(L) \end{bmatrix}$$

and

$$Y_t = \begin{bmatrix} f_{1t} \\ f_{2t} \end{bmatrix}, \quad \Gamma_B = \begin{bmatrix} \gamma_1 \\ \gamma_2 \end{bmatrix}, \quad \varepsilon_t = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix}$$

with the following residual structure

$$\sum_{\varepsilon} \begin{bmatrix} \text{var}(\varepsilon_{1t}) & 0 \\ 0 & \text{var}(\varepsilon_{2t}) \end{bmatrix}$$

Multiplying equation (1) by $B\square\square^{\prime}$, results in a reduced form representation in equation (2) where $\Gamma_A = B_0^{-1}\Gamma_B$, $A_L = B_0^{-1}B_L$, and $e_t = B_0^{-1}\varepsilon_t$

$$Y_t = \Gamma_A + A_L Y_{t-i} + e_t \qquad (4)$$

Define f_{1t} as scaled weekly investment in USD into country *x* mutual funds and f_{2t} is scaled weekly investment into China or Japan focused mutual funds. In Panel A of Table 7, we find that only contemporaneous flows into China funds have significant impact on all country fund flows in particular India where the size of the coefficient and statistical significance is strongest with a 1% increase in China fund flows leading to a 0.04% increase in Indian fund flows. We expect this is attributable to the strong performance of Indian equities that has led to the emergence of many "BRIC" dedicated funds. Next in Panel B of Table 7, we re-estimate the bivariate VAR models by replacing China fund flows with Japan fund flows. A similar conclusion emerges with the coefficients of contemporaneous Japan fund flows having the strongest positive impact on country fund flows, most notably for China and India, where a 1% increase in flows into Japan funds leads to a 1.6% and 1.1% increase in flows into China and

India respectively. The negative and significant coefficients on lags of flows into China and Japan funds indicates some flow reversion and that these flows are quite volatile from week to week.

Figure 2 is a series of impulse response function plots showing the response of Korea, Singapore, India, and Thailand to one standard deviation perturbation of investment flows into China funds (left hand side) and Japan funds (right hand side). A consistent pattern exist for all countries selectively shown here that perturbations into China fund have a more positive and lasting impact on flow innovations into other country funds. The result is indicative that positive sentiment leading to increased flow innovations into China will lead to positive innovations into other Asian market funds.

VII. CONCLUSION

This paper uses weekly net investor purchases into country funds to examine their pattern of investments and their determinants. Between 2002-2009, the number of fund families in Asia ex-Japan has grown 47%, mainly driven by growth from China and India. During this period, Hong Kong and Taiwan experienced spill-over of growth and wealth from China while mutual funds activities in the rest of Asia are more subdued. Furthermore, as Hong Kong and Taiwan are part of "Greater China" funds, which we classified as flows into China, the flows used in their individual VAR estimates will be understated. Thailand is the only country where fund size has reduced. International mutual funds exhibit positive cumulative flows into seven Asian equity markets and negative cumulative flows into four markets during the study period.

China and India have the highest correlation and Thailand exhibits relatively higher correlation with India and Taiwan. Concurrent and previous week local return has a significant impact on concurrent mutual fund flows for all countries. We find that previous day world return predicts an increase in foreign net flow but it is the local return that attracts country fund flows. Same week flows into China funds have significant impact on all country fund flows and in particular

to India. In addition, positive innovations in investor flow into China funds leads to positive activities into other Asian market funds.

It is important to note that the data used in this research consists of funds under the Asia ex-Japan and Japan country funds category but do not include funds under the categories Global Emerging Market Funds and International Funds. A more complete analysis should include other fund types and analyze how changes in country allocations can impact local returns.

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Table 1: Number of Funds and Fund Families and Average Fund Size in Millions of USD by Country

This tables reports the number of funds and fund families and average fund size in millions of USD by country between the years 2003-2009 from the EPFR database. The non-Japan focused funds included in the sample are those categorized under Asian ex-Japan funds.

Panel A

Year	2003	2004	2005	2006	2007	2008	2009
Number of Fund Families	76	78	78	82	106	115	112
Number of regional funds	255	214	323	330	465	571	498
Number of Country Funds	201	177	308	344	546	652	553
China	71	78	141	167	266	300	248
Hong Kong	24	20	31	21	31	34	29
India	28	21	45	70	122	164	144
Indonesia	5	2	4	3	8	7	5
Korea	32	24	38	30	42	53	44
Malaysia	2	2	3	3	4	7	5
Pakistan	0	0	0	0	0	3	3
Philippines	3	1	1	1	1	2	1
Singapore	9	9	14	17	26	23	19
Taiwan	16	10	12	15	22	25	29
Thailand	11	10	19	17	22	31	23
Vietnam	0	0	0	0	2	3	3
Japan							
Number of Fund Families	12	8	10	10	17	6	4
Number of Funds	32	19	30	32	65	34	12

Panel B

Year	2003	2004	2005	2006	2007	2008	2009
EoW Asset Size (US$ mn)							
Fund Family	62	101	108	157	209	93	125
Regional Funds	60	90	98	135	175	77	91
Country Funds	63	116	119	180	239	107	157
China	97	120	119	194	271	130	215
Hong Kong	32	62	42	88	148	221	258
India	64	269	269	243	264	88	104
Indonesia	4	29	17	25	22	18	8
Korea	57	92	75	123	200	55	73
Malaysia	93	167	137	204	341	65	107
Pakistan	0	0	0	0	0	0	0
Philippines	0	0	8	35	52	21	21
Singapore	23	27	41	107	167	70	87
Taiwan	34	86	139	227	213	113	144
Thailand	46	49	43	57	52	20	22
Vietnam	0	0	0	0	695	213	298
Japan	126	248	332	475	347	174	115

Table 2: Cumulative Foreign Equity Flow in Millions of USD by Country

This table reports cumulative weekly foreign equity flows in millions of USD by country over different periods. The sample period is January 2002 to September 2009. The sample is split into two sub-periods, sub-period 1, January 2002-December 2006, sub-period 2, January 2007-September 2009.

Country	Period	Cum. Flow in USD millions
China	01/2002-09/2009	3,683
China	01/2002-12/2006	6,324
China	01/2007-09/2009	(2,641)
Hong Kong	01/2002-09/2009	585
Hong Kong	01/2002-12/2006	72
Hong Kong	01/2007-09/2009	513
India	01/2002-09/2009	4,493
India	01/2002-12/2006	6,657
India	01/2007-09/2009	(2,164)
Indonesia	01/2002-09/2009	78
Indonesia	01/2002-12/2006	(4)
Indonesia	01/2007-09/2009	82
Japan	01/2002-09/2009	(5,934)
Japan	01/2002-12/2006	23,017
Japan	01/2007-09/2009	(28,951)
Korea	01/2002-09/2009	(906)
Korea	01/2002-12/2006	(1,000)
Korea	01/2007-09/2009	94
Malaysia	01/2002-09/2009	(88)
Malaysia	01/2002-12/2006	(10)
Malaysia	01/2007-09/2009	(77)
Philippines	01/2002-09/2009	8
Philippines	01/2002-12/2006	17
Philippines	01/2007-09/2009	(9)
Singapore	01/2002-09/2009	129

Country	Period	Cum. Flow in USD millions
Singapore	01/2002-12/2006	180
Singapore	01/2007-09/2009	(51)
Taiwan	01/2002-09/2009	561
Taiwan	01/2002-12/2006	186
Taiwan	01/2007-09/2009	374
Thailand	01/2002-09/2009	(309)
Thailand	01/2002-12/2006	108
Thailand	01/2007-09/2009	(417)
Vietnam	09/2007-09/2009	80

Table 3: Correlation of Weekly Foreign Equity Flow

Panel A of this table reports weekly correlation of foreign equity flows by region. Panel B reports weekly correlation of foreign equity flows to Asian markets.

Panel A: Regional Correlation

Region	Asia ex-Japan	Emerging Europe	Europe & Middle East	Middle East	Middle East & Africa	Latin America
Asia ex-Japan	1.00	0.61	0.33	0.15	-0.02	0.35
Emerging Europe		1.00	0.48	0.26	0.07	0.41
Europe & Middle East			1.00	0.44	0.25	0.29
Middle East				1.00	0.39	0.16
Middle East & Africa					1.00	0.24
Latin America						1.00

Panel B: Country Correlation

	China	Hong Kong	India	Indonesia	Japan	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
China	1.000	0.300	0.659	0.225	0.231	0.139	-0.009	0.287	0.260	0.011	0.186
Hong Kong		1.000	0.163	0.061	-0.029	0.125	0.004	0.322	0.103	0.013	0.007
India			1.000	0.330	0.344	0.147	0.029	0.195	0.224	0.127	**0.346**
Indonesia				1.000	0.078	0.167	0.059	-0.022	-0.061	-0.040	0.144
Japan					1.000	0.001	0.172	0.136	0.055	0.032	0.150
Korea						1.000	0.091	0.159	0.120	0.021	0.122
Malaysia							1.000	0.081	0.194	-0.245	-0.100
Philippines								1.000	0.181	0.125	0.246
Singapore									1.000	0.157	0.061
Taiwan										1.000	**0.291**
Thailand											1.000

Table 4: Summary Statistics of Weekly Foreign Equity Flows

This table reports summary statistics of weekly foreign equity flows for total sample period and sub-periods. The last two columns report the weekly autocorrelation at lags 1 and 2, respectively.

Country	Min	Mean	Median	Max	Std	ρ 1	ρ2
Total sample period							
China	-942.47	9.03	3.64	806.90	123.76	0.43	0.31
Hong Kong	-354.08	1.42	0.06	181.41	29.48	0.14	0.1
India	-848.10	10.99	8.61	346.38	112.55	0.41	0.23
Indonesia	-13.90	0.18	-0.01	19.91	3.04	0.31	0.04
Japan	-1453.07	-15.14	-8.06	1537.80	333.67	0.68	0.62
Korea	-465.17	-2.26	-1.24	226.15	42.33	0.15	0.1
Malaysia	-24.88	-0.22	-0.02	25.60	3.41	0.46	0.32
Philippines	-6.40	0.02	0.00	8.38	1.54	0.12	-0.05
Singapore	-138.38	0.39	-0.02	109.72	17.12	0.23	0.18
Taiwan	-54.93	1.34	-0.23	183.92	19.72	0.6	0.47
Thailand	-73.57	-0.82	-0.45	81.70	12.00	0.37	0.15
Vietnam	-42.98	0.76	0.00	40.13	9.35	-0.19	-0.15

Table 4: Summary Statistics of Weekly Foreign Equity Flows (Continued)

Country	Min	Mean	Median	Max	Std	ρ1	ρ2
Period 1							
China	-173.88	24.23	4.36	806.90	73.63	0.49	0.41
Hong Kong	-354.08	0.28	0.02	124.90	28.87	0.08	0.01
India	-668.05	25.51	12.33	275.05	76.65	0.5	0.25
Indonesia	-9.30	-0.02	-0.01	8.30	1.76	0.33	0.04
Japan	-795.60	91.70	34.13	1537.80	291.24	0.64	0.56
Korea	-465.17	-3.83	-1.06	58.12	33.01	0.04	-0.05
Malaysia	-3.61	-0.04	-0.01	3.19	0.44	0.44	0.2
Philippines	-4.91	0.09	0.00	8.38	1.10	0.18	-0.12
Singapore	-41.24	0.69	0.01	30.56	6.00	0.18	0.07
Taiwan	-34.63	0.71	-0.09	25.13	7.60	0.16	-0.12
Thailand	-28.88	0.41	-0.15	65.07	9.22	0.31	0.25
Period 2							
China	-942.47	-18.51	-8.72	557.54	179.54	0.35	0.23
Hong Kong	-121.13	3.48	0.76	181.41	30.55	0.23	0.25
India	-848.10	-15.33	-4.66	346.38	155.00	0.34	0.19
Indonesia	-13.90	0.54	-0.03	19.91	4.50	0.03	0.03
Japan	-1453.07	-205.33	-147.78	838.76	320.27	0.56	0.45
Korea	-322.41	0.59	-3.02	226.15	55.38	0.17	0.2
Malaysia	-24.88	-0.54	-0.42	25.60	5.68	0.46	0.31
Philippines	-6.40	-0.07	-0.07	6.69	1.99	0.08	-0.01
Singapore	-138.38	-0.15	-1.87	109.72	27.61	0.24	0.19
Taiwan	-54.93	2.48	-2.26	183.92	31.50	0.65	0.53

Country	Min	Mean	Median	Max	Std	ρ1	ρ2
Thailand	-73.57	-3.05	-3.20	81.70	15.65	0.39	0.07
Vietnam	-42.98	0.76	0.00	40.13	9.35	-0.19	-0.15

Table 5: Bivariate VAR Between Mutual Fund Flows and Local Returns

This table presents results from bivariate model between mutual fund flows and local returns for weekly frequencies. The ordering in VAR begins from local return to scaled mutual fund flow (mutual fund flows divided by average market capitalization). Let ***, **, * denotes significance at 1%, 5%, and 10%, respectively.

Flow Eqn	China	Hong Kong	India	Indonesia	Japan	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
Mutual fund flow											
Lag1	**0.218**	**0.115**	**0.243**	**0.312**	**0.298**	-0.016	**0.358**	**0.135**	**0.151**	**0.440**	**0.290**
t-stat	**4.32*****	**2.28****	**4.81*****	**6.24*****	**5.90*****	-0.32	**7.08*****	**2.71*****	**3.01*****	**8.89*****	**5.73*****
Lag2	**0.118**	0.074	**0.094**	-0.062	**0.166**	**0.089**	0.049	-0.030	0.051	**0.097**	0.072
t-stat	**2.30****	1.46	**1.80***	-1.19	**3.28*****	**1.78***	0.93	-0.61	1.00	**1.78***	1.37
Lag3	**0.150**	0.062	0.072	0.026	**0.291**	**0.143**	**0.203**	**-0.212**	0.058	-0.012	-0.032
t-stat	**2.9**	1.2	1.4	0.5	**5.8*****	**2.9*****	**3.9*****	**-4.3**	1.1	-0.2	-0.6
Lag4	**0.080**	0.011	0.019	**0.133**	0.045	0.051	0.023	**0.120**	**0.161**	**0.181**	-0.021
t-stat	**1.74***	0.22	0.40	**2.72*****	0.91	1.02	0.46	**2.43*****	**3.26*****	**3.68*****	-0.44
Local return											
Lag0	**2.143**	0.009	**0.239**	**0.014**	**0.061**	**0.031**	**0.008**	0.009	**0.024**	**0.020**	**0.058**
t-stat	**5.62*****	1.59	**9.59*****	**3.25*****	**5.86*****	**2.62****	**1.93***	1.58	**1.88***	**3.15*****	**3.75*****

Flow Eqn	China	Hong Kong	India	Indonesia	Japan	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
Lag1	**3.094**	**0.011**	**0.180**	**0.019**	**0.055**	**0.035**	**0.012**	**0.013**	**0.047**	**0.010**	**0.064**
t-stat	**7.80*****	**2.03****	**6.52*****	**4.59*****	**5.02*****	**2.91*****	**2.69*****	**2.48*****	**3.58*****	**1.63**	**4.02*****
Lag2	0.032	-0.004	-0.032	0.004	**0.031**	0.018	**0.009**	-0.004	0.007	**0.011**	0.010
t-stat	0.08	-0.72	-1.11	1.05	**2.80*****	1.44	**2.08****	-0.67	0.51	**1.69***	0.63
Lag3	0.004	0.002	-0.019	0.001	0.004	-0.003	-0.007	0.000	0.021	0.007	0.011
t-stat	0.01	0.34	-0.66	0.22	0.38	-0.24	-1.51	0.09	1.59	1.12	0.69
Lag4	**-0.770**	-0.006	-0.017	**-0.010**	-0.003	-0.011	-0.002	**0.016**	-0.010	**0.012**	-0.003
t-stat	**-1.84**	-1.14	-0.60	**-2.29**	-0.25	-0.91	-0.41	**2.99*****	-0.76	**1.84***	-0.20
Adj. Rsq	0.351	0.029	0.388	0.177	0.600	0.048	0.289	0.089	0.133	0.408	0.177

Table 6: Determinants of Mutual Fund Flows

This table presents results from a VAR model between mutual fund flows and local returns for weekly frequencies. The ordering in VAR begins from country return in USD to scaled mutual fund flow (mutual fund flows divided by average market capitalization). Two exogenous variables are included, Asia ex Japan returns in USD and change in local currency relative to USD. Let ***, **, * denotes significance at 1%, 5%, and 10%, respectively.

	China	Hong Kong	India	Indonesia	Japan	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
Mutual fund flow											
Lag1	**0.220**	**0.110**	**0.242**	**0.289**	**0.234**	-0.017	**0.347**	**0.142**	**0.167**	**0.439**	**0.276**
t-stat	**4.24*****	**2.15*****	**4.67*****	**5.62*****	**4.61*****	-0.33	**6.77*****	**2.77*****	**3.22*****	**8.58*****	**5.35*****
Lag2	**0.111**	0.074	**0.092**	-0.054	**0.116**	**0.084**	0.037	-0.055	0.044	**0.119**	0.064
t-stat	**2.11****	1.43	**1.74***	-1.02	**2.24****	**1.66***	0.69	-1.08	0.85	**2.14****	1.19
Lag3	**0.148**	0.055	0.085	0.040	**0.262**	**0.137**	**0.187**	**-0.226**	0.070	-0.033	-0.022
t-stat	**2.81*****	1.06	1.61	0.75	**5.24*****	**2.70*****	**3.54*****	**-4.55**	1.37	-0.60	-0.41
Return											
Lag0	**2.098**	0.009	**0.233**	**0.014**	**0.067**	**0.031**	**0.010**	0.008	0.019	**0.021**	**0.061**
t-stat	**5.44*****	1.57	**9.15*****	**3.24*****	**6.41*****	**2.50****	**2.19**	1.43	1.45	**3.26*****	**3.78*****
Lag1	**2.776**	0.016	**0.113**	**0.018**	**0.074**	0.003	**0.019**	**0.013**	**0.048**	0.006	**0.062**
t-stat	**4.12*****	1.06	**2.76*****	**2.94*****	**4.76*****	0.14	**2.98*****	**1.89***	**1.81***	0.61	**2.68*****
Lag2	0.456	0.002	0.002	0.007	**0.069**	0.038	**0.017**	0.001	**0.059**	**0.026**	**0.040**
t-stat	0.66	0.14	0.05	1.12	**4.34*****	1.83	**2.72*****	0.11	**2.19****	**2.63****	**1.73***
Lag3	-0.019	-0.016	-0.025	0.005	**0.046**	-0.002	0.004	0.000	0.011	0.001	0.010
t-stat	-0.03	-1.05	-0.60	0.74	**2.87*****	-0.07	0.66	-0.04	0.40	0.07	0.45

	China	Hong Kong	India	Indonesia	Japan	Korea	Malaysia	Philippines	Singapore	Taiwan	Thailand
Asiaxj											
Lag1	0.0053	-0.0001	**0.0017**	0.0000	-0.0001	0.0005	-0.0001	0.0001	0.0000	0.0000	-0.0001
t-stat	0.55	-0.46	**3.26*****	0.55	-0.91	**2.03****	**-1.67**	1.12	-0.05	0.10	-0.34
Lag2	-0.0091	-0.0001	-0.0007	0.0000	**-0.0004**	-0.0003	-0.0001	0.0000	-0.0006	-0.0002	-0.0006
t-stat	-0.94	-0.41	-1.35	-0.10	**-2.75**	-1.15	**-1.95**	-0.39	**-2.36**	**-1.98**	**-2.04**
Lag3	0.0030	0.0002	0.0003	-0.0001	**-0.0003**	0.0000	**-0.0001**	0.0001	0.0001	0.0002	-0.0001
t-stat	0.32	1.30	0.60	-1.38	**-2.15**	-0.04	**-2.74**	1.44	0.40	1.56	-0.25
FXC											
Lag1	**0.2134**	-0.0018	**0.0034**	0.0000	-0.0001	0.0001	-0.0001	**0.0004**	-0.0002	-0.0005	**-0.0019**
t-stat	**2.13****	-0.63	**2.32****	0.27	-0.34	0.33	-0.49	**1.70***	-0.39	-1.28	**-2.97**
Lag2	-0.039	-0.0004	-0.0004	0.0001	0.0002	0.0001	-0.0002	0.0001	-0.0005	-0.0002	-0.00004
t-stat	-0.39	-0.13	-0.24	0.42	0.90	0.23	-0.88	0.39	-0.78	-0.41	-0.06
Lag3	-0.0001	0.001	0.001	-0.0001	**-0.0004**	-0.00004	0.000	**0.0005**	-0.0002	0.001	-0.0002
t-stat	0.00	0.20	0.72	-0.99	**-1.86**	-0.13	-0.25	**1.93***	-0.39	**1.98****	-0.35
Adjrsq	0.355	0.021	0.399	0.187	0.627	0.059	0.305	0.103	0.134	0.438	0.184

Table 7: Bivariate VAR Between Mutual Fund Flows and Local Returns

This table presents results from bivariate model between mutual fund flows and local returns for weekly frequencies. The ordering in VAR begins from scaled China flows to scaled mutual fund flow . Let ***, **, * denotes significance at 1%, 5%, and 10%, respectively.

Panel A

	Japan	Hong Kong	India	Korea	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand
Mutual fund flow										
Lag1	**0.397**	**0.127**	**0.278**	0.054	**0.209**	**0.481**	**0.270**	**0.389**	**0.172**	**0.341**
t-stat	**7.88*****	**2.51****	**5.48*****	1.06	**4.17*****	**9.71*****	**5.41*****	**7.75*****	**3.43*****	**6.69*****
Lag2	**0.146**	0.070	**0.112**	**0.082**	0.034	**0.101**	-0.021	0.036	-0.029	0.044
t-stat	**2.82*****	1.37	**2.11****	**1.61**	0.65	**1.84***	-0.42	0.69	-0.58	0.82
Lag3	**0.288**	0.042	0.083	**0.132**	0.070	-0.031	0.077	**0.215**	**-0.199**	-0.057
t-stat	**5.54*****	0.84	1.56	**2.58****	1.39	-0.56	1.50	**4.07*****	**-3.98**	-1.06
China Flow										
Lag0	**0.005**	**0.003**	**0.042**	**0.005**	**0.006**	**0.001**	**0.002**	**0.0005**	**0.003**	**0.005**
t-stat	**6.02*****	**6.71*****	**16.12*****	**4.11*****	**5.36*****	**1.27**	**4.01*****	**1.68***	**7.93*****	**3.09*****
Lag1	-0.001	**-0.001**	**-0.010**	**-0.004**	**-0.004**	0.000	**0.002**	0.000	**-0.002**	-0.0002
t-stat	-0.74	**-2.03**	**-2.92**	**-3.10**	**-3.20**	0.21	**3.18*****	-0.88	**-3.69**	-0.10
Lag2	0.0001	-0.0004	-0.003	**0.003**	**0.003**	-0.001	0.000	0.000	-0.001	-0.002
t-stat	0.13	-0.68	-0.81	**2.10****	**2.73*****	-0.85	0.57	0.48	-1.39	-0.96
Lag3	**-0.003**	0.000	-0.004	**-0.003**	0.000	0.000	**-0.002**	-0.001	0.000	-0.001
t-stat	**-3.55**	-0.32	-1.22	**-2.25**	0.18	0.24	**-3.83**	-2.06	0.23	-0.60

	Japan	Hong Kong	India	Korea	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand
Adj. Rsq	0.587	0.113	0.503	0.077	0.170	0.399	0.201	0.268	0.179	0.145

Panel B

	China	Hong Kong	India	Korea	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand
Mutual fund flow										
Lag1	**0.320**	**0.118**	**0.321**	0.001	**0.202**	**0.485**	**0.300**	**0.383**	**0.151**	**0.346**
t-stat	**6.34*****	**2.34****	**6.32*****	0.01	**4.02*****	**9.82*****	**5.96*****	**7.63*****	**2.74*****	**6.80*****
Lag2	**0.101**	0.082	0.069	**0.099**	0.080	**0.096**	-0.050	0.028	-0.028	0.063
t-stat	**1.92***	1.61	1.30	**1.98****	1.58	**1.74***	-0.97	0.52	-0.50	1.16
Lag3	**0.142**	0.058	**0.107**	**0.157**	0.071	-0.028	0.047	**0.213**	**-0.206**	-0.076
t-stat	**2.67*****	1.14	**2.02****	**3.14*****	1.41	-0.51	0.90	**4.04*****	**-3.77**	-1.40
Japan Flow										
Lag0	**1.612**	0.035	**1.106**	**0.076**	0.088	0.031	**0.013**	**0.047**	**0.068**	**0.260**
t-stat	**6.02*****	1.31	**6.61*****	**1.70***	1.52	0.91	**3.54*****	**3.16*****	**2.42****	**2.76*****
Lag1	**-0.781**	-0.037	-0.285	-0.048	**-0.178**	**0.065**	0.004	**-0.038**	**-0.070**	-0.073
t-stat	**-0.26**	-1.30	-1.53	-0.93	**-2.85**	**1.77***	1.01	**-2.38**	**-2.29**	-0.72
Lag2	-0.349	-0.039	-0.146	0.047	**0.150**	**-0.072**	-0.001	0.021	0.029	0.056
t-stat	-0.12	-1.39	-0.81	0.94	**2.43****	**-1.99**	-0.18	1.33	0.97	0.56
Lag3	-0.180	0.003	**-0.550**	-0.058	-0.094	0.028	**-0.016**	**-0.033**	0.050	-0.038
t-stat	-0.60	0.11	**-2.99**	-1.12	-1.48	0.75	**-4.12**	**-2.08**	1.62	-0.38

	China	Hong Kong	India	Korea	Singapore	Taiwan	Indonesia	Malaysia	Philippines	Thailand
Adj. Rsq	0.274	0.024	0.251	0.025	0.108	0.408	0.164	0.286	0.077	0.144

Figure 1: Cumulative Eeekly Foreign Equity Flows in Asia

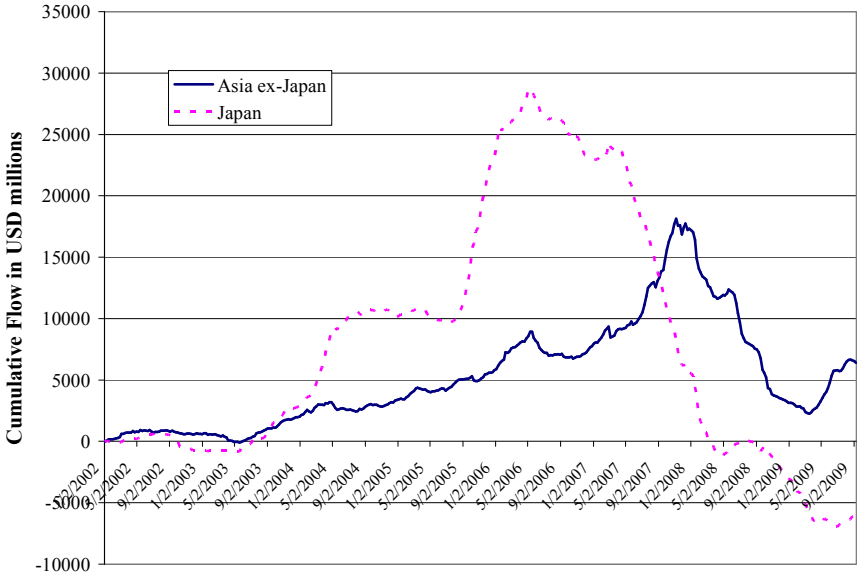
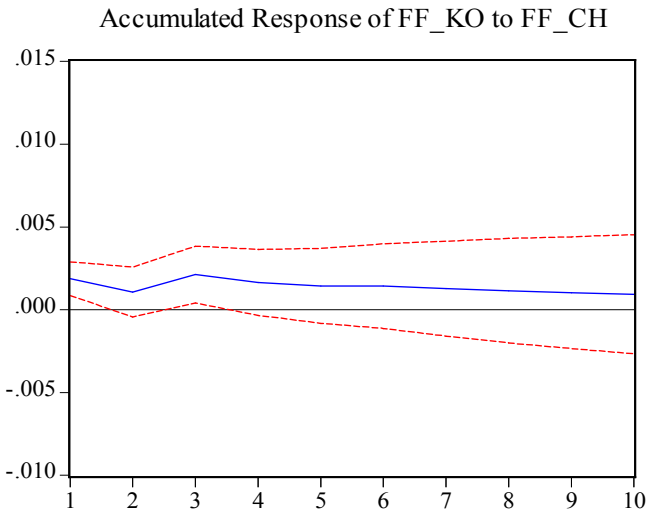
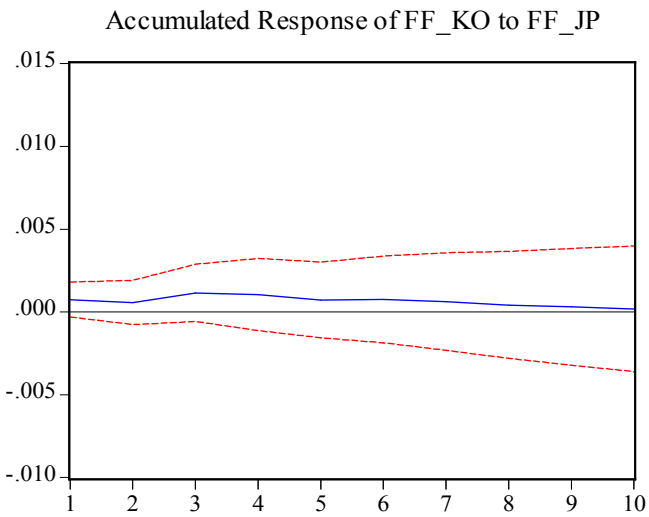


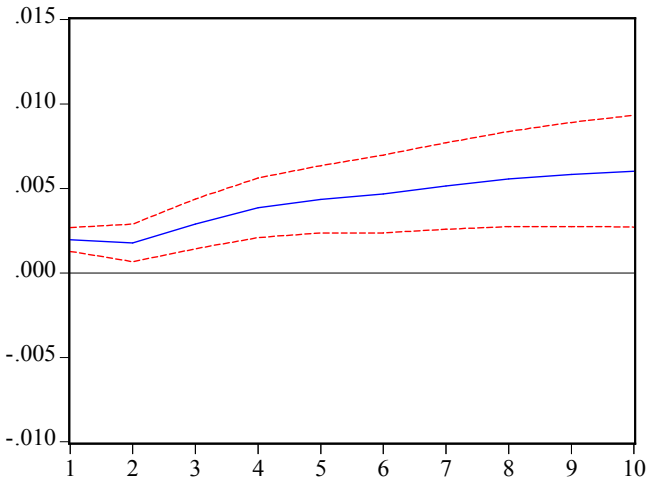
Figure 2: Accumulative Impulse Response Functions

The following figures are accumulative impulse response plots of one standard deviation shock in net flow (FF) for each period from two -variable VAR. The x-axis is the number of days. The flow innovations are based on Cholesky factorization with ordering of variables running from China flows (FF_CH) to country x returns or Japan flows (FF_JP) to country x flows ie. Korea (FF_KO), Singapore (FF_SG), India, (FF_IN), and Thailand (FF_TH). The dotted lines are 95% confidence band computed with Monte Carlo simulation.

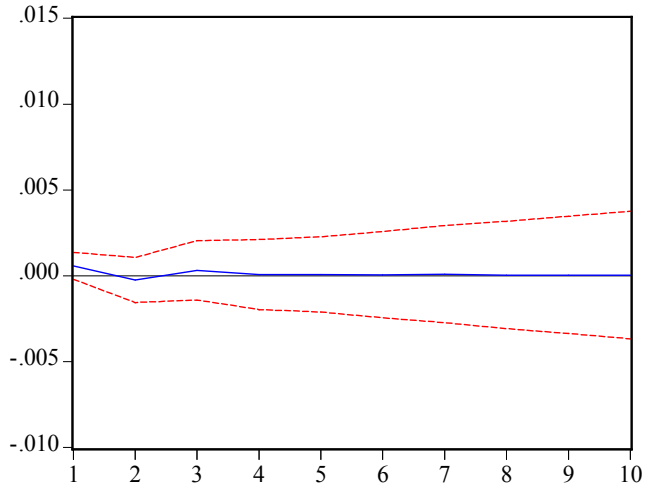




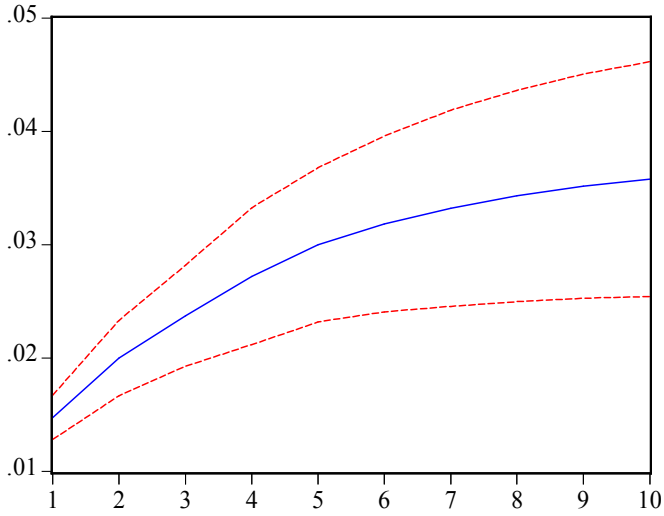
Accumulated Response of FF_SG to FF_CH



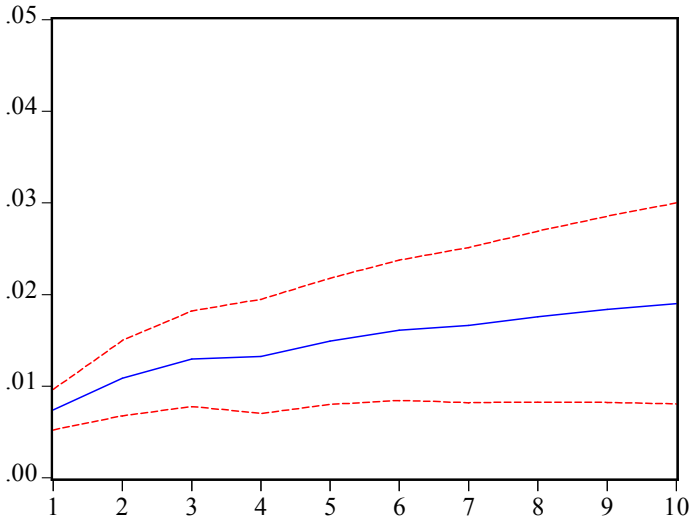
Accumulated Response of FF_SG to FF_JP

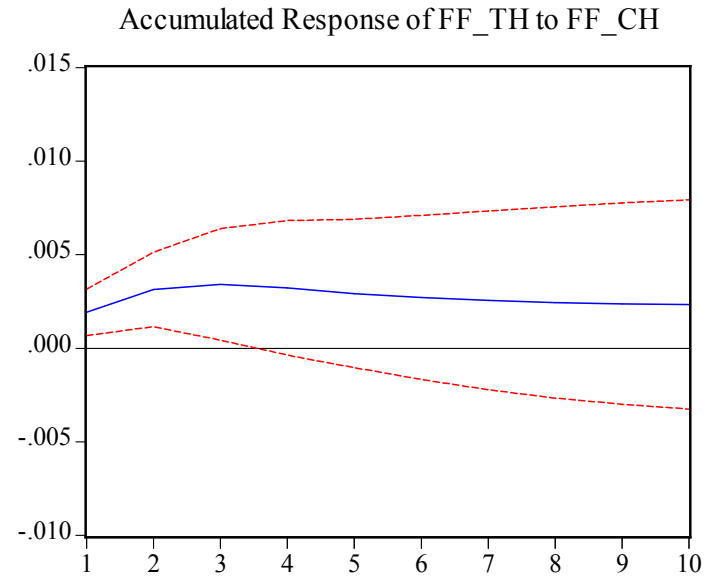


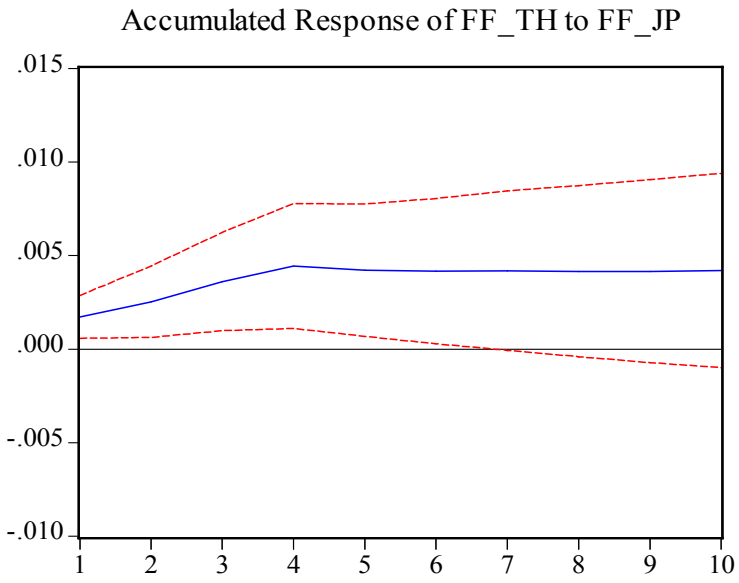
Accumulated Response of FF_IN to FF_CH



Accumulated Response of FF_IN to FF_JP




Accumulated Response of FF_TH to FF_CH
.015
.010
.005
.000
-.005
-.010
1
2
3
4
5
6
7
8
9
10


Accumulated Response of FF_TH to FF_JP
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.010
.005
.000
-.005
-.010
1
2
3
4
5
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9
10