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Foreign Capital Inflows and the Current Account Imbalance: Which Causality Direction?

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Abstract

The ongoing financial globalization has instigated growing concerns on the issue of benefits and costs from free international capital mobility. Past experiences in the emerging market countries indicate that foreign capital inflows could cause persistent current account deficits and lead to currency crises. This paper empirically demonstrates that foreign capital inflows and current account imbalances interact in different ways between developed countries and emerging market countries. Using the Granger non-causality test, we find that foreign capital inflows Granger-cause the current account in the cases of emerging market countries, while a causal relation is negligently detected in the cases of developed countries. Indeed, distinct from developed countries, the current accounts of emerging market countries are susceptible to the influence of foreign capital inflows. Given the relatively immature financial markets, emerging market countries should be cautious while embracing financial globalization and prudent measures to manage large capital inflows are necessary.

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• **Keywords:** Current account, Foreign capital inflows, Capital account crisis,

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Intertemporal balance, Granger causality

I. Introduction

The persistent and growing current account deficit of the U.S. since the 1990s and the corresponding surpluses of its counterparts from the rest of the world, particularly in emerging market countries (EMCs), have instigated a large body of research on why this global imbalance occurs, when it will adjust, and how the adjustment will unravel (IMF, 2005; Bernanke, 2005; Clarida, 2006). In resolving the puzzling issue of why international investors are willing to continuously finance the profligate U.S., the theory of the intertemporal current account balance model explicates that the current account imbalance is a reflection of economic agents' intertemporal optimization decisions on consumption and investment (Obstfeld and Rogoff, 1996). Therefore, a current account imbalance, either in magnitude or duration, is irrelevant and should not spur any serious concern for policy makers. However, there is apprehension for when sentiment changes in foreign investors - as when Calvo and Reinhart (1999) suggested a "sudden stop" of foreign capital, which devastated the economies of the EMCs during the 1990s' currency crises - might plague the U.S. as well. Indeed, excessive capital inflows coupled with the persistent current account deficit that the U.S. now experiences are analogous to what the EMCs had prior to the 1990s' "capital account crisis".[1] The enduring U.S. current account deficit has been perceived as a portent of a day of reckoning, such as noted in Obstfeld and Rogoff (2004) and Roubini and Setser (2004).[2]

There is no shortage of arguments that developed countries in general and the U.S. in particular are different from developing countries and the plight of what

[1]The succession of currency crises during the last decade of the 20th century in emerging market countries was mostly preceded by large private capital inflows and was triggered by sudden shifts in market sentiment, which led to massive capital flow reversals. These crises are described as "capital account crises" to distinguish them from the conventional crises that originate from the current account imbalance. See IMF (2003). Note that since 1993 the balance of payment manual provided by the IMF has reclassified most items in the previous capital account into a newly-coined account, "financial account." Currently, the capital account keeps meager items, but its name usually refers to the financial account. Here, the "capital account crises" in fact indicate "financial account crises."

[2]Obstfeld and Rogoff (2004) estimated that for the U.S. to restore its external balance, the trade weighted value of the U.S. dollar might have to depreciate as high as 40 per cent. Roubini and Setser (2004) considered different scenarios for possible U.S. current account adjustments in a global economic framework and argued that an unpleasant one seems unavoidable.

EMCs experienced need not recur.[3] In their studies on industrial countries' adjustment of current account deficits, Debelle and Galati (2005) and Croker, *et al.* (2005) found that the process of adjustment is usually accompanied with a benign recession and disorderly corrections rarely occur.[4] With the privileged position that the U.S. has, McKinnon (2001) and Poole (2005) argued that U.S. assets owned by international investors are mostly denominated in dollars and a large fraction of U.S. assets held abroad are denominated in foreign currencies. Dollar depreciation, should it occur in a hard-landing fashion, will be self-limiting.[5] Accordingly, the current account reversal might be inevitable, but a disruptive adjustment in the U.S. is overstated.

There has recently been a surge of research attempting to tackle the issue of foreign capital inflows cum current account imbalances. This approach is based on testing whether there is a different causal relationship in the current account imbalance and foreign capital inflows between developed and developing countries. To date, as far as the authors acknowledge, there are only a few studies on this topic, such as Fry, *et al.* (1995), Wong and Carranza (1999), Sarisoy-Guerin (2004) and Yan (2005). Within these studies, different causality testing approaches are implemented for different country sets and time periods, and they commonly investigate the causal relationships of the current account and foreign capital inflows by using the net capital inflows, i.e. the financial account from the balance of payment account.

This paper attempts to further explore this causal relationship between current account imbalances and foreign capital inflows. We particularly distinguish our study from the extant research studies in two respects. The first is that we use the

[3]We use EMCs and developing countries interchangeably in this paper. The EMCs make up a group of countries which are classified as developing countries with more dynamism in their economies relative to other developing countries. However, compared to the developed countries, either EMCs or developing countries have relatively immature financial and economic structures, which might be one of the reasons causing different adjustment processes on current accounts between EMCs and developed countries.

[4]Freund (2000), Debelle and Galati (2005), and Croke, et al. (2005) identified the period of the current account reversal based on the threshold of a 2 per cent (or 5 per cent) deficit and then analyzed what the national savings and investment changes were prior to, during, and after the current account reversals.

[5]For the United States, unlike other countries in the world, a hard-landing process is inherently self-limiting. United States assets owned by international investors are predominantly denominated in dollars and a large fraction of U.S. assets held abroad are denominated in foreign currencies. Dollar depreciation, should it occur in a hard-landing process, will be self-limiting, because the dollar value of U.S. assets abroad will rise, thus improving the U.S. net international investment position. Market participants, knowing this fact, are therefore unlikely to drive down the foreign currency value of the dollar in a rapid and disruptive fashion.

gross, instead of net, foreign capital inflows to investigate the causal relationship with the current account imbalance. Net foreign capital inflows are the difference between foreign and domestic residents' international investment behavior. If we want to know how foreign investors affect domestic current account imbalances, then it is more appropriate to use gross foreign capital inflows. Second, the EMCs' currency crises of the 1990s show that massive foreign capital inflows might cause a consumption spree or overinvestment. On the contrary, the sudden stop in foreign capital flows also causes a shortage on consumption or investment deficiency, and both could bring about a current account imbalance, as Bustelo (2000) argued.[6] Therefore, determining the causality direction between foreign capital inflows and national savings or investment, or both, has critical policy implications.

Using the augmented Vector Autoregression (VAR) model to estimate and implement the Granger non-causality test, we find that for developed countries, gross foreign capital inflows show a negligible causal relationship with the current account, while for the EMCs it always seems true that foreign capital inflows Granger-cause current account imbalances. By investigating the two components of the current account, national savings and investment, the results of the causal relationship with foreign capital inflows mostly remain the same although in emerging market countries, there is evidence of different causal relationships between foreign capital inflows and national savings or investment.

The rest of this paper is organized as follows. Section II explains the causes of the resurging capital inflows toward emerging market countries and proposes a possible causal relationship between the current account and foreign capital inflows. Section III describes the data used and explains the empirical testing strategy. Section IV presents the empirical results and discusses why there are such different causal relationships between developed and emerging market countries and proposes policy implications for emerging market countries. The concluding remarks are in Section V.

II. Foreign Capital Inflows and the Current Account Imbalance

The intertemporal balance model of the current account, such as in Obstfeld and

[6]In his study of distinguishing the causes of Mexico's 1994-95 peso crisis and the Asian 1997-98 financial crisis, although persistent current account deficits were perceived in both crises, Bustelo (2000) suggested that foreign capital inflows mainly were channeled to increase consumption (decrease national savings) in Mexico, while they increased domestic investment for the Asian countries.

Rogoff (1996), provides the perspective of individual optimization behavior through an intertemporal decision. Accordingly, the current account imbalance indicates that the economic agent takes advantage of tapping international financial markets to smooth out its consumption over time in order to attain intertemporal optimization. In practice, it appears true that developed countries mostly embrace the blessing of free capital mobility, yet developing countries are littered with cases of suffering from a boom-bust cycle to their economies due to foreign capital flows, as indicated by Williamson (2005). Although *ex post* balance of payment accounting is an accounting identity, there are various channels for the current account to affect the financial account, and vice versa.

A. Causes of foreign capital inflows and current account imbalances

Two issues need to be considered when dealing with how international capital mobility affects current account imbalances. One concerns the causes of the foreign capital inflows, and the other is about the policy response.

(1) Causes of capital inflows: "pull" or "push" factors

The resurgence of foreign capitals flows into developing countries since the end of the 1980s has drawn much attention on their causes and possible consequences.[7] Two factors which operate to attract foreign capital inflows are proposed - namely, "push" and "pull" factors - as noted in Goldstein (1995) and Agenor and Montiel (1999). "Pull" factors, also called "internal" factors, are those that attract capital from abroad as a result of attractive domestic conditions, such as a higher marginal productivity of capital, improved creditworthiness induced by better macroeconomic policy, and structural reform. "Push" factors, also called "external" factors, are those that operate by unfavorable conditions in the industrial countries, such as a low interest rate and recession, with particular emphasis on the U.S.

In their study of the revival of substantial international capital inflows to developing countries, Calvo, *et al.* (1993) found that external factors, not internal factors, explain the foreign capital inflows into Latin America.[8] Chuhan, *et al.*

[7]The Latin America debt crisis erupted at the beginning of the 1980s and thereafter international capital flows were shunned from developing countries. It was after the resolutions were initiated by the Brady Plan that international capital resurged and began to flow into developing countries. See Agénor and Monteil (1999, pp. 545-574).

[8]The conclusion of Calvo, *et al*. (1993) is based on the finding that international reserve accumulation and real exchange rate appreciation in Latin American capital-receiving countries are highly correlated with various U.S. financial variables.

(1993), using a wider sample of developing countries, concluded that "external" factors are much more important for capital inflows to Latin American than for those to Asia.[9] On the other hand, history shows that capital mobility has mostly occurred among developed countries, as noted in Obstfeld and Taylor (2002).[10] Only when developed countries have suffered from the low profitability of investment has capital moved to developing countries.

In theory, the causal relationship between foreign capital inflows and current account may be embedded in the driving forces of foreign capital inflows. For instance, if foreign capital inflows are motivated by the "pull" factor, then it is plausible that foreign capital inflows are demand-induced, and therefore we may expect a causal relationship from current account toward foreign capital inflows. Conversely, if foreign capital inflows are supply-pushed, such as driven by the "push" factors, then foreign capital inflows will cause the current account imbalance. In practice, various policy responses that countries will take when large capitals flow in may implicate the causal relationship between current account and foreign capital inflows.

(2) Policy response to foreign capital inflows and its effects on current account

When developing countries receive massive foreign capital inflows, an instant effect is an overheating economy due to an excessive expansion of aggregate demand. In order to let the air out from the inflated economy, four policy responses have been provided - including sterilization, exchange-rate policies, fiscal policies, and capital control - as opined by Goldstein (1995), Reinhart and Reinhart (1998), and Agenor and Montiel (1999). Imposing capital controls, practicing contractionary fiscal policy, and adopting flexible exchange rate regimes - although effective - are relatively hard to implement politically and timely. As a result, sterilization is most commonly practiced when confronting large foreign capital inflows.

When foreign capital flows in, the monetary authority can use either full, partial,

[9]Chuhan, *et al.* (1993) studied nine Latin American and nine Asian countries. Their findings are based on extending the work of Calvo, *et al.* (1993) and including additional variables, such as the secondary market price of a country's debt, credit rating, the stock price-earnings ratio, the relative return on the domestic stock market, and black market premium.

[10]Obstfeld and Taylor (2002) argued that capital is biased towards developed countries pre-1914, as is the situation today. Although net flows (inflows minus outflows) have been held constant at relatively low levels for the past 30 years, gross flows (inflows plus outflows) have increased tremendously, because capital flows are mostly between developed countries and for "diversification finance."

or no sterilization. With partial or no sterilized intervention, the ensuing monetary expansion will push inflation to increase and could deteriorate the current account, due to the loss of competitiveness from the real exchange rate appreciation. As a result, foreign capital inflows can drive the current account to change. On the other hand, when there is complete sterilization, foreign reserves will increase and the current account will not be affected. Hence, no relationship can be detected between foreign capital inflows and the current account. However, this non-causality might prove to be short-lived. As Calvo (1991) predicated, there is a limitation to sterilization. With a higher domestic interest rate caused by open market operations that swap domestic assets for foreign ones, more foreign capital will flow in and ultimately deteriorate the current account. In the case of sterilization to safeguard domestic economic stability, foreign capital inflows eventually will affect the current account imbalance.

For developed countries that mostly adopt flexible exchange rate regimes and have rather sophisticated financial markets, there is no need to undertake any particular policy response toward foreign capital inflows, and we rarely perceive cases with any disorderly adjustment from the foreign capital flows. Freund and Warnock (2005) argued that the merits of developed countries are well-developed financial systems (which are more efficient for intermediating inflowing funds) and the foreign debts of industrial countries (which are more likely to be denominated in the home currency). Therefore, the causal relationship between foreign capital inflows and current account in developed countries might be less obvious.

B. The causal relation between foreign capital inflows and the current account

Up to date, few papers study the causality between the current account (*CA*) and net foreign capital flows (i.e. financial account, *FA*).[11] In the following, we briefly review these articles and thereafter present the motivation of this paper.

(1) Causal relationship between current account and financial account

Fry, *et al*. (1995), using annual data from 1970 to 1992 for developing countries, found that 17 countries with *FA* Granger-cause *CA*, 12 countries with *CA* Granger-cause *FA*, and 21 countries have no causal relationship.[12] Wong and Carranza (1999) studied four developing countries (Argentina, Mexico, the Philippines, and

[11]In this paper the foreign capital flows represent the net capital inflows which are known as the financial account in the balance of payment accounting.

Thailand) and showed that, prior to 1989 when capital mobility was restricted, there is evidence that *CA* Granger-causes *FA*, while the direction of causality is the other way around from 1989Q1 to 1994Q4 when capital mobility was liberalized. Wong and Carranza (1999) emphasized the policy implications of those consequences whereby free capital mobility can affect current accounts.[13] Sarisoy-Guerin (2004) began to pool developing and developed countries together, although he did not specifically emphasize the implications of the different causal relationships between these two groups of countries. Using different causality testing methods upon 20 industrial countries and 19 developing countries, he found that there are more developed countries with causality going from *CA* to *FA*, while the developing countries have more cases with causality going the other way around.[14]

Yan (2005) proposed to compare whether there are different causal relationships on *CA* and *FA* between developed and developing countries in the current era of high capital mobility (since 1989). In addition, by adding two controlled variables (exchange rate and *GDP*) in the Granger-causality test regression for 5 developing countries (including Argentina, Mexico, Indonesia, South Korea, and Thailand) and 5 developed countries (including France, Germany, Japan, the U.K., and the U.S.), Yan (2005) found it to be mostly true that *CA* Granger-causes *FA* for the 5 developed countries, while it is other way around for the 5 developing countries.[15]

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[12]Fry, *et al.* (1995) used an error correction model, which assumes that *CA* and *FA* have co-movements in the long run, and a Granger non-causality can be tested. Although the method used in Fry, *et al.* (1995) is seminal, the results are rather unreliable, because of the rather short sample size and they uniformly used one lag in the error correction model. In addition, *CA* and *FA* are not pre-tested for whether they are stationary.

[13]The causal relationship found in Wong and Carranza (1999) is intuitively straightforward. When capital mobility is under restriction, the current account will govern the major motion in the balance-of-payment accounting, and therefore the current account causes the financial account. When the capital account is liberalized, with an unsophisticated domestic financial system to channel and monitor inflowing funds, the current account is susceptible to the influence of foreign capital flows.

[14]Sarisoy-Guerin (2004) investigated annual data, starting variously from the 1960s up to 2000 for 20 developing and 20 developed countries. Abiding by the rule of the same integrated order so as to run the causal relation regression between *CA* and *FA*, he applied either the standard Granger-causality test or the co-integration error correction causality test. However, pre-testing the unit root to identify the same integrated order reduces the number of qualified countries for the causality test to less than half.

[15]Yan (2005) used quarterly data, which are deflated by *CPI* to become real variables, starting from 1989 for the developing countries; for the G-5 the sample period starts variously depending upon when capital mobility was liberalized.

(2) Gross foreign capital inflows and its effects on national savings and investment

This paper differs from previous studies on the causal relationship between foreign capital flows and current account in two respects. First, we focus on the causal relationship between the current account and gross foreign capital inflows (*FAI*), instead of net foreign capital inflows (*FA*) that are the focus of previous studies. Net capital inflows are residuals of the difference between foreign investors investing in the domestic country and the domestic residents investing into foreign countries. Principally, net foreign capital inflows represent the decision of the international portfolio deployment for both foreign and domestic investors. As what we are interested in is to see how foreign investors interact with domestic investment and consumption, then it is plausible to use *FAI* instead of *FA*. For the purpose of comparison, we also execute the interaction between *CA* and *FA*.

Second, reckoning that there might be different causal relationships between foreign capital flows and the two components of the current account - namely, national savings (*S*) and investment (*I*) - we examine the causal relationship of *FAI* with *S* and *I*. Foreign capital inflows can bring new management skills and new technology, which might complement domestic investment and benefit economic growth, and therefore they can have positive effects on domestic investment and savings. It is also possible that foreign capital inflows might substitute out domestic investment, and a profligate government and a released liquidity-constraint in the private sector can worsen domestic savings, as argued by Griffin and Enos (1970).[16] Therefore, depending upon the government policy and economic agents' behavior, foreign capital inflows can either worsen or improve national savings or domestic investment, and therefore the current account can be duly affected. Accordingly, there could be different causality directions between *S* (or *I*) and *FAI*, and whether one causes the other can only be settled empirically.

III. Data and Testing Strategies

All the data are adapted from the International Financial Statistics (IFS) maintained by the International Monetary Fund (IMF). Here, *S*, *I*, *CA*, and *FAI* are measured in the domestic currency and expressed as ratios to *GDP*.[17]

[16]Griffin and Enos (1970) argued that foreign capital inflow may supplant domestic savings and distort the composition of investment, ultimately reducing the growth rate of *GDP*.

For EMCs, the sample starts on the first quarter of 1989 (or 1989Q1) when foreign capital resurged and began to flow into developing countries, and it ends in 2005Q4. Five countries that were heavily affected by the currency crises of the 1990s are included: Argentina, Mexico, Indonesia, South Korea, and Thailand. For countries with limited data, like Argentina, Indonesia and Thailand, the sample starts from 1993Q1, 1991Q1, and 1993Q1, respectively, and for Mexico and South Korea it ends on 2005Q4, while for Argentina, Indonesia, and Thailand it ends on 2004Q4. Developed countries consist mainly of Australia, Canada, Japan, the U.K., and the U.S. Among them, Australia liberalized capital mobility in 1984 when it started adopting the flexible exchange rate regime. Canada, the U.K., and the U.S. liberalized their capital account since the beginning of the 1970s, and in relation to them the time period spans from 1974Q1 up to 2005Q4. Japan did not liberalize its capital account until the beginning of the 1980s, and so the sample used is the period from 1982Q1 to 2005Q4.[18]

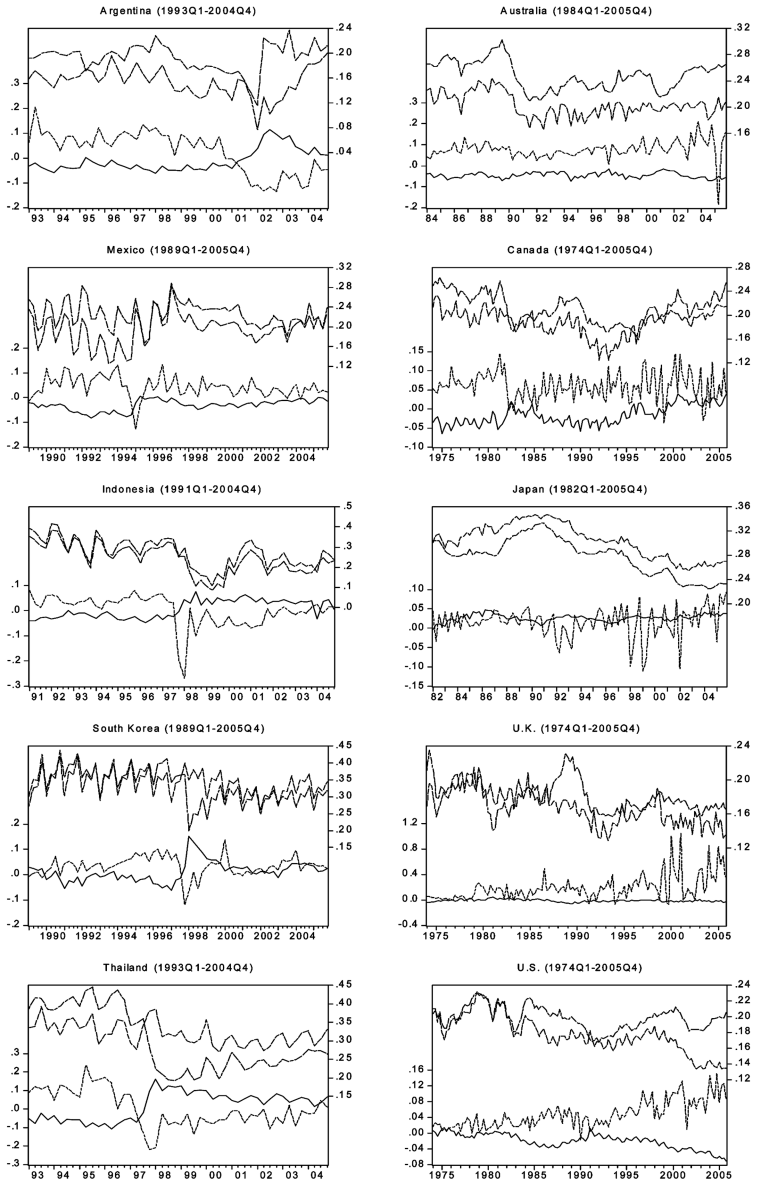
A. The descriptive data

In Figure 1 we present the time series of *CA* and *FAI* (see the left scale), as well as *S* and *I* (see the right scale) for each individual country. The upper pair of the graphs show the time series of *S* and *I*, and the difference between these two variables is the current account balance reflected in the solid line of the two pairs of graphs for the time series of *CA* and *FAI*. For EMCs, there is a significantly enduring current account deficit prior to currency crises (Asian 1997-98; Mexico 1994-95; and Argentina, 2001-02), while after the crises, *CA* reverses abruptly in a V-shaped style and then levels off and remains at the positive side (Mexico remained positive for a short term and then went back to the negative side although on a moderate scale). Here, *FAI* is the mirror image of the *CA* imbalance, particularly during the time of currency crises, and *FAI*'s sudden drop matched well with *CA*'s sudden reversal. Thereafter, the current account remains on the positive

[17]The code number for each variable in the IFS is as follows: *CA* (78ald), *I* is the sum of gross fixed capital formation (93e.c) and changes in inventories (93i.c), *S* (*CA* minus *I*), *FAI* is the sum of the liabilities of foreign direct investment (78bed), portfolio investment (78bgd), and other investment (78bid), and *GDP* (99b.c). These code numbers are based on the U.S., and other countries might have some minor differences.

[18]Most of the developed countries liberalized their capital accounts prior to 1989; for example, Canada, the U.K., and the U.S. liberalized their capital accounts in the early 1970s, while Australia and Japan liberalized theirs in the early and mid-1980s, respectively. For the 10 countries we are studying here, a detailed analysis of their financial liberalization may be found in Kaminsky and Schmukler (2003).

Figure 1. *S* and *I*, and *CA* and *FAI*



Note: The left scale (the lower part) is for current account (*CA*) and foreign capital inflows (*FAI*), which are represented by the solid and dotted lines, respectively. The right scale (the upper part) is for the national savings (*S*) and investment (*I*), which are presented by solid and dotted lines, respectively. All the variables are in terms of *GDP*.

(negative) side with a moderate magnitude. For developed countries, Australia, Canada, and the U.S. show similar patterns like the EMCs in which the current account deficit moves abreast with the positive *FAI*, particularly in Australia for the

whole sample period and the U.S. since 1991. For Japan and the U.K., we find no clear sign of the correlation between *CA* and *FAI*. It is worth noting that for developed countries, although persistent current account imbalances are not rare, there is no sign of a sudden reversal in *CA* as seen in the EMCs.

Table 1 shows the detailed descriptive statistics of mean, standard deviation, and correlation coefficients for *S*, *I*, and *FAI*. Some interesting information can be read. The first is that the means of *CA* in terms of *GDP* are mostly moderate (the difference between the mean of *S* and *I*) either for *CA* surplus countries (Indonesia, 0.00; South Korea, 0.01; Thailand, 0.02; Japan, 0.02) or *CA* deficit countries (Argentina, -0.01; Mexico, -0.04; Australia, -0.05; Canada -0.02; U.K., -0.01; and U.S., -0.02). Australia and Mexico both surpass 4 for *CA* deficit, and the U.S. *CA* imbalance seems not to be as astonishingly high as what is shown recently from the average of the whole time horizon. This implies that the current account seems to follow a mean-reversal process, as shown in Milesi-Ferretti and Razin (1996).[19] The second is that the correlation between *S* and *I* is mostly over 0.50, where Indonesia and Japan are even higher than 0.90.[20] The argument, that free capital mobility is supposed to have a low correlation between *S* and *I* as proposed by Feldstein and Horioka (1980), seems not to appear either in our sample countries.

The third point is that, in theory, it is possible that an inflow of foreign capital will increase domestic savings if *GDP* increases. On the contrary, an inflow of foreign capital might unleash the liquidity constraint and hence increase consumption and lower national savings. On the other hand, foreign capital inflows can be a complement or substitute for domestic investment. If foreign capital inflows complement domestic investment, then they will enhance domestic investment. Conversely, if foreign capital inflows serve as a substitute, then it will have a negative effect on domestic investment. Table 1 shows that there are negative correlations between *FAI* and *S*, except for Indonesia, Australia, and Canada, which have positive correlations. As for the correlation between *FAI* and *I*, except in the case of Argentina where there is a negative correlation, there is a

[19]When an intertemporal current account balance holds, this implies that the current account imbalance cannot deviate far away from the sustainable path for too long. Trehan and Walsh (1991) proposed a unit root test to test whether the U.S. current account deficit is sustainable.

[20]Argentina has an unusually negative correlation between *S* and *I*, -0.14. This is because of the short sample range used and the currency crisis occurred in 2001-2002. The long-waited resolution on its foreign debt brought uncertainty and deteriorated investment incentives even though national savings jumped up after the crisis as shown in Figure 1. Regarding the causes of Argentina's sovereignty debt defaults, see Hausmann and Velasco (2002).

Table 1. Descriptive Statistics of *S*, *I*, and *FAI*

Emerging Market Countries				Developed Countries			
Argentina (1993Q1-2004Q4)	*S*	*I*	*FAI*	**Australia** (1974Q1-2005Q4)	*S*	*I*	*FAI*
Mean	0.17	0.18	0.03	Mean	0.20	0.25	0.08
Std. Dev.	0.03	0.03	0.08	Std. Dev.	0.02	0.02	0.05
Correlation				Correlation			
S	1			*S*	1		
I	-0.14	1		*I*	0.78	1	
FAI	-0.44	0.75	1	*FAI*	0.02	0.14	1
Mexico (1989Q1-2005Q4)	*S*	*I*	*FAI*	**Canada** (1974Q1-2005Q4)	*S*	*I*	*FAI*
Mean	0.19	0.23	0.04	Mean	0.19	0.21	0.06
Std. Dev.	0.03	0.03	0.04	Std. Dev.	0.03	0.02	0.04
Correlation				Correlation			
S	1			*S*	1		
I	0.72	1		*I*	0.50	1	
FAI	-0.15	0.08	1	*FAI*	0.09	0.24	1
Indonesia (1991Q1-2004Q4)	*S*	*I*	*FAI*	**Japan** (1974Q1-2005Q4)	*S*	*I*	*FAI*
Mean	0.26	0.26	0.00	Mean	0.30	0.28	0.02
Std. Dev.	0.06	0.09	0.06	Std. Dev.	0.03	0.03	0.04
Correlation				Correlation			
S	1			*S*	1		
I	0.93	1		*I*	0.95	1	
FAI	0.27	0.45	1	*FAI*	-0.12	-0.11	1
South Korea (1989Q1-2005Q4)	*S*	*I*	*FAI*	**U.K.** (1974Q1-2005Q4)	*S*	*I*	*FAI*
Mean	0.34	0.33	0.03	Mean	0.17	0.18	0.19
Std. Dev.	0.04	0.05	0.04	Std. Dev.	0.02	0.02	0.20
Correlation				Correlation			
S	1			*S*	1		
I	0.65	1		*I*	0.48	1	
FAI	-0.17	0.24	1	*FAI*	-0.36	-0.22	1
Thailand (1993Q1-2004Q4)	*S*	*I*	*FAI*	**U.S.** (1974Q1-2005Q4)	*S*	*I*	*FAI*
Mean	0.32	0.30	0.00	Mean	0.18	0.20	0.05
Std. Dev.	0.03	0.09	0.1	Std. Dev.	0.02	0.01	0.03
Correlation				Correlation			
S	1			*S*	1		
I	0.51	1		*I*	0.60	1	
FAI	0.14	0.77	1	*FAI*	-0.63	-0.06	1

Note: *S*, *I*, and *FAI* denote national savings, investment, and the gross capital inflows, respectively. All the variables are in terms of *GDP*. The mean of *FAI* in Indonesia and Thailand is listed as "0," because we only choose two decimals. The sample range is listed under the name of the country.

positive relationship (i.e. a complementary relationship between foreign capital and domestic investment). The magnitude of the correlation varies quite considerably among countries. High correlation coefficients between *FAI* and *S* can be found in

Argentina (-0.44) and the U.S. (-0.63), while for Australia and Canada the correlation between *FAI* and *S* is relatively low at 0.02 and 0.09, respectively. The correlation between *FAI* and *I* is as high as 0.75 and 0.77 for Argentina and Thailand, respectively, while for Mexico and the U.S. it is as low as 0.08 and -0.06, respectively.

The descriptive statistics indicate that, for each of the developed countries and EMCs, *FAI* has different degrees and direction of correlation with *S* or *I*. As is well acknowledged, correlation does not imply causality. In the following, we propose the Granger-type causality test on *FAI* with *CA*, and *FAI* with *S* and *I*.

B. Augmented VAR

A traditional non-Granger causality test, as proposed by Granger (1969), is based on a VAR model, and each variable in the model needs to be stationary or integrated with order 0, denoted as I(0). As noted in Nelson and Plosser (1982), most macroeconomic variables are not stationary and are usually I(1). If every variable in the VAR system has the same integrated order I(1) for instance, then a Granger-non causality test based on the cointegration estimation with an error correction model can be implemented, such as some of the cases shown in Sarisoy-Guerin (2003) and Yan (2005). However, most macroeconomic variables do not have the same integrated order. An augmented VAR estimation, which would not require the same integrated order for each variable in the VAR model, has been suggested for the Granger non-causality test by Dolado and Lütkepohl (1996) and Toda and Yamamoto (1995). In the following, we briefly describe how to apply this methodology.

(1) Causality between *CA* and *FAI*

We first investigate the causal relationship between *CA* and *FAI* and estimate the following VAR (Vector Autoregression) system to test for Granger non-causality:

$$CA_t = a_1 + \sum_{i=1}^{m+d_{\max}} b_{1i} FAI_{t-i} + \sum_{i=1}^{m+d_{\max}} g_{1i} CA_{t-i} + V_{1t}, \quad (1a)$$

$$FAI_t = a_2 + \sum_{i=1}^{m+d_{\max}} b_{2i} FAI_{t-i} + \sum_{i=1}^{m+d_{\max}} g_{2i} CA_{t-i} + V_{2t}, \quad (1b)$$

where *CA*, *FAI*, and *V* represent the current account, gross foreign capital inflows, and error term, respectively; α is a constant term; and denote coefficients

to be estimated; and m represents the lag order selected by the sequential LR (likelihood ratio) test.[21] The term $d_{\max}$ represents the extra lags added, and this is the reason to call this estimation the augmented VAR. The extra lags should equal the maximal integrated order of the variables in the VAR system. The null hypotheses of Granger non-causality from *FAI* to *CA* and from *CA* to *FAI* are $\beta_{1i} = 0 (i = 1, \ldots, m)$ and $\gamma_{2i} = 0 (i = 1, \ldots, m)$, respectively. The rejection of the null hypothesis of the Granger non-causality from *FAI* to *CA* implies that the past *FAI* can help predict the current *CA*, and vice versa. The inference of the null hypothesis is based on the Wald test, which follows an χ^2 distribution and has m degrees of freedom.

(2) Causality between *S, I,* and *FA*

Using components, national savings, and investment instead of *CA*, the augmented VAR model turns out to have three variables and can be expressed as follows:

$$S_t = \alpha_3 + \sum_{i=1}^{m+d_{max}} \beta_{3i} FAI_{t-i} + \sum_{i=1}^{m+d_{max}} \gamma_{3i}^{S} S_{t-i} + \sum_{i=1}^{m+d_{max}} \gamma_{3i}^{I} I_{t-i} + V_{3t}, \qquad (2a)$$

$$I_t = \alpha_4 + \sum_{i=1}^{m+d_{max}} \beta_{4i} FAI_{t-i} + \sum_{i=1}^{m+d_{max}} \gamma_{4i}^{S} S_{t-i} + \sum_{i=1}^{m+d_{max}} \gamma_{4i}^{I} I_{t-i} + V_{4t}, \qquad (2b)$$

$$FAI_t = \alpha_5 + \sum_{i=1}^{m+d_{max}} \beta_{5i} FAI_{t-i} + \sum_{i=1}^{m+d_{max}} \gamma_{5i}^{S} S_{t-i} + \sum_{i=1}^{m+d_{max}} \gamma_{5i}^{I} I_{t-i} + V_{5t}, \qquad (2c)$$

where S and I respectively represent national savings and investment, and the rest of the variables and coefficients to be estimated are the same as defined in equations (1a) and (1b). The estimation and procedure and lags selection criterion for the VAR model are similar to the previous presentation. The null hypothesis of Granger non-causality from *FAI* to both S and I is $\beta_{3i} = 0 (i = 1, \ldots, m)$ and $\beta_{4i} = 0 (i = 1, \ldots, m)$, while inversely from both S and I to *FAI* it is

[21] Except for using the LR test as a criterion to determine the lag order, there are two other frequently used criteria: the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC). In general, the SIC chooses fewer lags and the AIC picks more lags, compared to LR. The sequential LR tests are implemented by the estimation using 12 lags, and if the sample size is small, then we start with fewer lags. The restricted model is then estimated by using 11 lags. The LR test checks whether there is any significant difference between these two models. If there is not, then we sequentially test down the lag and select the model when a significant result appears.

$\gamma_{5i}^{S} = 0 (i = 1, \ldots, m)$ and $\gamma_{5i}^{I} = 0 (i = 1, \ldots, m)$. The inference of the null hypothesis is similar to the previous case and based on the Wald test, which follows an χ^2 distribution and has m degrees of freedom.

IV. Empirical Results and Discussions

We first implement the unit root test to assure whether there exist different integrated orders for each variable in each country. By using the ADF unit root test, as proposed by Dickey and Fuller (1979), Table 2 shows that most variables are

Table 2. Unit Root Test

Emerging Market Countries					
Argentina (1993Q1-2004Q4)	*CA*	*S*	*I*	*FAI*	*FA*
Level	-1.84(8)	-2.47(9)	-1.38(1)	-1.56(1)	-2.31(0)
1st difference	-3.74(5)***	-3.28(4)**	-8.84(0)***	-12.4(0)***	-10.6(0)***
Mexico (1989Q1-2005Q4)	CA	S	I	FAI	FA
Level	-2.34(8)	-2.23(4)	-3.18(4)**	-5.62(0)***	-3.38(1)**
1st difference	-3.10(8)**	-3.94(3)***			
Indonesia (1991Q1-2004Q4)	CA	S	I	FAI	FA
Level	-1.59(1)	-2.47(4)	-2.13(4)	-3.84(0)***	-3.86(0)***
1st difference	-12.3(0)***	-3.81(3)***	-3.32(3)**		
S. Korea (1989Q1-2005Q4)	CA	S	I	FAI	FA
Level	-2.95(0)**	-1.22(10)	-1.40(9)	-4.98(0)***	-5.49(0)***
1st difference		-5.28(10)***	-3.49(8)**		
Thailand (1993Q1-2004Q4)	CA	S	I	FAI	FA
Level	-1.74(5)	-1.54(8)	-1.86(5)	-1.93(1)	-1.89(2)
1st difference	-2.67(4)	-2.46(8)	-2.26(5)	-9.94(0)***	-9.02(0)***
2nd difference	-11.58(2)***	-7.42(6)***	-6.92(3)***		
Developed Countries					
Australia (1984Q1-2005Q4)	*CA*	*S*	*I*	*FAI*	*FA*
Level	-4.99(4)***	-2.00(5)	-2.65(3)	-2.82(3)	-2.98(6)**
1st difference		-3.81(10)***	-8.32(0)***	-10.5(2)***	
Canada (1974Q1-2005Q4)	CA	S	I	FAI	FA
Level	-0.63(10)	-1.41(12)	-2.75(2)	-4.75(5)***	-1.08(7)
1st difference	-4.22(9)***	-2.88(11)**	-6.76(4)***		-7.30(6)***
Japan (1982Q1-2005Q4)	CA	S	I	FAI	FA
Level	-3.19(4)**	-1.07(4)	-1.07(2)	-2.25(3)	-3.65(3)***
1st difference		-3.41(3)**	-4.20(1)***	-16.4(2)***	
U.K. (1974Q1-2005Q4)	CA	S	I	FAI	FA
Level	-2.11(4)	-2.18(5)	-3.16(1)**	-0.22(11)	-3.21(3)**
1st difference	-6.28(3)***	-4.65(9)***		-5.59(10)***	
U.S. (1974Q1-2005Q4)	CA	S	I	FAI	FA
Level	-0.69(8)	-1.00(12)	-2.72(10)	0.11(11)	-0.61(3)
1st difference	-2.72(7)	-2.56(11)	-3.89(11)***	-6.23(10)***	-10.2(2)***
2nd difference	-9.43(6)***	-7.39(10)***			

Note: The unit root test is based on Dickey and Fuller (1979), and the regression is executed with the constant term. The sample range is listed beside the name of the country. In Thailand and the U.S., we detect variables with the 2nd integrated order.

I(1), some are I(0), and a few are I(2), such as Thailand's *CA*, *S*, and *I*, and *CA* and *S* for the U.S.[22] The rather complicated combination of different integrated orders of the variables for each country vindicates the advantage of using the augmented VAR estimation for the Granger non-causality test.

A. Empirical results

We first present the causal results by using gross foreign capital inflows, *FAI*. In order to examine whether there is any difference in using net versus gross foreign capital inflows, we also present the results using net foreign capital inflows, *FA*. The estimation method and procedure when using *FA* instead are the same as when *FAI* is used.

(1) Causal relationship by using gross foreign capital inflows

Tables 3a, 3b, 4a, and 4b show the results of the Granger non-causality test. The statistics listed inside the tables are the Wald test statistics, and the *P*-values are in

Table 3a. Granger Causality Test on *FAI* and *CA* for 5 EMCs

Country	Lagged Variables	Dependent Variables	
		CA	*FAI*
Argentina[5]	*CA*		3.62(0.60)
1993Q1-2004Q4	*FAI*	26.4(0.00)***	
Mexico[5]	*CA*		5.35(0.37)
1989Q1-2005Q4	*FAI*	26.4(0.00)***	
Indonesia[4]	*CA*		6.61(0.15)
1991Q1-2004Q4	*FAI*	22.2(0.00)***	
S. Korea[1]	*CA*		0.15(0.69)
1989Q1-2005Q4	*FAI*	7.43(0.00)***	
Thailand[5]	*CA*		9.26(0.09)*
1993Q1-2004Q4	*FAI*	48.8(0.00)***	

Note: *CA* and *FAI* denote the current account and gross foreign capital inflows, respectively. All the variables are in terms of *GDP*. The sample range is listed under the name of the country. The test is based on the modified Wald test. The number in the bracket beside the country name shows the degrees of freedom of χ^2. The number in the parenthesis beside the modified Wald test statistics is the *P*-value. ***, **, and * represent the 1 per cent, 5 per cent, and 10 per cent significance levels, respectively.

[22]Using the other unit root test of Philips and Perron (1987), we also find out that Thailand's current account, national savings, and investment and the U.S. current account and national savings could have the I(1) process. Using I(1) instead for these variables in the causality estimation and test, the results are the same with those presented in Tables 3-6 when using I(2).

Table 3b. Granger Causality Test on *FAI* and *CA* for 5 Developed Countries

Country	Lagged Variables	Dependent Variables *CA*	Dependent Variables *FAI*
Australia[5]	*CA*		3.84(0.57)
1984Q1-2005Q4	*FAI*	7.81(0.16)	
Canada[6]	*CA*		11.3(0.07)*
1974Q1-2005Q4	*FAI*	14.6(0.02)**	
Japan[5]	*CA*		1.24(0.94)
1982Q1-2005Q4	*FAI*	3.65(0.60)	
U.K.[5]	*CA*		1.85(0.86)
1974Q1-2005Q4	*FAI*	4.00(0.54)	
U.S.[12]	*CA*		8.68(0.72)
1974Q1-2005Q4	*FAI*	17.7(0.12)	

Note: The same to Table 3a.

Table 4a. Granger Causality Test on *S, I,* and *FAI* for 5 EMCs

Country	Lagged Variables	Dependent Variables *S*	Dependent Variables *I*	Dependent Variables *FAI*
Argentina[6]	*S*		5.39(0.49)	5.19(0.51)
1993Q1-2004Q4	*I*	16.9(0.00)***		2.49(0.86)
	FAI	6.08(0.41)	16.6(0.01)***	
Mexico[5]	*S*		7.91(0.16)	7.83(0.16)
1989Q1-2005Q4	*I*	9.00(0.10)*		9.64(0.08)*
	FAI	2.97(0.70)	4.89(0.42)	
Indonesia[2]	*S*		0.69(0.70)	4.35(0.11)
1991Q1-2004Q4	*I*	5.49(0.06)*		1.91(0.38)
	FAI	1.51(0.46)	6.49(0.03)**	
S. Korea[6]	*S*		16.7(0.01)***	4.68(0.58)
1989Q1-2005Q4	*I*	12.8(0.04)**		4.63(0.59)
	FAI	8.19(0.22)	18.5(0.00)***	
Thailand[6]	*S*		9.93(0.12)	24.2(0.00)***
1993Q1-2004Q4	*I*	19.1(0.00)***		6.54(0.36)
	FAI	16.2(0.01)***	7.26(0.29)	

Note: *S*, *I*, and *FAI* denote national savings, investment, and gross foreign capital inflows, respectively. All the variables are in terms of *GDP*. The sample range is listed under the name of the country. The test is based on the modified Wald test. The number in the bracket beside the country name shows the degrees of freedom of χ^2. The number in the parenthesis beside the modified Wald test statistics is the *P*-value. ***, **, and * represent the 1 per cent, 5 per cent, and 10 per cent significance levels, respectively.

the parentheses. Note that we estimate the augmented VAR and choose $d_{\max}$ to be 0, 1, or 2, depending upon the maximal integrated order as shown in Table 2. The

Table 4b. Granger Causality Test on *S*, *I*, and *FAI* for 5 Developed Countries

Country	Lagged Variables	Dependent Variables		
		S	*I*	*FAI*
Australia[5]	*S*		4.65(0.45)	5.03(0.41)
1984Q1-2005Q4	*I*	5.82(0.32)		2.22(0.81)
	FAI	4.61(0.46)	5.18(0.39)	
Canada[6]	*S*		3.52(0.74)	6.88(0.33)
1974Q1-2005Q4	*I*	2.49(0.86)		14.8(0.02)**
	FAI	6.91(0.32)	9.54(0.14)	
Japan[5]	*S*		4.53(0.47)	1.02(0.96)
1982Q1-2005Q4	*I*	20.7(0.00)***		1.23(0.94)
	FAI	1.59(0.90)	4.83(0.43)	
U.K.[4]	*S*		0.78(0.94)	3.41(0.49)
1974Q1-2005Q4	*I*	7.13(0.12)		1.79(0.77)
	FAI	4.72(0.31)	0.87(0.92)	
U.S.[12]	*S*		17.8(0.12)	6.65(0.87)
1974Q1-2005Q4	*I*	31.6(0.00)***		6.98(0.85)
	FAI	20.2(0.06)*	14.2(0.28)	

Note: The same to Table 4a.

numbers in the brackets beside χ^2 represent the degrees of freedom for each country in the regression.

We first report results of the Granger non-causality test for *CA* and *FAI* as shown in Tables 3a and 3b for EMCs and developed countries, respectively. For all the EMCs as shown in Table 3a, under the 1 per cent significance level, Granger non-causality from *FAI* to *CA* can be rejected. For the opposite direction of causality, except for Thailand in which *CA* Granger-causes *FAI* under the 10 per cent significance level, no causal relationship is detected. Table 3b presents the results of the five developed countries. For the null hypothesis of Granger non-causality from *CA* to *FAI*, all cannot be rejected under the 5 per cent significance level (Canada can be rejected under the 10 per cent significance level). For the opposite causality direction going from *FAI* to *CA*, only Canada can reject the null hypothesis of Granger non-causality.

Table 4a shows the results of causal relationship between *S*, *I*, and *FAI* for EMCs. Argentina, Indonesia, and South Korea show that *FAI* Granger-causes *I*. Mexico has a weak Granger causality going from *I* to *FAI*. Thailand has bi-directional causality between *S* and *FAI*. For developed countries, as the results offer in Table 4b, except when *I* Granger-causes *FAI* under the 5 per cent

significance level for Canada and *FAI* Granger-causes *S* under the 10 per cent significance level for the U.S., the rest show no causal relationship at all.

In sum, the results in Tables 4a and 4b are consistent with those of Tables 3a and 3b. For EMCs, it is mostly true that *FAI* Granger-causes *CA* or *S* and (or) *I*, while for developed countries, except for Canada, there is no significant causal relationship detected between *FAI* and *CA*, or *FAI*, and *S* and *I*.

(2) Causal relationship by using net foreign capital inflows

In order to compare the results, we also execute the causal relationship using net foreign capital inflows (represented by *FA*).[23] The results are shown in Tables 5 and 6 for the causality direction test of *CA* and *FA* and for *S*, *I*, and *FA*, respectively. For EMCs, as shown in Table 5a, except for Mexico which shows a bi-directional causal relationship, the rest are consistent with those which we find in cases of *CA* and *FAI*. For developed countries, the results are different from the causal relationship between *CA* and *FAI*. In Table 5a we find that *CA* significantly Granger-causes *FA* under the 1 per cent significance level for all the developed

Table 5a. Granger Causality Test on *CA* and *FA* for 5 EMCs

Country	Lagged Variables	Dependent Variables	
		CA	*FA*
Argentina[5]	*CA*		7.85(0.16)
1993Q1-2004Q4	*FA*	21.9(0.00)***	
Mexico[5]	*CA*		19.0(0.00)***
1989Q1-2005Q4	*FA*	40.7(0.00)***	
Indonesia[4]	*CA*		6.30(0.17)
1991Q1-2004Q4	*FA*	21.4(0.00)***	
S. Korea[1]	*CA*		0.03(0.86)
1989Q1-2005Q4	*FA*	13.4(0.00)***	
Thailand[5]	*CA*		7.91(0.16)
1993Q1-2004Q4	*FA*	31.8(0.00)***	

Note: *CA* and *FA* denote the current account and financial account, respectively. All the variables are in terms of *GDP*. The sample range is listed under the name of the country. The test is based on the modified Wald test. The number in the bracket beside the country name shows the degrees of freedom of χ^2. The number in the parenthesis beside the modified Wald test statistics is the *P*-value. ***, **, and * represent the 1 per cent, 5 per cent, and 10 per cent significance levels, respectively.

[23]In IFS, the code number is 78bjd.

Table 5b. Granger Causality Test on *CA* and *FA* for 5 Developed Countries

Country	Lagged Variables	Dependent Variables	
		CA	*FA*
Australia[6]	*CA*		15.0(0.01)***
1984Q1-2005Q4	*FA*	12.3(0.05)**	
Canada[9]	*CA*		34.8(0.00)***
1974Q1-2005Q4	*FA*	8.75(0.45)	
Japan[5]	*CA*		7.84(0.16)
1982Q1-2005Q4	*FA*	1.82(0.87)	
U.K.[6]	*CA*		17.0(0.00)***
1974Q1-2005Q4	*FA*	12.1(0.05)**	
U.S.[9]	*CA*		35.7(0.00)***
1974Q1-2005Q4	*FA*	8.08(0.52)	

Note: The same to Table 5a.

countries except Japan. In addition, there are also causal relationships going from *FA* to *CA* under the 5 per cent significance level in Australia and the U.K.

Tables 6a and 6b show the causal relationship between *S*, *I*, and *FA*. For EMCs, either *FA* Granger-causes *S* (Mexico under the 10 per cent significance level) or *I*, (both Argentina and Indonesia under the 1 per cent significance level, and Thailand under the 10 per cent significance level) or *FA* Granger-causes both *S* and *I* (South Korea). In addition, we also find that Argentina's *I* Granger-causes *FA* (although only under the 10 per cent significance level), and both Mexico's *S* and *I* Granger-cause *FA*. Among the five developed countries, except Australia in which only *I* Granger-causes *FA*, the other four countries show that both *S* and *I* Granger-cause *FA*.

In summary, for EMCs our results of a causal relationship between *CA* and *FA* are consistent with the results from Yan (2005), where the sample range of 1989Q1-2000Q4 is used, real variables deflated by *CPI* are adopted, and two controlled variables (exchange rate and *GDP*) are added. For developed countries, although two countries are different, the causal results of the other three countries, Japan, the U.K. and U.S., are the same with Yan (2005). The causal relationships of *FA* with components *S* and *I* have a similar causality direction with *CA*. For EMCs, *FA* Granger-causes *S* or *I*, or both, while for developed countries, it is *S* or *I* or both which Granger-cause *FA*.

Table 6a. Granger Causality Test on *S*, *I*, and *FA* for 5 EMCs

Country	Lagged Variables	Dependent Variables		
		S	*I*	*FA*
Argentina[6]	*S*		10.4(0.10) *	4.82(0.56)
1993Q1-2004Q4	*I*	9.13(0.16)		11.9(0.06)*
	FA	7.46(0.27)	21.9(0.00)***	
Mexico[5]	*S*		2.93(0.71)	23.9(0.00)***
1989Q1-2005Q4	*I*	7.71(0.17)		25.4(0.00)***
	FA	9.44(0.09)*	3.38(0.64)	
Indonesia[2]	*S*		0.67(0.71)	4.35(0.11)
1991Q1-2004Q4	*I*	5.43(0.06)*		1.88(0.38)
	FA	1.47(0.47)	6.41(0.04)**	
S. Korea[6]	*S*		12.0(0.05)**	2.68(0.84)
1989Q1-2005Q4	*I*	16.4(0.01)***		6.56(0.36)
	FA	13.0(0.04)**	17.3(0.00)***	
Thailand[5]	*S*		19.8(0.00)***	8.79(0.11)
1993Q1-2004Q4	*I*	11.1(0.04)**		1.29(0.93)
	FA	8.52(0.12)	10.1(0.07)*	

Note: *S*, *I*, and *FA* denote national savings, investment, and the financial account, respectively. All the variables are in terms of *GDP*. The sample range is listed under the name of the country. The test is based on the modified Wald test. The number in the bracket beside the country name shows the degrees of freedom of χ^2. The number in the parenthesis beside the modified Wald test statistics is the *P*-value. ***, **, and * represent the 1 per cent, 5 per cent, and 10 per cent significance levels, respectively.

Table 6b. Granger Causality Test on *S*, *I*, and *FA* for 5 Developed Countries

Country	Lagged Variables	Dependent Variables		
		S	*I*	*FA*
Australia[6]	*S*		6.17(0.40)	8.97(0.17)
1984Q1-2005Q4	*I*	4.08(0.66)		14.4(0.02)**
	FA	6.83(0.33)	5.72(0.45)	
Canada[5]	*S*		1.44(0.91)	32.0(0.00)***
1974Q1-2005Q4	*I*	5.70(0.33)		33.1(0.00)***
	FA	5.65(0.34)	1.86(0.86)	
Japan[5]	*S*		6.28(0.27)	11.7(0.03)**
1982Q1-2005Q4	*I*	23.7(0.00)***		5.75(0.33)
	FA	2.64(0.75)	5.18(0.39)	
U.K.[4]	*S*		2.45(0.65)	14.8(0.00)***
1974Q1-2005Q4	*I*	8.81(0.06)*		16.0(0.00)***
	FA	5.02(0.28)	6.93(0.13)	
U.S.[9]	*S*		13.8(0.12)	56.3(0.00)***
1974Q1-2005Q4	*I*	35.5(0.00)***		44.2(0.00)***
	FA	4.56(0.87)	5.60(0.77)	

Note: The same to Table 6a.

B. Discussions and policy implications

Extant studies on the causal relationship between current account and foreign capital inflows use net foreign capital inflows, which represent the difference between foreign and domestic residents' international investment behavior. We argue that it is more suitable to use gross foreign capital inflows if we want to know how foreign investors affect domestic current account imbalances. Our empirical results show that foreign capital inflows have a negligent causal relationship on developed countries' current accounts, while EMCs are mostly susceptible to the influence of foreign capital inflows. What will bring about different causal relationships in foreign capital inflows and current account imbalances between developed countries and EMCs?

In theoretical rationale, free capital mobility can promote an efficient global allocation of savings and a better diversification of risk, and hence greater economic growth and welfare as noted by Fischer (1998). However, Stiglitz (2000 and 2004) held an opposing view and purported that there is considerable information asymmetry in international financial markets, such that free capital mobility does not necessarily lead to an optimal allocation of resources. Indeed, the 1990s' currency crises, which wreaked havoc many EMCs, demonstrate that they were initiated by a surge of foreign capital inflows, followed by a bubble boom, and then ended with a distressed economy when the foreign capital bolted out. However, developed countries are capable of blessedly embracing free capital mobility and backlashes from foreign capital flows are rarely seen.

What causes the distinct consequences between developed countries and EMCs in the era of high capital mobility? Due to lax regulations and imprudent supervision on the financial systems in EMCs, recklessly dismantling capital account restrictions is dangerous, as argued by Reinhart and Reinhart (1998). Bustelo (2000) argued that foreign capital inflows were culpable for the persistent current account deficits for the EMCs in the 1990s. Nevertheless, Milesi-Ferretti and Razin (2000) and Calvo, *et al.* (2006) showed that current account reversal is likely to accompany a disruptive adjustment, such as a contractionary devaluation

[24]During sudden stop episodes, when foreign financing quickly dries up, consumption and investment contract, and output quickly slumps. Calvo, *et al.* (2006) found that output in Mexico declined by 4.8 per cent between 1981 and 1983 and by 6.2 per cent between 1994 and 1995, while in South Korea it declined by 6.9 per cent between 1997 and 1998, and in Thailand by 11.7 per cent between 1996 and 1998. Milesi-Ferretti and Razin (2000) studied reversals in a sample of 105 low-income and middle-income countries between 1970 and 1996. They presented that, for the median country, the current account deficit shrank dramatically - by 7.4 per cent of *GDP* (going from 10.3 per cent to 2.9 per cent).

with an enormous loss of *GDP* as noted in Frankel (2005).[24] Conversely, a developed country, like Australia, with a flexible exchange rate regime, domestic currency-denominated debt instruments, and a relatively sound financial system can escape from an Asian-type financial crisis, even with an enduring current account deficit, as opined by Caballero, *et al.* (2005).[25]

The empirical findings of this paper complement those lines of research studies related to issues on capital account liberalization, adjustment of current account imbalance, and financial institutions discussed above. The experience of the 1990s' currency crises indicates that a persistent current account deficit serves as a warning indicator for a pending crisis, as documented in Corsetti, *et al*. (1999) and Edwards (2002). Indeed, an ill-functioning financial system could channel foreign capital into consumption binges and inefficient investments, each or both of which could put current account sustainability into jeopardy. This signifies that it is imperative for EMCs to take up measures to appropriately phase in capital account liberalization. For instance, Fischer (1998) offered that building up a strong financial system is an essential precondition for capital account liberalization. Nevertheless, by suggesting how to manage large capital inflows, IMF (2007a) hoisted that the quality of domestic financial markets plays a pivotal role to protect EMCs from the risk of capital account liberalization. While globalization proceeds at a swift pace, to manage large capital inflows, IMF (2007b) suggested that within different policy responses, having a tightening fiscal policy and greater exchange rate flexibility is more favorable.[26]

V. Concluding Remarks

The resurgence of international capital flows since the end of the 1980s has instigated discussions on the relevant issue of global current account imbalances. Whether the U.S. current account imbalance will unravel in a disorderly way like that which occurred in emerging markets' financial crises during the 1990s is a

[25]The Australian experience of smooth sailing through a persistent current account deficit during the 1980s and the turbulent period of the Asian 1997-98 crisis vindicates that it is groundless to worry about a current account imbalance in the U.S.

[26]The other two policy responses regularly under discussion are sterilization and capital control. Sterilization brings to quasi fiscal cost and in the long run it might be invalid with an increasing interest rate, and it only leads to more capital inflows. Although capital controls have an imminent effect, the related costs, such as administrative costs and market distortion costs, could be high and people can always circumvent the restriction. See IMF (2007b).

pending question for anyone to guess. Australia's experience at having decades' worth of current account deficits without suffering from the plight of capital account crises provides another guide as to how the issue of the U.S. current account deficit might wind up. In this paper we have empirically demonstrated the disparity in the causal relationships on current account and foreign capital inflows between developed countries and emerging market countries. We conclude this study on the causal relationship between current account imbalances and foreign capital inflows in three respects.

For the first look, distinct from the extant studies that usually investigate the causality direction between the current account and net foreign capital inflows, this paper emphasizes instead on using gross foreign capital inflows. Due to net foreign capital inflows being the difference between domestic and foreign investors' decisions, using gross foreign capital inflows is more suitable to examine how real foreign capital inflows affect the current account. The empirical results show that, for emerging market countries, it is mostly true that foreign capital inflows cause the current account imbalance. However, for developed countries no significant causal relationship is detected. The current accounts of emerging market countries are susceptible to the influence of foreign capital inflows.

The second aspect is that we find foreign capital inflows Granger-cause either national savings or investment for emerging market countries, but for developed countries there is a lack of evidence for causal relationships between foreign capital inflows and national savings and investment. The findings of causality direction between foreign capital inflows and national savings or investment, or both, highlight where the foreign funds are channeled to and certainly have meaningful implications for policymakers to determine which is liable for the current account imbalance.

The third point is that the findings from our empirical studies complement current research studies on issues related to the interaction between capital account liberalization, adjustment of current account imbalance and the financial institutions. The experience of the 1990s' currency crises indicates that a persistent current account deficit serves as a warning indicator for a pending crisis. An ill-functioning financial system could channel foreign capital into consumption binges and inefficient investments, each or both of which could put current account sustainability into jeopardy. Given the relatively immature financial markets, emerging market countries should be cautious when liberalizing their capital account and prudent measures to manage large capital inflows are necessary.

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