PROSIDING PERKEM V, JILID 2 (2010) 48 – 57
ISSN: 2231-962X

LINKAGES BETWEEN FOREIGN DIRECT INVESTMENT, DOMESTIC INVESTMENT AND ECONOMIC GROWTH IN MALAYSIA

LEAN HOOI HOOI, TAN BEE WAH

ABSTRACT

This paper examines the linkages between foreign direct investment (FDI), domestic investment and economic growth in Malaysia for the period of 1970-2009. Specifically, we would like to find out the impact of FDI and domestic investment on economic growth respectively and whether FDI crowds in or crowds out domestic investment. The objectives of this study can be performed using the following tests. First, the stationarity for each series is checked with the conventional Augmented Dickey-Fuller and Phillips-Perron unit root tests. Then, the Johansen-Juselius multivariate cointegration test in vector autoregressive system is used to detect the potential long-run equilibrium relationship among the variables. Finally, the Granger causality test is implemented to examine the causal relationship between FDI, domestic investment and economic growth. It is expected that the empirical analysis and findings would show some insightful implications to the policy makers and market players. Furthermore, the recent announced Tenth Malaysia Plan attaches with an important mission of leading the country towards a high-income nation. Private sector is in a critical position of driving this new growth aspiration. The question of attracting investment including FDI and domestic investment is foreseen to be a "hot" debate topic again despite numerous previous studies on the subject.

Keywords: Causality; Cointegration, Investment; Economic Growth

INTRODUCTION

For more than a century, foreign direct investment (FDI) has contributed significantly to the economic growth of Malaysia. Debate on the relationship between FDI and economic growth is ample and not new in the literature (e.g. Jackman, 1982; de Mello, 1997; de Mello, 1999; Feridun, 2004; Duasa, 2007; Pradhan, 2009). Many studies found that FDI and economic growth are closely related. However, Wong and Jomo (2005) argued that the role of FDI in stimulating a host country's economic growth is not consistent in the aftermath of Asian financial crisis. Nevertheless, Duasa (2007) and Pradhan (2009) supported the view that no strong relationship between FDI and economic growth in Malaysia. They also suggested that the inflow of FDI contributes to less volatility of economic growth. Hence, it is noted that the existing empirical studies focused on analyzing the broad relationship between FDI and economic growth in the case of Malaysia.

On the other hand, empirical studies of domestic investment (DI) are restricted in the host country. Hitherto, most of the previous empirical studies in Malaysia focused on FDI-led growth hypothesis rather than the DI-led growth hypothesis. Firebaugh (1992) suggested that DI is more likely to build relationship within the domestic industries. Apart from that, DI plays a dual role in the economy as part of aggregate demand and enlarges a nation's stock of productive assets. Thus, it is believed that DI is an important factor in accounting for business cycles and the policy makers shall consider DI in reforming the investment policy.

For this reason, the rehabilitated research's attention is shifted to empirically analyze the dynamic linkages between FDI and DI in influencing the economic growth (e.g. Choe, 2003; Razin, 2003; Kim and Seo, 2003; Hecht at al., 2004; Apergis et al., 2006; Tang et al., 2008; Adams, 2009; Merican, 2009). They found the existence of the long run relationship among FDI, DI and economic growth but the direction between the causal relationships among the variables remains vague. For example, Choe (2003), Kim and Seo (2003), Hecht et al. (2004) and Apergis et al. (2006) found bilateral causal relationship between FDI and economic growth, and economic growth also causes DI. In contrast, Tang et al. (2008) determined that

there is only one way causality from FDI to DI and FDI to GDP in China, while the causal link between DI and economic growth is bilateral.

Furthermore, the linkage between FDI and DI raises a question: does FDI crowd in or crowd out DI? Agosin and Machado (2005) claimed that if FDI crowds out DI, the increase in total investment is smaller than the increase in FDI. If there is a crowding in, the increase in total investment will be more than the increase in FDI. Interestingly, Kim and Seo (2003) showed that an expansion in FDI neither crowds in nor crowds out the DI in South Korea. However, Wang (2008) found that contemporaneous FDI crowds out DI in the developing countries. Empirical findings of FDI crowds in and/or crowds out DI from previous studies suggest that the effects are not on the scale and need further analysis to prove the complementary and substitution effects between FDI and DI.

Specifically, this paper seeks to contribute on country-specific study for the dynamic linkages among FDI, DI and economic growth in Malaysia. Most studies in the literature (e.g. Choe, 2003; Hetch et al., 2004; Apergis et al., 2006; Wang, 2008; Adams, 2009) employed cross-sectional or panel data to investigate the relationship between FDI, DI and economic growth that likely to suffer from problem of data comparability and heterogeneity. Adams (2009) used panel data analysis to conduct a study of FDI and DI in 42 Sub-Saharan Africa countries. The author found that FDI did not have positive impact on economic growth due to the low level of development in Sub-Saharan Africa but DI revealed positive and significant correlation with economic growth. Adams (2009) also revealed a net crowd out effect of FDI on DI as FDI is negatively correlated with DI. On the other hand, Hecht et al. (2004) explored that most of the DI has significant impact on FDI while the impact of FDI inflow towards DI is weaker among the 64 estimation countries. In addition, Choe (2003) found that the causal relationship is bilateral between FDI and economic growth; while only unilateral causal relationship running from economic growth to DI in the 80 observation countries. Nonetheless, the results provide evidence that the causal relationship between FDI and DI remains controversial.

To the core, there are limited studies which explicitly analyze the relationships between FDI, DI and economic growth in Malaysia (e.g. Ang, 2009 and Merican, 2009). Ang (2009) examined the long-run relationship between private DI, public investment and FDI in Malaysia for the period of 1960-2003. The results show that public investment, private DI and FDI are cointegrating in the long-run. Moreover, both FDI and public investment is statistically significant with private DI at a positive sign. Merican (2009) examined the linkages between FDI, DI and economic growth in four ASEAN members namely, Indonesia, Malaysia, Thailand and Philippines over the period of 1970-2001. The author found that FDI are better than DI in promoting economic growth of Malaysia. Nevertheless, both of these studies did not test the causality between the variables which is contradict to the earlier studies that assumed at least an unilateral causal relationship between FDI and economic growth (Zhang, 2001; Feridun, 2004; Pradhan, 2009) or DI and economic growth (Liwan and Lau, 2007; Balcioglu and Vural, 2009). Obviously, the causal relationship between FDI, DI and economic growth is still full of mistiness. Against this backdrop, the causal relationship among the variables for a country specific analysis is very important for policy makers to design the policy.

This study attempts to generate a better understanding of the dynamic linkages between FDI, DI and economic growth in Malaysia over the period of 1970 to 2009. Specifically, we would like to find out the impact of FDI and DI on economic growth respectively. Furthermore, this study assesses to find out the effect of FDI on DI in order to examine whether FDI crowds in or crowds out DI. The objectives of this study can be performed by the following analyses. First, we employ the conventional Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests to check the stationarity of each series. Second, the Johansen and Juselius (1990) multivariate cointegration test will be used to detect the potential long-run relationship among the variables. Third, we normalize the cointegrating vector by DI to find out the crowding effect of FDI to DI. Finally, the Granger causality test will be implemented to examine the causal relationship between FDI, DI and economic growth.

The rest of this paper is organized as follows. Section 2 overviews the FDI, DI and economic growth in Malaysia. Section 3 discusses data, model specification and methodology used in this study. The empirical findings are reported in Section 4. Finally, the conclusion and policy recommendations are presented in Section 5.

OVERVIEW OF MALAYSIA'S FDI, DI AND ECONOMIC GROWTH

Since the independence in 1957, Malaysia experienced a solid growth with an average annual rate of 6 per cent during the period of 1970 to 1980. GDP growth recorded nearly 0 per cent during the economic depression in the middle of 1980s. Then, the country recovered from the crisis in mid-1980s and achieved an average GDP growth rate of at least 9 per cent during 1990 to 1996. However, the GDP growth rate declined to -7 per cent during the Asian financial crisis. Since then, the economic growth showed a slow process of recovery and maintained inconsistent, with an annual growth rate of 5 per cent from 2002 to 2008. Figure 1 presents the time series plot of the real GDP growth rate in Malaysia for the period of 1970 to 2009.

DI accounted for about 30 per cent of GDP from 1970s to 1980s in average. The share declined to 26.39 per cent before picking up again in the 1990s. On the whole, DI dominated FDI with the share into GDP for more than half century prior to the 2007 global financial/economic crisis. Besides DI, FDI inflow is also a dominant factor to spur the economic growth of Malaysia as it maintains an open policy toward investment and trade since 1980. According to the inward FDI Potential Index[1] (UNCTAD, 2004) and Ang (2009), Malaysia was ranked the first among the Asian developing countries for receiving FDI in 2003. Thus, the importance of FDI to economic development is therefore undeniable. In term of global competitive landscape, Malaysia faces greater competition than ever (Tenth Malaysia Plan[2]). Thus, the policy enhancement in consolidate the FDI and DI are needed in order to drive the economic growth.

The DI and FDI are expressed as the ratio of GDP with five years average in Table 1. In 1970 to 1974, the shares of DI and FDI to GDP were 21.24 per cent and 2.99 per cent respectively. The number surged to 37.03 per cent and 7.18 per cent in 1990 to 1994, making it the highest throughout the sample period. In average, the DI and FDI contributed 27.72 per cent and 3.85 per cent respectively to GDP over the whole sample periods. On the other hand, the proportional shares of FDI to DI recorded a 13.99 per cent from the earlier 1970s and slummed into the lower share of 8.65 per cent in 1985-1989[3]. However, the shares of FDI to DI increased dramatically to 19.41 per cent in the following five years. On the whole, the average ratio of FDI to DI is 13.75 per cent from 1970 to 2009.

DATA, MODEL SPECIFICATION AND METHODS

Data and Model Specification

The data set consists of annual time series data over a forty year period from 1970 to 2009, which is obtained from International Financial Statistics (IFS) and World Bank. Economic growth is measured by real GDP at year 2000 constant price, DI is proxy by real gross fixed capital formation (GFCF)[4], and FDI is estimated using net FDI inflows. All variables are measured in Ringgit Malaysia (RM) in million.

All the variables are transformed into natural logarithmic form for the usual statistical reasons before the analysis. The estimated model can be expressed in equation (1) below.

$$\ln Y_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln DI_t + \varepsilon_t \qquad (1)$$

[1] The inward FDI Potential Index is shown for three-year period to offset annual fluctuations in the data. The index covers 141 economies for as much of the period as the data permit. However, some economies in transition could not be ranked in the early years for lack of data or because they did not exist as a separate country. The index excludes tax havens, which for tax rather than productive reasons tend to have massive FDI inflows in relation to their economic size.

[2] Malaysia government allocated RM230 billion for development expenditure under the Tenth Malaysia Plan. Economic sector received 55% of the total allocation. To achieve the goal of 6 per cent per annum growth rate, the Malaysian Investment Development Authority has been corporatized and rebranded to leap the investment activities.

[3] This aggressive trend became incoherent due to the economic downturn in 1980s.

[4] The gross fixed capital formation (GFCF) does not measure the total investment as all kinds of financial assets are excluded. GFCF included land improvements; plant, machinery, and equipment purchases; and the construction of roads, railway, private residential dwellings, commercial and industrial buildings etc.

where $\ln Y_t$ is real GDP, $\ln FDI_t$ is net FDI inflows and $\ln DI_t$ is the DI, β_0 is the constant parameter and ε_t is the error terms.

METHODOLOGY

We begin by employing the augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1981) and Phillips-Perron (PP) (Phillips and Perron, 1988) unit root tests to check the stationarity properties of each variable in order to avoid any spurious regression. Then, the long-run equilibrium relationship between the three variables is tested by Johansen's multivariate cointegration procedure (Johansen, 1988; Johansen and Juselius, 1990). In order to examine the Johansen's cointegration approach, the vector autoregressive (VAR) model is estimated:

$$\Delta Y_t = \pi Y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-i} + u_t$$

where Δ is the first difference operator, Y_t is a vector of the three endogenous variables $\left(\ln Y_t, \ln FDI_t, \ln DI_t\right)$. Γ is a matrix of VAR parameters for lag i and π is a coefficient matrix which contain information about the long run relationship between variables in the vector. If the variables are cointegrated, the cointegrating rank, r, is given as $\pi = \alpha\beta'$, where α is the matrix of parameters denoting the speed of convergence to the long-run equilibrium and β represents the matrix of parameters of the cointegrating vector. Johansen-Juselius derived trace test (λ_{trace}) and maximum eigenvalues test ($\lambda_{\max}$) for testing the numbers of cointegrating rank in the system.

If the variables are cointegrated, an error correction term should be included into the vector error correction model (VECM)[5] below to examine the causality between the variables:

$$\Delta \ln Y_t = \alpha_1 + \sum_{i=1}^{k} \delta_{1i} \Delta \ln Y_{t-i} + \sum_{i=1}^{k} \delta_{2i} \Delta \ln FDI_{t-i} + \sum_{i=1}^{k} \delta_{3i} \Delta \ln DI_{t-i} + \beta_1 EC_{t-1} + \varepsilon_{1t}$$

$$\Delta \ln FDI_t = \alpha_2 + \sum_{i=1}^{k} \vartheta_{1i} \Delta \ln Y_{t-i} + \sum_{i=1}^{k} \vartheta_{2i} \Delta \ln FDI_{t-i} + \sum_{i=1}^{k} \vartheta_{3i} \Delta \ln DI_{t-i} + \beta_2 EC_{t-1} + \varepsilon_{2t}$$

$$\Delta \ln DI_t = \alpha_3 + \sum_{i=1}^{k} \kappa_{1i} \Delta \ln Y_{t-i} + \sum_{i=1}^{k} \kappa_{1i} \Delta \ln FDI_{t-i} + \sum_{i=1}^{k} \kappa_{1i} \Delta \ln DI_{t-i} + \beta_3 EC_{t-1} + \varepsilon_{3t}$$

From the equations above, Δ is the first difference operator and the residuals ε_{it} are assumed to be normally distributed and white noise. EC_{t-1} is the one period lagged error correction term derives from the cointegrating equation[6]. The error correction term will delay the speed of short-run adjustment toward

[5] According to Engle and Granger (1987), if the variables are cointegrated, Granger causality test within the first difference VAR model will be misleading. Therefore, an error correction term should be included into the VECM model.

[6] This term must be included to avoid misspecification and omission of important constraints and will be excluded if the variables are not cointegrated.

the long-run equilibrium. The significance of the EC_{t-1} term represents the long-run causality, while the joint F-tests on the differenced explanatory variables depict the short-run causality.

EMPIRICAL FINDINGS

The results of ADF and PP unit root tests in Table 2 indicate that both tests cannot reject the null hypothesis in level but it is rejected at the first differenced. Hence, we conclude that all variables are $I(1)$[7]. Given that the variables are $I(1)$, we proceed to test the long-run equilibrium relationship with the multivariate Johansen-Juselius cointegration test. In order to specify the model, the Akaike's information criterion (AIC) statistic suggests that three year is the optimal lag length in this VAR system. Table 3 Panel A summarizes the results of likelihood ratio tests for cointegration. Amusingly, both the trace and maximum eigenvalues statistics indicate that the null hypothesis of zero cointegration is rejected at the 1 per cent significant level. Hence, we conclude the existence of at least one cointegration relationship among the variables.

As the variables are cointegrated and the interest of this study is to evaluate the response of real output on FDI and DI respectively, we normalized the coefficient of $\ln Y_t$ to 1 to obtain the long-run coefficients of $\ln Y_t$ with respect to FDI and DI. The long-run coefficients are reported in Table 2 Panel B. It is shown that $\ln FDI_t$ is positively related to $\ln Y_t$ but $\ln DI_t$ is in a reverse direction. Conversely, the coefficients of both variables are statistically significant at the 1 per cent level. This result infers that the real output will increase in the long-run if FDI increases. FDI may contribute to the economic growth through its impact on capital stock, market competition and technology transfer to the local firms in Malaysia.

In contrast, increase of DI will depreciate GDP growth. This result although contradicts with Tang et al. (2008) and Merican (2009) but it is consistent with Elboiashi et al. (2009). The contradiction may be due to different framework and sample period used for the investigation. According to Elboiashi et al. (2009), there may be an offset effect between FDI and DI in the country. Both local and foreign firms are competing for the human capital and scarce production factors. Foreign firms which are more productive and efficient will be the winner. Nevertheless, by normalizing the coefficient of DI to 1, we find that FDI is positively significant at 1% level with the coefficient of 1.0612. In other words, a 1 per cent increase in FDI will lead to 1.06 per cent increase in DI. Therefore, we can verify that FDI crowds in DI in Malaysia. This finding is in line with Ang (2009).

In view of the fact that the series are cointegrated, we proceed to determine the direction of causality within the VECM framework. The results of both long-run and short-run Granger causality tests are presented in Table 4. For the long-run Granger causality, we find that the one period lagged error correction term has a negative sign but it only statistically significant when FDI as the dependent variable. This infers that FDI has causality relationship with DI and economic growth in the long-run. For the short-run causality analysis, we find that only unilateral Granger causality running from GDP to FDI and from DI to FDI. This result suggests that the foreign investors are concerned about the economic growth and the local investment sentiment to make their investment decision in Malaysia.

CONCLUSION AND POLICY RECOMMENDATIONS

This paper prompts to access the dynamic linkages between FDI, DI and economic growth in Malaysia from 1970 to 2009. The empirical results of this study can be summarized as follows. First, the FDI, DI and economic growth are cointegrated in the long–run. Second, FDI has positive impact to the economic growth while DI is negatively affecting the economic growth in the long-run. Third, an increase of FDI will bring positive impact to the DI. In other words, FDI crowds in DI and there appears complementary effect

[7] Nelson and Plosser (1982) indicated that most of the macroeconomic variables are not stationary at level but it will stationary after the first differencing.

from FDI to DI. Forth, there is one way causal relationship from DI and economic growth to FDI respectively in the short-run.

We support the view that high economic growth will attract FDI inflow in Malaysia. DI is also an important factor in attracting FDI in the short-run. With the crowd in effect of FDI on DI, the expansion in FDI inflows may be associated with an incredible boost in DI, and both FDI and DI can collaborate themselves for the development in the country. Therefore, it is time to review the investment policy for encouraging DI besides FDI. Facing the high competition from the neighbouring countries in attracting FDI, the policy maker shall provide a conducive environment to local investors. Domestic promotions and attractive packages such as taxes incentives, finance facilities, reduce the transaction costs and improve the delivery system by cutting bureaucracy and corruption can be launched.

The Ministry of International Trade and Industry has targeted DI to make up 40 per cent of the country's aggregate investment in year 2010. On the other hand, Malaysia is en route to improve the quality of retaining and attracting FDI inflows in order to woo the FDI after the recent global financial/economic crisis. As proposed in the Tenth Malaysia Plan, initiatives such as benchmarking Malaysia's attractiveness, empowering Malaysian Investment Development Authority to attract investment and investing in talent recruitment can be undertaken.

In limitation, the exact types of DI and inward FDI that will contribute most to the output growth is beyond the scope of this paper. This might be an interesting issue for future research. Moreover, the proxy variable of DI and the decomposition of DI to private and public funds may give a clearer picture of its impact in the country.

REFERENCES

Adam, S. (2009) Foreign direct investment, domestic investment and economic growth in Sub-Saharan Africa. *Journal of Policy Modeling*, 31(6), pp. 939-949.

Agosin, M.R. and Machado, R. (2005) Foreign investment in developing countries: does it crowd in domestic investment? *Oxford Development Studies*, 33(2), pp. 149-162.

Ang, L.B. (2009) Do public investment and FDI crowd in or crowd out private domestic investment in Malaysia? *Applied Economics*, 41(7), pp. 913-919.

Apergis, N., Katrakilidis, C.P. and Tabakis, N.M. (2006) Dynamic linkages between FDI inflows and domestic investment: a panel cointegration approach. *Atlantic Economic Journal*, 34, pp. 386-394.

Balcioglu, H.B. and Vural, K. (2009) Comparison of macroeconomic performance of selected Asian countries. An econometric analysis of China economic growth and policy implications. *Theoretical and Applied Economics*, September 2009, pp. 9-16.

Choe, J.I. (2003) Do foreign direct investment and gross domestic investment promote economic growth? *Review of Development Economics*, 7(1), pp. 44-57.

De Mello, L.R. (1997) Foreign direct investment in developing countries and growth: A selective survey. *Journal of Development Studies*, 34(1), pp.1-34.

De Mello, J.L.R. (1999) Foreign direct investment-led growth: evidence from time series and panel data. *Oxford Economic Papers*, 51(1), pp. 133-151.

Dickey, D.A. and Fuller, W.A. (1981) Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica*, 49(4), pp. 1057-1072.

Duasa, J. (2007) Malaysian foreign direct investment and growth: does stability matter? *Journal of Economic Cooperation*, 28(2), pp. 83-98.

Economic Planning Unit, (2010) Tenth Malaysia Plan 2011-2015, Prime Minister's Department, Putrajaya, Malaysia.

Elboiashi, H., Noorbakhsh, F., Paloni, A. and Azemar, C. (2009) The causal relationships between foreign direct investment (FDI), domestic investment (DI) and economic growth (GDP) in North African non-oil producing countries: empirical evidence from cointegration analysis. *Advances in Management*, 2(11), pp. 19-25.

Engle, R.F. and Granger, C.W.J. (1987) Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2), pp. 251-276.

Firebaugh, G. (1992) Growth effects of foreign and domestic investment. *American Journal of Sociology*, 98(1), pp. 105-130.

Feridun, M. (2004) Foreign direct investment and economic growth: a causality analysis for Cyprus, 1976-2002. *Journal of Applied Sciences*, 4(4), pp. 654-657.

Hecht, Y., Razin, A. and Shinar, N.G. (2004) Interaction between capital inflows and domestic investment : Israel and developing economies. *Israel Economic Review*, 2(2), pp. 1-14.

Jackman, R.W. (1982) Dependence on foreign investment and economic growth in the Third World. *World Politics*, 34(2), pp. 175-196.

Johansen, S. (1988). Statistical analysis of cointegrating vectors. *Journal of Economic Dynamics and Control*, 12(2-3), pp. 231-254.

Johansen, S. and Juselius, K. (1990) Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2), pp. 169-210.

Kim, D.D-K. and Seo, J.S. (2003) Does FDI inflow crowd out domestic investment in Korea? *Journal of Economic Studies*, 30(6), pp. 605-622.

Liwan, A. and Lau, E. (2007) Managing growth: The role of export, inflation and investment in three ASEAN neighbouring countries. *ICFAI Journal of Managerial Economics*, 5(4), pp. 7-16.

Merican, Y. (2009) Foreign direct investment and growth in ASEAN-4 nations. *International Journal of Business and Management*, 4(5), pp. 46-61.

Nelson, C.R. and Plosser, C.R. (1982) Trends and random walks in macroeconomic time series: some evidence and implications. *Journal of Monetary Economics*, 10(2), pp. 139-162.

Osterwald-Lenum, M. (1992) A note with quantities of the asymptotic distribution if the maximum likelihood cointegration rank test statistics, *Oxford Bulletin of Economics and Statistics*, 54(3), pp. 461-472.

Phillips, P.C.B. and P. Perron (1988) Testing for a unit root in time series regression. *Biometrika*, 75(2), pp. 335-346.

Pradhan, R.P. (2009) The FDI-led growth hypothesis in ASEAN-5 countries: evidence from cointegrated panel analysis. *International Journal of Business and Management*, 4(12), pp.153-164.

Razin, A. (2003) FDI flows and domestic investment: overview. *CESifo Economic Studies*, 49(3), pp. 415–428.

Tang, S., Selvanathan, E.A. and Selvanathan, S. (2008) Foreign direct investment, domestic investment, and economic growth in China. *World Economy*, 31(10), pp. 1292-1309.

UNCTAD (2004) World Investment Report 2004. United Nations, New York.

Wang, M. (2008) Foreign direct investment and domestic investment in the host country: evidence from panel study. *Applied Economics*, *iFirst*.

Wong, H.K. and Jomo, K.S. (2005) Before the storm: The impact of foreign capital inflows on the Malaysian economy, 1966-1996. *Journal of the Asian Pacific Economy*, 10(1), pp. 56-59.

Zhang, K.H. (2001) Does foreign direct investment promoting economic growth? Evidence from East Asia and Latin America. *Contemporary Economic Policy*, 19(2), pp.175-185.

FIGURE 1: Annual growth rates of GDP

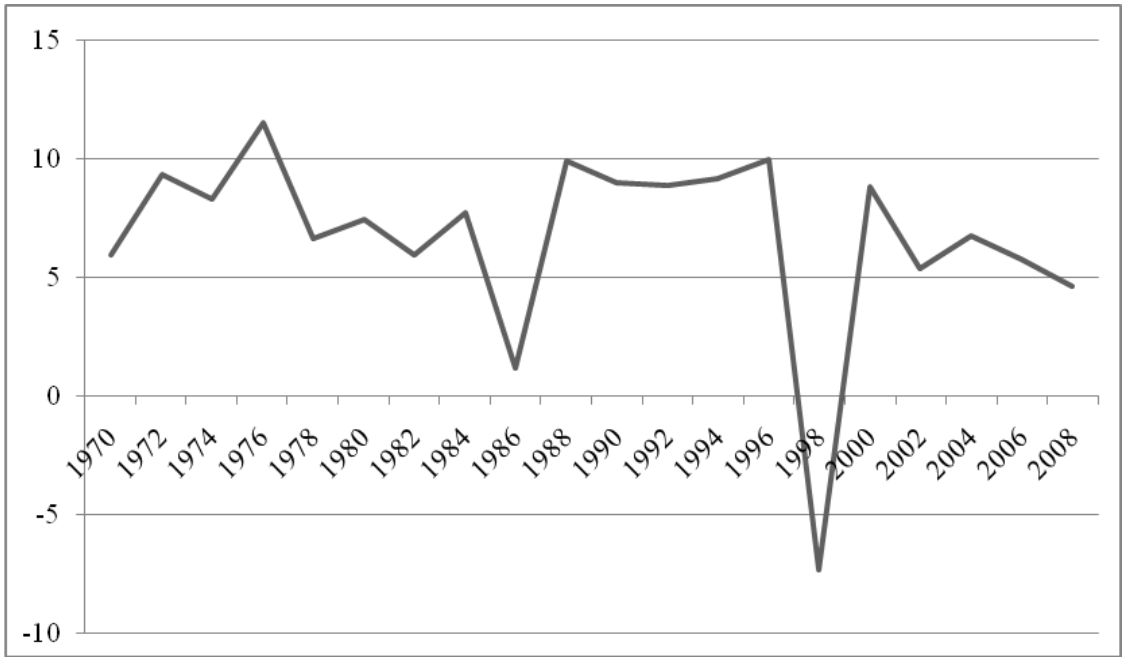

TABLE 1: Average ratio of DI to GDP, FDI to GDP and FDI to DI (in percentage)

Year	DI/GDP	FDI/GDP	FDI/DI
1970-1974	21.24	2.99	13.99
1975-1979	24.28	3.21	13.33
1980-1984	34.25	4.12	11.95
1985-1989	26.39	2.33	8.65
1990-1994	37.03	7.18	19.41
1995-1999	35.59	4.95	14.52
2000-2004	22.37	2.75	12.39
2005-2009	20.60	3.26	15.76
1970-2009	27. 72	3.85	13.75

TABLE 2: The results of unit root tests

Variables	Test statistics	
	ADF	PP
$\ln Y_t$	–2.086 (0)	–2.091 (1)
$\Delta \ln Y_t$	–5.056 (0)***	–5.062 (1)***
$\ln FDI_t$	–1.715 (0)	–1.630 (1)
$\Delta \ln FDI_t$	–8.186 (0)***	–8.184 (1)***
$\ln DI_t$	–1.776 (1)	–2.726 (1)*
$\Delta \ln DI_t$	–4.181 (0)***	–4.222 (1)***

Note: The asterisks ***, ** and * denote the significance at 1, 5 and 10 per cent levels respectively. ADF is the augmented Dickey-Fuller test and PP is the Phillips-Perron test. ln denotes as natural logarithm and Δ is the first different operator. Figure in the parentheses indicate the optimal lag length for ADF test and bandwidth for PP test. The optimal lag length and bandwidth are selected by Akaike's information criterion (AIC) and Newey-West Bartlett kernel. The critical values are obtained from MacKinnon (1996).

TABLE 3: The result of Johansen-Juselius cointegration test

Panel A: Multivariate cointegration test				
Series: $\ln Y_t \ln FDI_t \ln DI_t$		LR tests statistics	Critical values#	
Hypotheses				
H_0	H_1		1 per cent	5 per cent
$LR(\lambda_{\text{trace}})$				
$r = 0$	$r \geq 1$	59.872***	34.99	41.07
$r \leq 1$	$r \geq 2$	14.469	19.96	24.60
$r \leq 2$	$r \geq 3$	4.725	9.24	12.97
$LR(\lambda_{\max})$				
$r = 0$	$r = 1$	45.403***	22.00	26.81
$r \leq 1$	$r = 2$	9.744	15.67	20.20
$r \leq 2$	$r = 3$	4.725	9.24	12.97

Panel B: Normalised long run coefficients			
$\ln Y_t$	$\ln FDI_t$	$\ln DI_t$	*Intercept*
1.000	4.796***	-4.520***	21.456***

Note: *** denotes the significant level at 1 per cent. # represent that the critical values were obtained from Osterwald-Lenum (1992). The Akaike's Information Criterion (AIC) is used to select the optimal lag order.

TABLE 4: The results of Granger causality tests based on VECM

Dependent variable	χ^2 statistics [p-values]			ECT_{t-1} [*t*-statistics]
	$\sum \Delta \ln Y_t$	$\sum \Delta \ln FDI_t$	$\sum \Delta \ln DI_t$	
$\Delta \ln Y_t$	–	2.2761 [0.5171]	1.3662 [0.7135]	-0.0044 [-0.0581]
$\Delta \ln FDI_t$	11.2346** [0.0105]	–	8.7705** [0.0325]	-0.6021*** [-3.5820]
$\Delta \ln DI_t$	0.5644 [0.9045]	1.3254 [0.7231]	–	-0.0362 [-0.2375]

Note: ***, ** and * denote the significant level at 1, 5 and 10 per cent levels respectively.