



# External Shocks to and Volatility of Economic Growth in Asain-6: A Dynamic Panel 1991-2011

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**Abstract:** The global economy has recently been characterised by a string of new style financial crises that plunged a number of rapidly growing and successful economies in the world into financial chaos and economic collapse. The challenge of reconciling international mobility with domestic economic stability and developmental priorities has now emerged as the most pressing and controversial topic in international economies and policymaking. At the heart of this new policy focus is a renewed emphasis on the conventional wisdom about the need to treat foreign direct investment (FDI) flows separately from other forms of capital flows (short run and long run debt) in designing national policies to monitor capital flows.

There are many things that went wrong for the countries caught up in the Asian crises of 1997, 2002 and 2008, but of the myriad causes two clear central problems can be identified- the fatal combination of large and volatile international capital inflows, interacting with fragile domestic financial sectors. In particular, the Asian financial crisis has created confusion about the role of foreign capital in the development of Asia. Since the crisis, there has been heated debate on how beneficial foreign capital is in promoting economic growth, given that it also created systemic risks that were a key to the Asian financial crisis. This paper contributes to the debate by assessing the role of foreign capital inflows and outflows in generating sustainable savings and growth prior to and during the crisis. Though there has been a large number of studies of foreign capital inflows, few have gone beyond qualitative assertions regarding FDI, long and short term debt, savings and growth. This study makes some attempt at rectifying this gap by quantifying the above issue using the dynamic panel modelling of six Asian countries over and during the crisis (1991-2011). The main conclusion of this article is that sudden decreases of foreign capital inflows and global crisis explain most of the fluctuation in the Asian annual growth rates since 1990s.

**Keywords :** Foreign Capital , Crisis, Growth, Panel

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## **Introduction**

There has been greater acceptance of the view that capital supply shocks, the sudden interruption and reversal of capital inflows facilitated by capital account liberalization, can cause financial crises. However, for the most part it is thought that the volatility of capital flows applies predominantly to short-term flows such as portfolio flows and short-term bank loans and not longer term capital flows such as FDI. Hence economies that finance their current account deficits mainly via foreign direct investment (FDI) and long term debt are seen as less susceptible to financial crisis. Several researchers have examined the sources of vulnerability to crisis in the Asian context. The conventional wisdom is that crises are largely due to swings in short-term capital (mainly bank loans). The spate of financial crises in emerging economies in the 1990s, coinciding as they have with increased cross-border flows of capital, motivates our interest in examining the nexus between crises and the composition of capital flows. Does reliance on FDI guarantee stability? The analysis in this paper challenges the casual presumption that the switch towards FDI alone will in fact guarantee stability.

Foreign capital and economic growth have been at the core of economic analysis largely because of their implication for the long-term economic progress. Nevertheless, in the past few decades, the connections among them and the directions of causality are still far from being clear. In the early 2000s, foreign capital inflows became important sources of finance in all Asian countries in general, and particularly in the six hardest-hit economies (Korea, Malaysia, Indonesia, Thailand, Philippines and the Singapore). Capital inflows in region rose from 24.4 percent of GDP in the 1980 to 38 in the 2008. Any shocks that induced a large drop in capital inflows had the potential to create serious financial and economic problems for the countries in the region. Capital flows to Asia increased domestic investments, and increased investment contributed to (achieve) higher growth (investment-led growth hypothesis). The higher growth performances attracted further capital flows. A virtuous cycle of capital inflows and economic growth was indeed an important part of what was called the Asian "miracle". During the episode of strong capital inflows, several of these host countries expensed over investment, in that capital inflows were causing adverse side effects, overheating domestic economies to speculative appreciation pressure. Higher growth invited more investment and more investment invited more capital inflows that produced even higher exports and economic growth.

Once the currency was destabilized in mid 1997, 2002 and 2008 among ASEAN countries, capital inflows to the region became substantially cut. As discussed above, net private capital flows to the Asian region in 1997 became only one-tenth of that of 1996. Most of the outflows took place in banking flow reversal. The vicious circle set in after September 1997: Capital outflows caused the currency to depreciate; depreciation made the real economy and banking sector weaker; weak economies made investors more pessimistic; and pessimism encouraged further capital outflows.

This study attempts to address these issues by focusing on the dynamic relationship between growth, foreign capital and investment both in the short- and long run. We consider six Asian (here after referred to as Asian-6) in our sample: Thailand (THI), Malaysia (MAL), Indonesia (IND), Philippines (PHI), Singapore (SIN) and South Korea (SKOR). We have chose ASAIN-6 because those countries have relatively open economies and actively seek foreign capital to fill the resources gap<sup>1</sup>. A review of the recent literature on these issues reveals that three important arguments stand out in empirical studies: First, the bulk of the evidence suggests that high saving will result in high levels of investment and

1 These countries are also classified as heavy lightly stably integrated financial markets.



hence a higher level of economic growth. Second, an increase in domestic savings may indeed be offset by reductions in foreign capital inflows and vice versa. Third, a large saving-investment gap will cause a high level of current account deficit, and hence a large inflow of foreign capital, which creates an increasing financial risk and a higher interest rate premium (F. Doraisami, 2007).

*The objective of this paper is three-fold: First, we seek evidence on the causal relationship among foreign capital inflows and economic growth. Second, the paper investigates whether foreign capital inflows and in particular short-term debt displaced domestic savings. Third, is FDI more resilient to the onset of international financial crisis compared to other forms of foreign capital inflows?*

This paper attempts to make a number of contributions to the existing literature. First, ASIAN-6 is the recipient of large FDI flows by world standards. Four of the ASEAN countries (Malaysia, Indonesia, Thailand and the Philippines) have accounted for approximately 50 percent of FDI flows to developing countries since 1990s. Despite the importance of foreign capital in these countries, there is little empirical being carried out to examine the impact of foreign capital on economic growth and domestic saving. The popular view behind FDI is that it can permanently increase the rate of growth in the host through technology transfer, diffusion and spill-over effects into the host country. Consequently, it is often argued that FDI contributes more to growth than domestic savings. Second, there is also a growing consensus that recent financial crises, particularly in East Asia is due to large exposure of short-term debts<sup>2</sup>. Several authors have pointed out that unlike FDI; short-term debt effect on economic progress is only temporary. In addition, there is no evidence to indicate a relationship between level of short-term and economic growth. Overall, the empirical evidence on the causal relationship between FDI and economic growth is rather inconclusive. Hence motivated by the recent events in the region, we intend to show to what extent FDI, domestic saving and short-term debt can have any influence, if at all, on the overall economic growth. The drawback of previous studies is that they failed to consider the non-stationary issue in Dynamic panel data. This study makes some attempt at rectifying this lacuna by quantifying the above issue using the Dynamic panel techniques over the period of crisis 1991-2010.

The main results of this study can be summarized as follows. First, economic growth had a significant positive effect on saving ratios and the causality runs in both directions. Second, SD displaced domestic saving both in short and long run, but the coefficient is less than one prior to the crisis and more than one during the crisis. Third, FDI positively affects growth ratio in the long run, hence suggesting that transitory change in FDI augment the supply of domestic saving and increase domestic investment .

The remainder of the paper is organized as follows: section II provides the trends of the external capital inflow to the Asian economies over the period from 1970 to 2010. Section III reviews the model used in the analysis. This is followed by the presentation of the methodology utilized in the analysis, and the empirical results appear in section IV. Finally, the last section summarizes the results along with the concluding remarks.

## **Asian's External Capital Inflow**

Linking the composition of international capital flows to economic instability and financial crises is quite straightforward. It argues that short-term inflows or "hot money" can be easily reversed, while longer-term flows (in the form of long maturity bonds and loans and

<sup>2</sup> Analyst believed that excessive external short-term obligation are vulnerable to sudden changes in market sentiment and financial panics (see for example, Radelet and Sachs, 1998 and Furman and Stiglitz 1998)



especially FDI) cannot. Movements of hot money are seen as being dominated by interest rate differences and by expected exchange rate changes which can alter rapidly, leading to capital volatility, while FDI is determined by long-term fundamental economic characteristics which are more stable. Indeed FDI is often presented as being relatively irreversible in the short-run. Since it enhances the productive capacity of the host country, it produces the revenue stream necessary to cover future capital outflows

The composition of the flow of foreign capital to Asia can be categorized into long-term flows comprising official long-term capital (external debt of the public sector) and private long-term capital (FDI), and short-term flows (changes in the net foreign assets position of the banking institutions and large corporations as well as portfolio investments). Figure 1 shows the total gross capital inflows to the ASIAN-6 for the period 1991 - 2010. Several features of the capital inflow are evident. First, capital flows to these countries increased markedly in the 1990s and they were closely related to the period when these economies were growing rapidly. Second, capital flows to Philippines and Singapore dwarf other Asian-6 economies.

The share of private capital flows to the Asian countries increased compared to that of other developing sub-regions from about 68 billion in 2002 to 349 billion in 2007. Net private capital flows to East Asia and Pacific remained strong at \$228 billion in 2007, up from 203 billion in 2006. Net FDI inflows remained robust at \$117 billion (105 billion), while the net portfolio equity inflow declined from 54.8 to 48.6 in the same period. The net debt increased from 35.1 billion to 58.4 billion, much of this debt was from private creditors which increased from 42.7 to 60.7 billion- medium and long debt increased from 15 to 28.8, while the short term increased from 27.7 to 37.9 billion), and the net official flows continued to be negative at 7.6 and 2.3 billion in 2006 and 2007 respectively).

The global financial crisis brought to an abrupt end the surge in foreign capital flows. In 2008, total net international flows of private capital to developing countries fell to \$707 billion ( 4.4 percent of developing countries GDP), from the record high level of 1.2 trillion ( 8.6 percent of GDP) reached in 2007. Net portfolio equity flows plunged by almost 90 percent from \$139 billion to \$16 billion in 2008. Similarly, private debt declined substantially to \$108 billion from \$499 billion in 2007, driven by the sharp fall in short-term debt, which moved from \$202 billion in 2007 in to negative territory (-16.3 billion), and in bond financing which came to just \$11 billion in 2008 compared with \$85 billion in 2007. Net medium and long term bank flows were \$123, 40% lower than in 2007. The rate of increase in FDI slowed markedly, ending the year at a 583 billion, 60 billion higher than 2007. The downturn affected all developing regions but to various degrees, Short term debt accounted for a major share of the decline in East Asia, ( 67 percent ), while the FDI inflows rose slightly in 2008 most of the \$ 63 billion increase flowed to the East and South Asia regions. World Bank (2011).

### **Theoretical Foundations**

The likely consequences of foreign capital have led to heated discussions among economists since the 1950s (Friedman, 1958; Rosenstein-Rodan, 1957; Rostow, 1960; and Bauer, 1976). The theory can be classified into two groups' opposing views on the effect of foreign capital inflow on economic growth. One is the optimism of the neo-classical theory (simple endogenous-growth model) which argues that international capital compensates scarce capital, and promotes investment and growth by increasing the domestic investment rate and/or by leading to investments associated with positive spillovers, such as the transfer of technology or skills in order to help developing countries achieve 'take-off' (see for example Rogoff, 1999 and Fisher 1998, 2003). Whereas, Rodrik (1998), Stiglitz(2000) and Bhagwati(1998) highlight a negative side that capital liberalization may lead to more instability in the financial market rather than increasing growth-inducing effects, if a country's



economy is immature. Rodrik and Subramanian(2008) argue that capital accumulation of less developed countries is insufficient, not because they save less but because they do not have enough investment opportunities. Under such circumstances, a higher capital inflow into their markets, they argue, will have a negative impact on their economic growth by reducing return on investment through the appreciation of foreign exchange rates and by weakening their international competitiveness.

**The Empirical Evidence: An Initial Look**

The relationship between foreign capital inflows and economic growth had been widely examined by economists. Many studies demonstrated that the impact of foreign capital would differ across countries according to whether a country faced a binding savings or foreign exchange constraint, and with the degree of monetary of the economy, dependency ratio, and the stage of development of financial intermediaries.

It is only recently that researchers have investigated the effect of short-term capital and long-term capital on economic growth. Authors such as, Combo and Hernandez (1995) point out that one reason why controls on short-term foreign capital flows may be counterproductive is that the flows they discourage may contribute to growth. Gruben and Mcleod (1998) using data from 18 Asian and Latin America countries showed that increases in the share of FDI to GDP are positively and significantly related to subsequent changes in saving, and the changes in the share of portfolio equity capital inflows to GDP also have a significant positive relation to saving. Nevertheless, their findings also reveal that other types of capital inflow offer mixed and insignificant results. The results of this investigation are mixed. De Mello (1999) argues that in the open economy FDI might be detrimental to growth if it is a substitute for domestic saving, in which case, FDI inflows exacerbate balance of payments problems via foreign exchange remittances. Grenville (2008) discusses the macroeconomic consequences of capital flows and how policy should respond to them, as well as how to manage a crisis when it occurs, while Schadler (2008), draws lessons on policy options for over 90 recent episodes of large capital inflows.

Grilli and Milesi- Ferretti (1995) and Rodrik (1998, 2008) fail to find any such relationship. Prasad et al. (2004) concludes that financial integration is neither a necessary nor a sufficient condition for achieving a high rate of growth. Reisen and Soto 2001, examine the panel data for 44 countries over 1986-97 and find that FDI inflows, but not any other type of capital inflows are positively correlated with subsequent economic growth. The long and short term debt has a negative effect on growth in all countries in the sample and all levels of income. While the study of Mody and Murshid (2002) discusses the other side of the problem, since they approve that there is a very strong evidence between the foreign capital inflow and macroeconomic variables in the sample of 60 developing countries. However this effect changing overtime depends on the right policy and distribution of the foreign capital to most effective sectors, management. We can summarize the study results as follows:

	<u>Domestic Investment</u>	<u>Efficiency</u>	<u>Consumption</u>	<u>In All Sectors</u>	<u>Negative Fluctuations</u>
FDI	+	+	+	(+)	.....
PI	.....	+	+	(+)	(+)
LD	+	(+)	-	+	-
SD	-	(+)	(+)	+	+

\*The indicators: + higher effect,- higher negative effects, ..... no effect and (+) little effect

Doraisami (2007) highlights a macroeconomic risk of FDI by noting that substantial FDI inflows has created a large export sector and made the country vulnerable to a sudden decline in export growth. A policymaker must conduct a sort of simulation exercise to know the macroeconomic, financial and reversal risks of capital inflow by tracing how it moves through the system and, in the event of sudden withdrawal, what its likely impact would be.

Prasad et al. (2007) also document a negative cross-country correlation between the ratio of capital inflows to GDP and growth, and discuss possible explanations for this finding. Manzocchi and Martin (1997) empirically test an equation for capital inflows derived from an open-economy growth model on cross-section data for 33 developing countries and find relatively weak support.

Recently, Rodrik and Subramanian 2008, have presented a clearly argued case in favour of the benefits of financial globalization. They provide the most detailed review of the literature about the growth and capital account openness and they conclude that financial globalization has not generated increase in investment or higher growth in emerging markets. Furthermore, countries that have grown most rapidly have been those that rely less on capital inflows.

Thus, in summary, this discussion has argued that capital inflows are more likely to foster higher growth in developing countries if they are motivated by, and hence channelled into productive investment, and if they lead to investments that generate positive spillovers through either the real or financial sector of the economy.

### **Methodology**

Although, we find so many empirical studies analyzing this important issue, most of these studies have certain limitations such as ad hoc use of econometric techniques. Moreover, the studies on the Asian region are mainly based on cross section or time series data It is, therefore, important to re-examine the effect of defendant type of foreign capital and economic growth in these fast growing economies using more recent data , new methodology and the panel data. Furthermore, the study estimates flexible dynamic (reduce form) models and identifies long-run and short-run correlations among the variables of interest. The base line model is specified as follows:

$$GRO_t = \hat{h}_0 + \hat{h}_1 GDS_t + \hat{h}_2 SD_t + \hat{h}_3 LD_t + \hat{h}_4 FDI_t + \hat{h}_5 Cri + \mu_t \quad (1)$$

Where  $\mu_t$  is the error term to capture the unobserved effects and assumed to have zero mean and constant variance. The  $\hat{h}$  's are parameters to be estimated.

Next, we use the Dynamic Generalized Least Squares (GLS) methodology of Stock and Watson (1989) as described in Campbell and Perron (1991) and developed by Pesaran et al. (2001). This methodology corrects for (i) serial correlation (the sample residuals exhibit AR(1) using (GLS); and (ii) endogeneity of the regresses by including lags and leads of changes in the explanatory variables. Furthermore, Mark and Sul (1999) show that there are sizeable gains in pooling the data. Kao and Chiang (2000) have compared different estimation techniques for panel data and have found that DGLS outperforms both OLS and fully modified OLS. To this end, we are focusing our analysis on DGLS. The long-run Dynamic Generalized Least Squares (DGLS) for the growth equation is:

$$GRO_{ijt} = \pi_{ij} + \lambda_{ij} X'_{ijt} + \sum_{j=1}^{P_1} \delta_{ij} \Delta X_{i, L_{t-j}} + \sum_{j=1}^{P_2} \gamma_{ij} \Delta X_{i, L_{t+j}} + e_{ijt}, \quad (2)$$



Hence  $X_{ijt}$  are the regressors of the savings model in the level form  $L$ , and  $L_{t\pm j}$  here denotes to the lag and lead operator<sup>3</sup> of the first different parameters,  $e_{ijt}$  is the error term to capture the unobserved effects and is assumed to have zero mean and constant variance.

Eq. (2) where lags and leads of  $\Delta X_{ijt}$  are included in the co-integration regression in order to produce asymptotically unbiased estimators, and to avoid the likely problem of estimating nuisance parameters. Eq. (2) is an extension of Eq. (1) where lags and leads of  $X'_{ijt}$  are included in the cointegration regressions in order to produce asymptotically unbiased estimators, and to avoid the likely problem of estimating nuisance parameters. By estimating Eq. (2), it is possible to construct asymptotically valid test statistics, as well as to estimate the long-run relationship where the coefficients of  $\Delta X_{ij}$  are the cointegrating parameters. Thus, the causal relationship between any of the  $X'_{ijt}$  and  $GRO_{ijt}$  can be tested using an  $F$  test. For example,  $X_{1ijt}$  Granger-causes  $GRO_{ijt}$  if the null hypothesis that " $\lambda_{1ij} = \delta_{1ij} = \gamma_{1ij} = 0$ " is rejected (see for more discussion Hussein and de Mello Jr, 2001).

Finally, the short-run (DGLS) for the growth equation is:

$$GRO_{ijt} = \eta_{ij} + \eta_{ijt}ECM_{ijt-1} + \eta_{ijt} \sum_{j=1}^{P_1} \eta_{ij} \Delta X_{ij}(L_{t+j}) + v_{ijt} \quad (3)$$

The terms  $ECM_{ijt-1}$  is the one period lagged error correction term from the long run savings function (assuming one vectors) and  $(L_{t+j})$  are the parameters in the lead form only. The  $\eta$ 's are parameters of the models to be estimated,  $u_{ijt}$  is the error term to capture the unobserved effects and assumed to have zero mean and constant variance. All variables are expressed in ratio of GDP, and  $t$  denotes time subscript. Annual data are used because some of the relevant data are not available at higher frequencies. The bulk of the data 1970 to 2010, comes from: Key Indicators of Developing Asian and Pacific Countries, 2011, Oxford University press, New York. All the variables are at market prices current local currency and converted to US dollar.

<sup>3</sup> Notice that the actual number of observations used in the analysis depends on the number of lag and lead variables used in the estimation. The integer  $k$ , the number of lags (or leads) is chosen as follows: Starting with a reasonable upper bound  $k$ , on estimation, if the variable (with the highest lag) is significant, then  $k$  is chosen as the optimal number of lags (or lead). If the variable is insignificant, the number of lags (leads) is reduced by one until the last lag (lead) is significant in the estimation.

## Estimation Process

### 1.1 Panel Unit Root Test

We begin our analysis by showing the univariate properties of the various variables of interest using (Fisher-PP) test for unit root tests. the results in Table 1 uniformly indicate that the null hypothesis of a unit root could not be rejected for all variables in the levels. The null hypothesis, however, was overwhelmingly rejected for all the series in first-differences.

**Table (1.1) (Fisher-PP) Test for Unite Root**

$I_{(1)}$ First Diff		$I_{(0)}$ (Level		Variables
Trend and Constant	Constant	Trend and Constant	Constant	
149.3 (0.00)	132.1 (0.001)	22.19 (0.44)	18.2 (0.52)	GRO
197.9 (0.00)	179 (0.00)	33.53 (0.53)	23.21 (0.33)	SAV
141.83 (0.00)	177.20 (0.00)	20.50 (0.76)	22.01 (0.69)	SD
632.06 (0.00)	284.43 (0.00)	38.54 (0.45)	29.08 (0.31)	FDI
265.37 (0.00)	230.14 (0.00)	25.70 (0.48)	26.42 (0.44)	L.D

Notes: The denotation: GRO= Growth rate of GNP ; S= Saving/GDP; FDI =Foreign direct investment/GDP; SD= Short -term debt/GDP; LD= Long term debt/ GDP.

#### 1.1.1 Panel Multivariate Cointegration Analysis

To determine whether the non-stationary variables identified above are co-integrated or not, the panel multivariate co-integration technique (Fisher- $c^2$ ) developed by (Maddala and WU,2000) is employed to the five dimensional vector:  $X_t = [GRO_t, SAV_t, SD_t, LD_t, FDI_t]$ . The Fisher methodology offers two likelihood ratio test statistics for determining the number of cointegrating vectors. In the first likelihood ratio statistics the null hypothesis is that there are at most  $r$  cointegrating vectors against the alternative hypothesis that there are  $r$  or more cointegrating vectors. This is the trace statistics. In the second test, the null hypothesis is that there is at most  $r$  cointegrating vectors against the alternative of  $r+1$  cointegrating vectors. This statistics-maximum eigenvalue  $I$ -max statistic is generally considered more powerful because the alternative hypothesis is in equality. Results of the co-integration analysis are summarised in Table 2

The Fisher multivariate tests reveal that the null hypothesis of no co-integration ( $r=0$ ) is easily rejected at the 5 per cent significance level in the system of five variables. Notice that both the computed  $I$ -max and trace statistics exceed their critical values. In addition, we find the eigenvalue associate with the first vector is dominant over those corresponding to other vectors, thereby confirming that there exists a unique cointegrating relationship in the system. This result implies that income, FDI, long term- debt and short-term debt share a stable long-term relationship with domestic saving. Clearly, the number of relationship is less than the full rank of five in our case, suggesting that all the variables are not  $I(0)$



stationary. At this point it is important to find out if each of the variables (including the short-term debt) enters the cointegrating relationship significantly. We test for zero restrictions upon each of the coefficients derived by the Johansen procedure. LR statistics reveal that all five variables enter the cointegrating relationship significantly. This finding implies that omission of any one of these variables may bias our results.

**Table (1.1.1) Test for Cointegration (Fisher-c<sup>2</sup>)**

Hypothesized No. of CE (s)	Fisher Stat. (From Trace Test)	Prob.	Fisher Stat. (From Max-Eigen Test)	Prob.
None	109.5	0.00	69.70	0.00
At most 1	57.63	0.00	43.40	0.00
At most 2	31.43	0.08	24.34	0.32
At most 3	20.16	0.57	17.93	0.71
At most 4	14.94	0.86	14.94	0.86

#### 1.1.1.1 Analysis of the Long and Short Run Results for the 1990-2010

The empirical results for the long and short-run model are displayed in Table (1.1.1.1). The numbers below the estimated long-run parameters are the asymptotic standard error. In general, the data fits the model reasonably well, as indicated by the high R<sup>2</sup>. Specifically, we can summarize the results as follows: The (ECM<sub>t-1</sub>) term is negative and bears higher significance, indicating that the burden of short-run endogenous adjustment to bring the system back to its long-run equilibrium is borne by economic growth (GRO). The speed of adjustment is -0.78 implying that 78 percent of the previous year's growth rate from its long run or equilibrium value will be corrected each year.

Looking at the specific parameters, we found that short-term inflow (SD) carries a negative sign and is statistically significant at 5 percent level, suggesting that it displaces domestic saving in, which in turn lead to negative effects on growth in the short and long runs Previous studies have documented that the massive outflows of the short run capital during the global and Asian financial crisis lead to sharp decreases in asset (stock and property) prices. This led to decrease in wealth especially the reserves of foreign currency, resulting in the sharp decrease in foreign capital. Most of the outflows took place in banking flow reversal. Furthermore, the coefficient of short-term debt bears more than one unit, suggesting that outflow of short term capital is higher than its inflows during this period.

These results are consistent with many previous studies, which conclude that the main reason for the crisis is higher outflow of short-term foreign capital (See for example, Makin 1999; Corbett and Vines, 1999 and Radelet and Sachs 1999, Sato 2001). Domestic saving and FDI have positive effects on growth and they are statistically significant at the 5 percent level or better. This is in accordance with the bulk of the literature (Lahiri, 1989 and Hussen and Thirlwall, 1999). The effect of long term foreign capital is the same but the coefficient changed to not significant at a 5 percent significant level, which indicates that the long term foreign capital is more important than short run foreign capital as sources to finance the development during the crisis. As shown, FDI and long term debt contributed positively to the economic progress of the Asian countries in the long run. The finding is directly comparable with Fry (1994) and Boone (1994) Khan and Hasan (1998) and Gruden and Mcleod (1998), to name a few. Again, our results highlight the importance of foreign

capital (FDI and long-term debt) to jump start the crisis-affected East Asian countries.

Finally, the sign and statistical significance of crisis coefficient is negative, indicating that the crisis hardly affected the performance of Asian development and created macroeconomic instability.

**Table(1.1.1.1): Long and Short Run Results Using Dynamic GLS**

Variables	Long DGLS 1991- 2010	Short DGLS 1991-2010
	Estimated Coefficients	
Short Term Debt / GDP	-2.65 (0.13)	-4.68 (0.031)
Saving / GDP	2.75 (0.03)	3.54 (0.78)
FDI/GDP	-0.42 (0.69)	1.90 (0.13)
Long Term Debt / GDP	-2.2 (0.43)	1.63 (0.89)
Crisis	-0.32 (0.01)	-0.43 (0.022)
ECM <sub>t-1</sub>	-0.43 (0.08)	-0.78 (0.016)
	R <sup>2</sup> = 0.91 Countries = 6 Log LR=221.3	R <sup>2</sup> =0.92 Countries = 6 Log LR=132.4

In general, the results of the long run support the view that in economies, such as ASIAN-6, where complete restriction on capital mobility is absent, the movement of foreign capital flows can affect economic growth. Specifically the results show that all types of foreign capital retard and restrict the economic growth and displaces domestic savings in short run. The vicious circle set of the different Asian crisis 1997, 2002 and 2008 start from the monetary section, the especially external sector: Capital outflows caused the currency to depreciate; depreciation made the real economy and banking sector weaker; weak economies made investors more pessimistic; and pessimism encouraged further capital outflows.

**1.1.1.1.1 Granger Causality Tests**

The cointegration tests presented above imply that the five variables are bounded together by one long-run relationship, but do not provide information about the causal relationship between these variables. We proceed with the Granger- Causality test by constructing with one error correction term. Results in Table 5 point to several interesting results about the usual relation; first, there is sufficient evidence to support the view of foreign capital inflows (FDI and LD) Granger-cause saving and economic growth in the long run<sup>4</sup>. These

4 The Granger-causality test is defined as follows:  $F = \frac{(ESS_R - ESS_{UR})/q}{[ESS_{UR}/(n-k)]}$ , where  $ESS_{UR}$  is the ESS for the unrestricted model, and  $ESS_R$  is the ESS for the relevant restricted model. The parameter q is the number of restriction and k is the total number of parameters in the unrestricted model.



causal relationships between foreign capital (FDI and LD), saving and growth are shown by the significance of the error-correction term (ECT). The effect of foreign investment on economic growth is either directly or indirectly through domestic saving in the long-run. It directly affects saving through being a source of capital formation (domestic saving). Capital formation including new machinery, managerial expertise, marketing know-how will contribute to an increase in total investment. Increases in investment directly contribute to growth (FDI@SAV@GRO). FDI also contributes to savings indirectly. FDI beneficially influences other macroeconomic factors, such as employment, export earning, government tax, consumption. These in turn, enhance saving (FDI@SAV). Second, a bi-directional causality relationship is detected between saving ratio and economic growth, detected in both the short and long run (error-correction term) channels. Hence our results tend to support the view that higher saving ratio causes economic growth. This finding is noteworthy because it explains why ASEAN-6 have recorded high saving and growth rates over the past few decades Third, the short run causality channels relationship between domestic saving (capital), growth to SD and LD; and from LD to FDI and SD are detected in the short run, hence, supporting the popular view that the economic progress in Asian-6 has attracted both short and long-term investors into Asian economies. These and other causalities are display in below.

**Table 1.1.1.1.1: Causality Test\* Results Based on Dynamic GLS for 1991-2010**

DEP.VAR	GRO	SAV/GDP	FDI/GDP	SD/GDP	LD/GDP	CRISIS
<b>c<sup>2</sup>-statistics</b>						
GRO	—	14.96 (0.12)**	8.91 (0.001)**	0.002 (0.41)	1.75 (0.013)**	6.32 (0.32)**
SAV/GDP	0.32 (0.12)	—	7.1 (0.001)**	1.98 (0.479)	3.21 (0.41)*	0.21 (0.19)
FDI/GDP	2.22 (0.098)**	0.12 (0.41)	—	1.18 (0.61)	5.1 (0.001)**	0.96 (0.76)
SD/GDP	0.98 (0.032)**	0.098 (0.65)	0.12 (0.76)	—	0.198 (0.12)	2.84 (0.003)**
LD/GDP	0.21 (0.13)	0.22 (0.47)	0.63 (0.21)	0.64 (0.01)	—	0.63 (0.12)
CRISIS	0.01 (0.84)	0.23 (0.75)	0.11 (0.76)	1.98 (0.021)*	0.091 (0.59)	—

### 1.1.1.2 Conclusions and Policy Implications

Maintaining adequate or optimal level of saving remains a central policy concern, not only to guarantee sufficient financing for capital accumulation, but also to avoid an excess of investment over saving rate, which as demonstrated by the recent Asian financial crisis tends to create inflationary pressures or balance of payment disequilibria.

This paper contributes to the debate on the importance of the types of foreign to domestic saving and economic growth in a dynamic panel framework. It is worth highlighting that this study made an initial attempt at placing the empirically controversial issue of causality between saving and foreign capital in a temporal multivariate and co-integrated Granger-causal framework in the both short as well as long run. Overall, the empirical results



support the popular explanation behind success of Asian-6 as the largely investment driven (investment-led hypothesis).

What has been the net effect of all types of foreign capital on saving rate in Asian-6 economies? The answer of this question and their policy implications can be summarised as follows:

First, the empirical results demonstrate that economic growth has a significant positive effect on saving ratio. The empirical analysis based on the approach by dynamic panel GLS show that saving and economic growth reinforced each other – the causality runs in both directions. Economic growth boosts saving ratio. This finding supports the hypothesis that there is a virtuous circle that goes from rapid growth to increase saving, higher saving is also likely to lead to faster capital accumulation and increase growth. Expansion, in turn, sets in motion a self-reinforcing process by which the anticipation of growth encourages investment, investment supports growth, and increased income raises saving ratio.

Second, SD displaced domestic saving both in the short and long run, but the estimated coefficient is less than one prior to the Asian crisis, and higher than one during the crisis, indicating that increase in SD crowd out domestic saving in a less than one-to-one fashion in long run, and more than one-to-one during the crisis. The sharp over-dependency on SD and its subsequent impact in destabilizing the economic performance has left their economies vulnerable to external shocks. Since the SD substitute the domestic saving and since there is a bi-directional run from growth to saving and from saving to growth, then the SD was indirectly affected growth negatively. The recent financial crisis clearly illustrates this point. All of these countries experienced negative growth rates for several quarters following the period of capital reversal<sup>5</sup>. The retreat of foreign capital during the recent financial crisis emphasized the need for local financing to avoid real consequence when the flows reversed. These results confirm evidence presented by Schmidt-Hebbel et al. (1992,1996) and by Jappelli and Pagano (1994) who found, on different samples, that foreign capital constraints have negative effects on savings.

Third, inadequate domestic saving relative to investment causes third, large size of foreign capital in Asian-6. Therefore, the Layton and Makin (1993) hypothesis that the causality runs from foreign capital to domestic saving and growth, does find support from our tests based upon Asian-6 economies. On the contrary, the FitzGerald (1993) hypothesis, that domestic saving is the only way of increasing own wealth, does not find support from our analysis.

Fourth, a few years after the onset of the crisis we now have firm evidence that, What has been the net effect of all types of foreign capital on saving rate, since in all Asian-6 countries, FDI remained remarkably stable and recorded an increase following the minor decline recorded in the immediate aftermath of the onset of the crisis. FDI favour the expansion of domestic saving by complementarily in production or by increasing their productivity through advanced technology spill over effects (in the form of technology, managerial expertise, it

<sup>5</sup> Radelet and Sachs (1998) pointed out that each of the five countries had initiated, but not completed financial liberalization and reform. The partial reforms had led to increasingly fragile financial system, characterized by growing short-term foreign debt, rapidly expanding bank credit, and inadequate regulation and supervision of financial institutions. These weaknesses, in turn, left the Asian economies vulnerable to a rapid reversal of capital flows.

<sup>8</sup> Edwards (1995) finds no differences in the response of domestic saving to changes in foreign saving among the Asian and Latin American countries. He concludes that domestic and foreign saving is substitutes- a 1 % increase in foreign saving is associated with 0.50 to 0.63 % decline in domestic saving. Gupta (1987), however, shows that increases in foreign saving increase saving in Latin American but has no effect on Asian countries' saving.



may also help new entrants to learn about export markets, stimulate competition with local firms, provide training for workers and marketing know-how etc). Indeed, our results show a crowding-in effect, that is, a one-dollar increase in the net inflows of FDI is associated with an increase in total investment and capital accumulation, then economic growth in the host economies of more than one dollar in the long run. Thus, by comparison with other types of foreign capital, FDI is like to be a relatively stable source of funds. Supporting this view, a number of studies investigating the determinants of currency crisis have found that higher ratio of FDI to total capital flows normally reduces vulnerability of a country to large shift in flows (Kim and Hwang 2000; Lipsey 2001; Markusen and Venables 1997 and Borensztein et.al 1998). Thus, those countries should be focusing on LD and FDI to finance their economic development rather than short term debt in future.

Fifth, a two-way causal relationship is detected between growth and FDI. It appears that increase in economic growth attracted more FDI and FDI led to even larger growth. This process seemed to create a virtuous circle of long-lasting increase in economic growth.

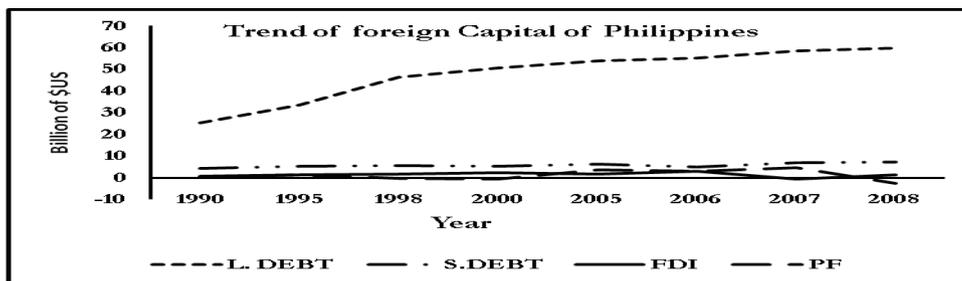
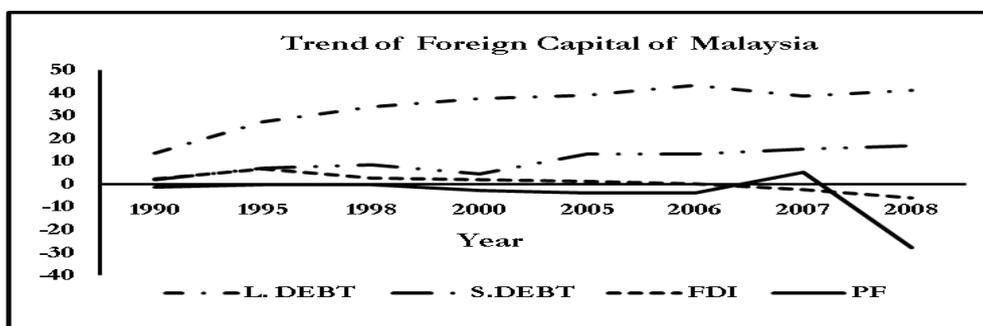
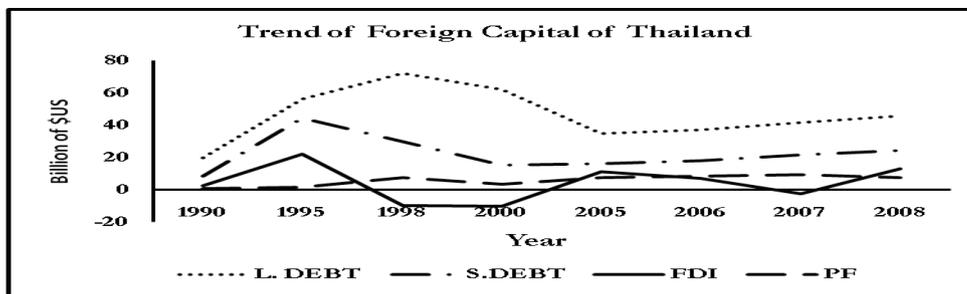
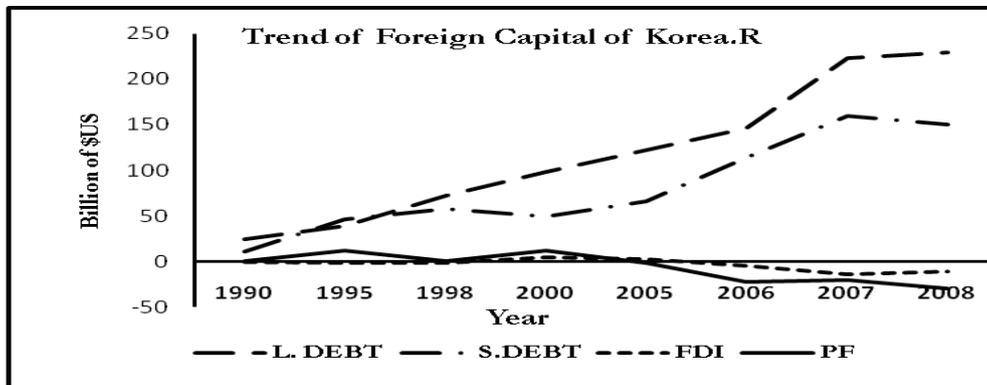
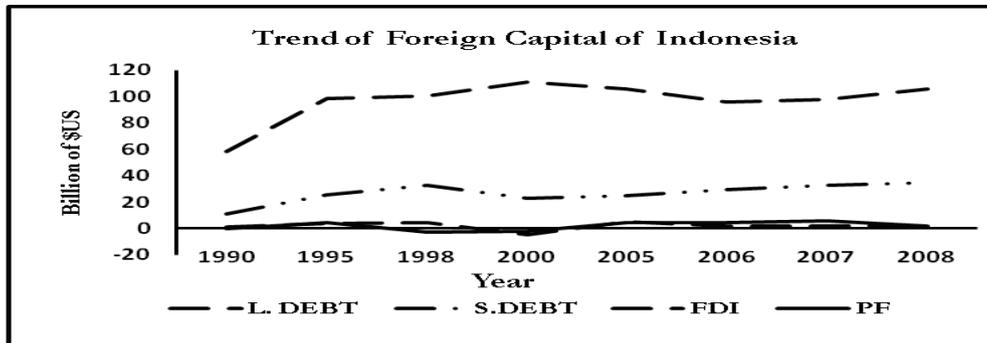
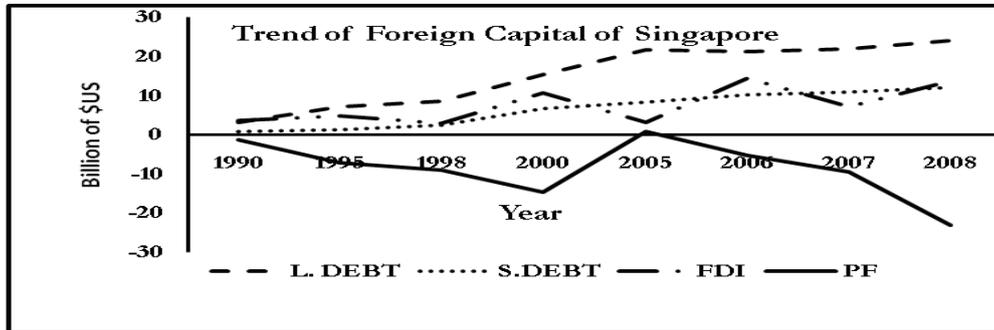


Figure (1-6) The Trend of Foreign Capital in the Asian- 6 Countries







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