Foreign direct investment volatility and economic growth in ASEAN-five countries

URL	http://weko.wou.edu.my/?action=repository_uri&item_id=397

FOREIGN DIRECT INVESTMENT VOLATILITY AND ECONOMIC GROWTH IN ASEAN-FIVE COUNTRIES

Chee-Keong Choong[1]*, Venus Khim-Sen Liew[2], Sok-Gee Chan[3], Huck-Khoon Ch'ng[4]

[1]Department of Economics, Faculty of Business and Finance, Universiti Tunku Abdul Rahman (Perak Campus), Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan,
[2]Deparment of Economics, Faculty of Economics and Business, Universiti Malaysia Sarawak, Sarawak
[3]Institute of China Studies, University of Malaya, 50603 Kuala Lumpur,
[4]School of Business and Administration, Wawasan Open University, Malaysia, Penang
(MALAYSIA) *Corresponding author: choongck@utar.edu.my

ABSTRACT

This study examines the role of foreign direct investment (FDI) volatility as a source of variability in five major ASEAN economies. Using bounds testing approach, we show that while FDI has positive and significant effect in all the ASEAN economies considered, its volatility retards long-run economic growth in Indonesia, Malaysia, the Philippines and Thailand. Moreover, FDI volatility can be welfare reducing even after controlling for other country-specific growth correlates. This finding is robust to different measures of FDI volatility.

Key words: Foreign direct investment, economic growth, volatility, bounds test

1. INTRODUCTION

The economic literature has widely documented the significant impacts of FDI on economic growth. A number of studies have found that higher levels of FDI are associated with higher growth rates (e.g., De Mello, 1997; Borensztein *et al*., 1998; Choong *et al.*, 2005, 2010a), while some studies have found no significant relationship between FDI and economic growth (e.g., Aitken *et al*., 1997; Aitken and Harrison, 1999)[1]. These controversial findings have motivated many empirical investigations to study the different mechanisms that explain the linkage between FDI and growth, including human capital (Borensztein *et al*., 1998), public infrastructure (Barro, 1990), trade policy or exports (Balasubramanyam, et al., 1996), technological diffusion (Barro and Sala-i-Martin, 1997), and level of economic development and absorptive capacity (Hermes and Lensink, 2003; Alfaro, et al., 2004; Choong *et al.*, 2010b, 2010c).

These studies, nevertheless, have neglected the impact of FDI volatility on economic growth. FDI volatility is expected to have adverse impact on economic growth for the following reasons. First, volatile FDI discourages innovation and technology adaption and thereby is detrimental to economic growth. Second, volatility of FDI flows is a proxy for country specific risk (e.g., economic or political uncertainty) and thereby FDI volatility may be a proxy for growth-retarding instability. Foreign investors, when confronted with risks, may postpone or even withdrawn the investments. Hence, FDI volatility has a destabilizing effect on the economic performance[2].

This study attempts to contribute to the literature by examining the relationship between FDI volatility and economic growth in ASEAN-Five countries, which are heavily dependent on FDI inflows in promoting their economic growth (UNCTAD, 2006)[3]. Since the late 1990s, FDI volatility has increased substantially due to few internal and external shocks, which led to increased uncertainty in the rate of return on invested foreign capital[4]. Hence, it is important to investigate the impact of FDI volatility on growth in these countries. The focus on ASEAN-Five economies reflects the intuition that if FDI volatility matters, then policy-makers in these economies, which depend heavily on FDI inflows, should give priority to stabilize FDI volatility in their attempts to promote economic growth. The rest of the paper is organized as follows. Section 2 describes the specification of the empirical model and data source. Section 3 presents the results and Section 4 concludes.

2. DATA AND METHODOLOGY

We use annual data from *International Financial Statistics*, International Monetary Fund to examine the relationship between FDI volatility and economic growth in ASEAN-Five countries. The output variable is the real GDP growth rate (*RGDPGR*). The FDI variable is gross FDI as a percentage of GDP (*FDIGDP*). Two different measures of FDI volatility, namely *FDISD* and *FDIEGARCH* are adopted in this study. FDISD is calculated by taking the standard deviation of error from the autoregressive equation for FDI with one-year lagged value and a time trend, whereas *FDIEGARCH* the alternative measure generated using exponential generalized autoregressive conditional heteroskedasticity (EGARCH) model[5].

[1] See De Mello (1997) and Buckley *et al*. (2002) for a comprehensive overview.
[2] See, for example, Lensink and Morrissey (2006) for details.
[3] Indonesia, Malaysia, the Philippines, Singapore and Thailand.
[4] For example, East Asian financial crisis erupted in mid-1997. See for instance, Gabriele *et al*. (2000) which pointed out that "… capital flows to developing countries are characterized by high, rising and unpredictable volatility" (p.1051).
[5] See Lensink and Morrissey (2006) for details.

We examine the long-run relationship between FDI volatility and economic growth in the following multivariate model based on the autoregressive distributed lag (ARDL) cointegration testing procedure proposed by Pesaran *et al*. (2001)[1]:

$$\begin{aligned} RGDPGR_t = {} & {}_0 + {}_1 RGDPGR_{t-1} + \sum_{p} {}_2 GFDI_{t-1} + {}_3 HCD_{t-1} + \sum_{p} {}_4 OPENNESS_{t-1} \\ & + {}_5 FDIVOL_{t-1} + \sum_{i=1}^{p} {}_6 RGDPGR_{t-i} + \sum_{i=0}^{p} {}_7 GFDI_{t-i} + \sum_{i=0}^{p} {}_8 HCD_{t-i} \\ & + \sum_{i=0}^{p} {}_9 OPENNESS_{t-i} + \sum_{i=0}^{p} {}_{10} FDIVOL_{t-i} + u_t \end{aligned} \quad (1)$$

where is difference operator, *FDIVOL* represents two different measures of FDI volatility (*FDISD* and *FDIEGARCH*), which are expressed in the natural logarithm. *RGDPGR* is employed in the levels as some values are negative. u_t is the Gaussian error term. *p* is lag structure to be included to eliminate autocorrelation in u_t .

Note that gross FDI inflow (*GFDI*) is also included to examine the impact of this variable at its level. Besides, two additional explanatory variables, namely openness ratio (*OPENNESS*) which is measured as the ratio of total of exports and imports to GDP, labour force (*HCD*) and are included in the estimation to avoid deficiencies arising from the omission of other relevant explanatory variables[2].

We examine the long run relationship by imposing the restriction that all estimated coefficients of lagged one level variables to zero. If the *F*-statistic obtained from the restriction is less than lower bound critical value, we do not reject the null hypothesis of no long-run relationship. In contrast, if the computed *F*-statistic is greater than upper bound critical value, then we reject the null hypothesis and conclude that there exists steady-state long-run equilibrium between the variables under study. However, if the *F*-statistic falls within lower and upper bound critical values, then the results are inconclusive and the stationarity of the series must be investigated[3].

3. EMPIRICAL RESULTS

The estimated bound test results as summarized in Table 1 suggest the existence of significant (at 5% level) long-run relationship for all countries under study, except for Singapore. Additionally, the estimated coefficient of FDI volatility (*FDISD*) as shown in Panel I of Table 2 is statistically negative in each of the ASEAN countries except Singapore. This suggests that real GDP growth rate and FDI volatility seem to move in the opposite directions; with a worsening of the FDI volatility normally follows the downturn of the economic growth. Moreover, this inverse relationship between FDI volatility and growth is robust to the alternative FDI volatility measure generated by EGARCH procedures, namely *FDIEGARCH* (Panel II, Table 2)[4]. Therefore, we are able to infer that a higher FDI volatility is accompanied with a lower rate of growth of output in the majority of these ASEAN countries[5]. The finding is expected as both real GDP growth rate and FDI volatility have been subject to the great fluctuations in ASEAN economies, especially during the East Asian financial crisis period. Our finding is in line with Lensink and Morrissey (2006), who report that the different measures of FDI volatility have a significantly negative coefficient in a growth regression for 87 countries over the period 1975-1997.

It is also interesting to look at the impacts of control variables. The estimated coefficient of FDI, regardless the use of the FDI volatility measures, is positive and statistically significant on the real GDP growth rate in all ASEAN countries, thereby indicating the presence of FDI inflows is crucial in stimulating the long-run economic growth in these countries. There exists a positive and significant relationship between openness variable (*OPENNESS*) and economic growth in all ASEAN countries while the sign of the labour force is mixed in most ASEAN countries[6].

In conclusion, it emerges that FDI volatility has a differentiated effect among ASEAN-Five countries. In particular, while it is harmful for long-run growth in ASEAN developing countries such as Indonesia, Malaysia, Philippines and Thailand, it has a marginal effect on ASEAN developed country such as Singapore. This could be attributable to the differences in the character of financial system of the ASEAN countries. The financial system in

[1] The autoregressive distributed lag procedure is on the lines adopted by various recent studies such as Ghatak and Siddiki (2001), Narayan and Smyth (2005), and Jayaraman and Choong (2009, 2010).

[2] The choice of these explanatory variables is in line with the well-known growth regression proposed by Levine and Renelt (1992).

[3] The critical values simulated for large sample sizes (500 to 1000 observations) are given by Pesaran *et al.* (2001). Narayan (2005) argues that the use of Pesaran *et al*.'s (2001) critical values for small sample study like ours (270 to 32 observations) may produce misleading results. Thus, we follow the critical values given by Narayan (2005), which are generated for small samples (30 to 80 observations).

[4] This finding is consistent with that obtained from bivariate model (results are available upon request from the authors), which examined the effect of FDI volatility only on economic growth. Thus, the impact of FDI volatility on growth rate in these countries is robust to the different FDI volatility measures as both the magnitude and the significance level are almost invariant to different specifications and volatility measures.

[5] The coefficient, however, is not statistically significant for Singapore.

[6] Diagnostic tests were conducted and the results obtained showed that there is no evidence of non-normality of error term, functional form misspecification, and heteroscedasticity in our estimated models. Moreover, the CUSUM and CUSUMSQ stability tests results indicate absence of instability in the estimated model. The results of diagnostic checking are not reported to conserve space, but are available upon request from the authors.

Singapore is much more sophisticated than the one in other four ASEAN countries, and thus entails a much higher ability in Singapore to stabilize the variability of FDI.

The second possible explanation is related to the role of government in these ASEAN countries. Singapore is more reluctant to interfere directly in the foreign exchange market by imposing direct controls or "non-liberal" measures such as fixed exchange rate regime and capital control in stabilizing the variability of private capital flows. However, this is not the case in other ASEAN developing countries. In fact, these measures or controls may lead to capital flight and the loss of confidence in the international investors, which may further worsen the situation of the volatility of private capital flows. As a consequence, long-run growth rate of ASEAN countries tend to be pro-cyclical with FDI inflows, but counter-cyclical with FDI volatility.

Table 1. Bound test results

Country	F-statistic	
	FDISD	FDIEGARCH
Indonesia(1977-2005)	17.81**	5.32**
Malaysia(1976-2005)	42.47**	62.77**
Philippines(1979-2005)	9.73**	14.79**
Singapore(1974-2005)	3.35	3.23
Thailand(1977-2005)	14.33**	12.67**

Notes: Refer to Table 1.

The 1, 5 and 10% critical bounds given by Pesaran *et al*. (2001) are [3.74, 5.06], [2.86, 4.01] and [2.45, 4.01] respectively.

The 1, 5 and 10% critical bounds given by Narayan (2005) are [4.77, 6.67], [3.35, 4.77] and [2.75, 3.99] respectively.

Table 2. Long-run estimated coefficients of economic growth

Variable	Indonesia	Malaysia	Philippines	Singapore	Thailand
Panel I: FDISD Measure					
FDI	6.58*(1.92)	0.04***(7.12)	0.13***(3.76)	0.28**(2.08)	0.12**(2.93)
HCD	-0.12***(-3.86)	-0.71 ***(-7.13)	0.41**(2.67)	-12.97***(-3.79)	-0.34**(-2.35)
OPEN	1.05***(3.87)	0.51***(7.36)	129.93**(2.99)	10.46***(3.70)	0.05(0.54)
FDISD	-27.95***(-3.35)	-0.67***(-3.96)	-0.22***(-3.06)	-6.35(-1.57)	-0.41**(-2.80)
Intercept	-0.76***(-3.83)	1.81***(7.29)	1.38***(3.98)	6.52***(3.73)	0.04(0.23)
Panel II: FDIEGARCH Measure					
FDI	2.18**(2.04)	0.10***(10.78)	0.16***(4.45)	0.27**(2.12)	0.10**(2.37)
HCD	-0.04***(-3.37)	0.03(0.93)	-0.28***(-3.25)	-17.53***(-3.16)	-0.92***(-4.03)
OPEN	0.46***(3.65)	0.08***(4.08)	0.54***(3.22)	14.49***(3.06)	0.01(0.04)
FDIEGARCH	-16.11***(-3.16)	-5.12***(-6.83)	-155.69***(-3.53)	-12.23(-1.62)	-0.41***(-3.23)
Intercept	-0.32***(-3.46)	0.62***(5.12)	1.69***(4.52)	8.72***(3.12)	0.19(1.05)

Notes: The asterisks *, ** and *** indicate the rejection of null hypothesis at the 10, 5 and 1% levels of significance, respectively. *t*-statistics are provided in parentheses.

4. CONCLUSIONS

The aim of the study is to analyse the relationship between FDI volatility and economic growth in ASEAN-Five countries and attention is given to determine whether FDI volatility is harmful or beneficial for long-run growth. Using ARDL model, the study finds that countries with higher FDI volatility have lower growth, even after controlling for some country-specific growth. This relation is robust to different measures of FDI volatility. The results suggest that a higher inflow of FDI, by itself, does not automatically imply economic growth as FDI volatility retards growth. The major implication is that policy-makers should mitigate the effect of an adverse shock to FDI flows, which may produce an uncertainty to reduce the effectiveness of FDI and economic growth.

Noteworthy, while FDI volatility is significantly harmful for long-run growth in ASEAN developing countries such as Indonesia, Malaysia, Philippines and Thailand, it has a marginal effect on ASEAN developed country such as Singapore. The disparity in the findings for Singapore and the other four ASEAN countries may be attributable to the more sophisticate financial system and the more liberal monetary policy practice of Singapore. Hence, Singapore could be a role model for other ASEAN countries to facilitate a more favorable environment for FDI.

ACKNOWLEDGEMENT

This paper is a product of an on-going research (entitled: Foreign Direct Investment, Economic Growth and Institutional Innovations: The Cross-National Evidence (FRGS/1/10/SSK/UTAR/03/2)) sponsored by Fundamental Research Grant Scheme (FRGS), Ministry of Higher Education (MOHE), Malaysia. Views expressed in this paper are not necessarily those of MOHE, Malaysia.

REFERENCES

1. Aitken, B., and A.E. Harrison (1999), "Do domestic firms benefit from direct foreign investment?", *American Economic Review*, 89, 605-618.
2. Aitken, B., G.H. Hanson, and A.E. Harrison (1997), "Spillovers, foreign investment and export behavior," *Journal of International Economics*, 43, 103-132.
3. Alfaro, L., A. Chanda, K.O. Sebnem and S. Sayek (2004), "FDI and economic growth: the role of local financial markets," *Journal of International Economics*, 64, 89-112.
4. Balasubramanyam, V.N., M. Salisu, and D. Sapsford (1996), "Foreign direct investment and growth in EP and IS countries," *Economic Journal*, 106, 92-105.
5. Borensztein, E., J. de Gregorio, and J.W. Lee (1998), « How does foreign direct investment affect economic growth?" *Journal of International Economics*, 45, 115-135.
6. Barro, R.J. (1990), Government spending in a simple model of endogenous growth, *Journal of Political Economy*, 98, 407- 443.
7. Barro, R.J., and X. Sala-i-Martin (1997), "Technological diffusion, convergence and growth," *Journal of Economic Growth*, 2, 1-26.
8. Buckley, P.J., J. Clegg, C. Wang, and A.R. Cross (2002), "FDI, regional differences and economic growth: panel data evidence from China," *Transnational Corporation*, 11, 1-23.
9. Choong, C.K., Z. Yusop and S.C. Soo (2005), "Foreign direct investment and economic growth in Malaysia: The role of domestic financial sector," *The Singapore Economic Review*, 50, 245-268.
10. Choong, C.K., A.Z. Baharumshah, Z. Yusop and M.S. Habibullah (2010a), "Private capital flows, stock market and economic growth in developed and developing countries: A comparative analysis," *Japan and the World Economy*, 22, 107-117.
11. Choong, C.K., S.Y. Lam and Z. Yusop (2010b), "Private capital flows to low-income countries: The role of domestic financial sector," *Journal of Business Economics and Management*, 11, 598-612.
12. Choong, C.K., Z. Yusop and S.H. Law (2010c), "Private capital flows to developing countries: The role of domestic financial sector," *Journal of the Asia Pacific Economy*, 15, 509-529.
13. De Mello, L. (1997), Foreign direct investment in developing countries and growth: a selective survey," *Journal of Development Studies*, 34, 1-34.
14. Gabriele, A., K. Boratav, and A. Parikh (2000), "Instability and volatility of capital flows to developing countries," *The World Economy*, 23, 1031-1056.
15. Ghatak, S. and J. Siddiki (2001), "The use of the ARDL approach in estimating virtual exchange rates in India," *Journal of Applied Statistics*, 28, 573-583.
16. Hermes, N. and R. Lensink (2003), "Foreign direct investment, financial development and economic growth," *Journal of Development Studies*, 40, 142-163.
17. Jayaraman, T.K. and C.K. Choong (2009), "Growth and Oil Price: A Study of Causal Relationships in Small Pacific Island Countries," *Energy Policy*, 37, 2182-2189.
18. Jayaraman, T.K. and C.K. Choong (2010), "How does monetary policy work in Solomon Islands?" *Pacific Economic Bulletin*, 25, 76-95.
19. Lensink, R., and O. Morrissey (2006), "Foreign direct investment: flows, volatility, and the impact on growth," *Review of International Economics*, 14, 478-493.
20. Levine, R., and D. Renelt (1992), "A sensitivity analysis of cross-country growth regressions," *American Economic Review*, 82, 942-963.
21. Narayan, P.K. (2005), "The saving and investment nexus for China: evidence from cointegration tests," *Applied Economics*, 37, 1979-1990.
22. Narayan, P.K. and R. Smyth (2005), "The residential demand for electricity in Australia: An application of the bounds testing approach to cointegration," *Energy Policy*, 33, 467-474.
23. Pesaran, M.H., Y. Renelt, and R. Smith (2001), "Bounds testing approaches to the analysis of level relationships," *Journal of Applied Econometrics*, 16, 289-326.
24. UNCTAD (2006), *World Investment Report 2006: FDI from Developing and Transition Economies: Implications for Development*. United Nations, New York and Geneva.