IJEM
International Journal of Economics and Management
Journal homepage: http://www.ijem.upm.edu.my

Crazy Rich Asian Countries? The Impact of FDI Inflows on the Economic Growth of the Economies of Asian Countries: Evidence from An NARDL Approach

LIM THYE GOH[a*], SHIVEE RANJANEE[b] AND WOON LEONG LIN[c]

[a]*Faculty of Economics & Administration, University of Malaya, Malaysia*
[b]*School of Business and Economics, Universiti Putra Malaysia, Malaysia*
[c] *Taylor University, Malaysia*

ABSTRACT

FDI inflows are often regarded as the engine of economic growth, where an increase in FDI leads to higher productivity and higher international trade. Recognising that financial crises, political instability and trade wars may shape the asymmetric behaviour of FDI inflows, this paper utilises the NARDL model by Shin et al. (2014) over the period 1970-2017 to examine the asymmetric cointegration between the FDI inflows and economic growth of three economic nation groups in the Asian region. The empirical results indicate that 1) there is significant evidence of the asymmetric effects of FDI inflows on the economic growth of Asian developing countries. More specifically, an increase in FDI inflows tends to lead to an increase in economic growth, while a reduction in FDI inflows is detrimental to economic growth. 2) a higher human capital index and capital stock in the host country promotes economic growth.

JEL Classification: E22, F21, F43
Keywords: Economic Growth, FDI inflows, Asymmetric Cointegration

Article history:
Received: 9 November 2019
Accepted: 12 April 2020

* Corresponding author: Email: ltgoh@um.edu.my

INTRODUCTION

Foreign direct investment (FDI) takes place when an investor establishes foreign business operations or acquires a foreign business. Classical growth theory indicates that increasing either one of the factors of production (labour or capital), while holding the other constant, and assuming no technological change, will increase output. As a result, FDI, in the form of capital investment should be positively associated with economic growth. Hence, it is not surprising that FDI has attracted much research which has investigated its impact on the economic performance of host countries. Although much empirical research has been carried out to investigate the impact of FDI on economic growth, the empirical evidence is far from uniform. Li and Liu (2005), Batten and Vo (2009), Lamsiraroj and Doucouliagos (2015) indicated a positive effect from FDI on a host country's economy, but Mencinger (2003), Turkcan and Yetkiner (2008) and Herzer (2012) indicated otherwise.

Moreover, as indicated by Jayanthakumaran (2016), the magnitude of FDI inflows depends on regional economic conditions, pro-market reforms, privatisation, liberalisation, a favourable political environment and a large and wealthy domestic market. Hence, it is not surprising that FDI inflows for the developing Asian countries plunged by 7.78% and 16.43% during the Asian Financial Crisis and the Global Financial Crisis, respectively. On the other hand, FDI inflows declined by 52% for the developed Asian countries during the Global Financial Crisis (UNCTAD, 2018). Although the magnitude of FDI inflows fluctuates across time, most of the existing literature has not explained to what extent the economic growth of a host country relies on FDI inflows. We believe that if FDI inflows are an important determinant of economic growth, a reduction of FDI inflows should have a detrimental impact on economic growth. Hence, the potential long-run asymmetric relationship between FDI inflows and economic growth should be explored.

Hence, this research intends to achieve the following, firstly, the exploration of the impact of FDI inflows on the economic growth of host countries. Secondly, utilising the nonlinear autoregressive distributed lags (NARDL) model by Shin et al. (2014) to investigate the long-run and short-run asymmetries in the FDI inflow-economic growth nexus. Besides, this research is timely, as global FDI flows decreased by 35% in the first half of 2018 (OECD, 2018). Hence, a reduction of FDI flows could be observed. The inspiration behind the selection of the countries studied was initiated by the Hollywood blockbuster movie- "Crazy Rich Asians". Besides Asian countries remained the main recipients of FDI inflows for the years 2016 (USD 476 billion) and 2017 (USD 475 billion). The remainder of this paper is structured as follows. The next section provides the background to the study, which is followed by the empirical model. Section 4 outlines the empirical results and Section 5 offers concluding remarks.

THEORETICAL BACKGROUND

Exogenous growth model

Pioneered by Solow and Swan (1956), the theory assumes that changes in production output are the result of changes in exogenous factors, which increase total factor productivity (TFP). According to the theory, exogenous increases are attributed to technological changes and permanent productivity improvements. Although the TFP growth is exogenous and, thus, cannot be observed, it can be estimated in conjunction with the effects of changes in capital stock accumulation over time. As suggested by the theory, an increase in capital stock accumulation would lead to an increase in economic growth. This suggests that FDI inflows enhance the capital accumulation of the host country, hence, promoting economic growth. The mathematical presentation of the Solow and Swan model (Cobb–Douglas production function) is as follows:

$$Y(t) = K(t)^{\alpha}(A(t)L(t)^{1-\alpha}$$

t denotes time, *Y(t)* represents total production. *L* and *K* represent labour and capital, *A* refers to labour-augmenting technology or knowledge, thus, AL refers to effective labour.

Endogenous growth model

Unlike the exogenous growth model, the endogenous growth model postulates that growth is imputed by endogenous factors. The theory holds that economic growth is driven by investment in human capital, innovation and technological changes within a country (Romer (1986, 1990); Lucas (1988) and Robelo (1991)). They argued that human capital development reduces the diminishing return to capital accumulation, hence, increasing the growth rate. Thus, theoretically, FDI inflows should be able to augment the economic growth of a host country through capital accumulation and technology transfers. The mathematical presentation of the endogenous model (AK model) is as follows:

$$Y = AK^{\alpha}L^{1-\alpha}$$

Y represents the total production of an economy. *K* refers to capital, whereas, *L* is labour, and α measures the output elasticity of capital.

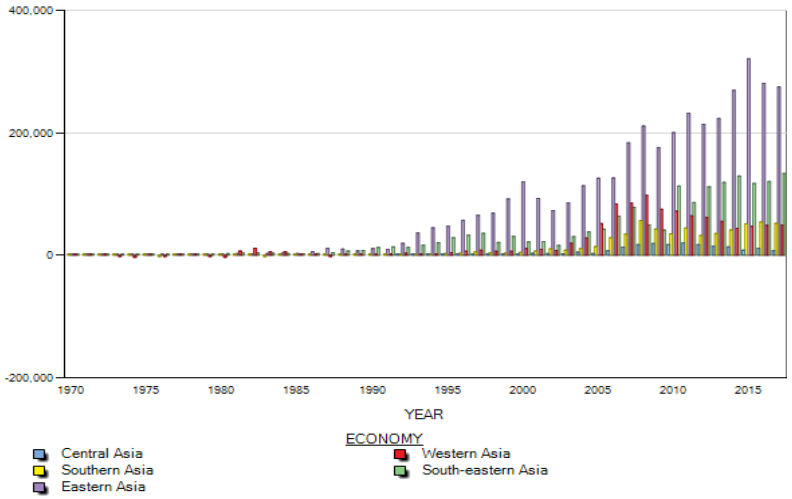
Both the exogenous and endogenous growth theories reveal that FDI inflows could lead to the economic growth of a host country in multiple ways. The exogenous growth theory focuses on capital accumulation brought in by FDI inflows, while the endogenous growth theory, on the other hand, focuses on technology transfer spillovers. Besides, the International Trade Theory by Mundell (1957), the Production Cycle Theory by Vernon (1966), the Theory of Exchange Rates on Imperfect Capital Markets by Itagaki (1981) and Cushman (1985) and the Eclectic Paradigm by Dunning (1973, 1980, 1988) explain why FDI takes place. FDI inflows are often regarded as the engine of economic growth, where an increase in FDI leads to higher productivity and higher international trade (Fontagne (1999), Najabat and Hussain (2017)).

Additionally, the United Nations Conference for Trade and Development (UNCTAD) (2013) further explained that FDI inflows are beneficial to host countries in several ways. i. FDI has a multiplier effect on the national income of the receiving economy. ii. FDI inflows create job opportunities, hence, reducing unemployment rates. iii. FDI inflows boost production capacity. iv. FDI inflows bring in the latest technology from abroad. v. imports are decreased as more goods are produced locally, hence, improving the trade balance. vi. a positive effect on the capital account. v. improves economic development.

FDI Inflows – Asia Region

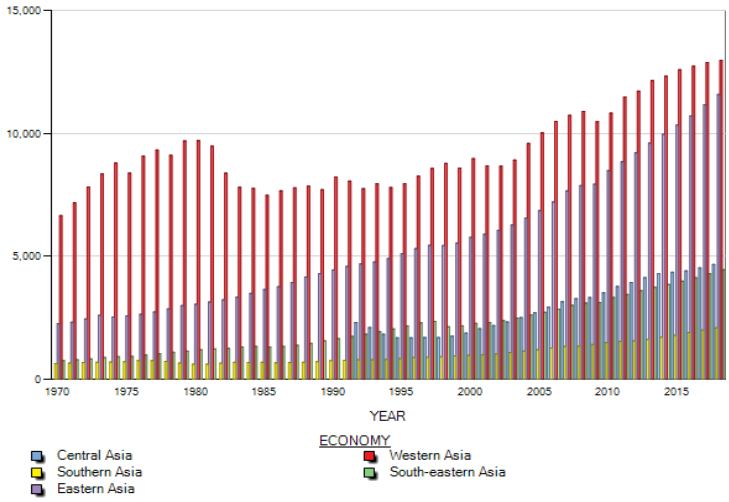
Over the past few decades, the inflows of foreign direct investment (FDI) from high-income western countries into the Asian region have remained significant. As highlighted in the recent World Investment Report (UNCTAD, 2018), although global FDI flows fell by 23 per cent to $1.43 trillion in 2017, developing Asia remained as the largest FDI recipient in the world at USD476 billion (UNCTAD, 2018).

Foreign direct investment (FDI) is seen as an important element of economic development. The following section highlights a brief analysis of FDI inflows and economic growth across the Asian region. Figure 1 and Figure 2 highlight the FDI inflows and the Real Gross Domestic Product (RGDP) of the Asian region from the year 1970 to 2017. As indicated in Figures 1 and 2, the Asian region has achieved positive growth in terms of FDI inflows and economic growth. From observation, significant increases in economic growth commenced with the start of positive growth in FDI inflows (beyond the year 1980).



Source: UNCTAD (2018)

Figure 1 FDI inflows to the Asian Region



Source: UNCTAD (2018)

Figure 2 RGDP of the Asian Region

Investment policies in the Asian region

The following section briefly highlights the various investment policies implemented by Asian host countries to attract the inflow of foreign direct investment.

Malaysia

Various factors have made Malaysia an attractive industrial and export base for foreign firms in the region. Among them are attractive tax incentives, liberal equity policies and the employment of expatriates. Malaysia's corporate tax rate of 25% and the maximum personal income tax rate of 26% are also relatively low compared to neighbouring countries. Besides, foreign companies are allowed to employ expatriates with skills not available in Malaysia. Also, foreign investors can hold 100% of the equity in all investments in new projects, as well as investments in expansion or diversification projects by existing companies. Today, the Malaysian Investment Development Authority (MIDA) is the most important government agency that *assists companies which intend to invest in the manufacturing and services sectors, as well as facilitating the implementation of their projects.*

Thailand

Thailand's Board of Investment (BOI) made some significant changes to its investment promotion policies in the year 2014, targetting the inflow of investment. The revised policy emphasised six key sectors, which included; activities that enhance national competitiveness, environmental friendliness, creating investment concentration based on regional potential, thereby strengthening the value chain, developing the local economy, creating special economic zones offering economic connectivity with nearby countries, and enhancing the competitiveness of Thai businesses and, thus, Thailand's role in the global economy. The BOI encourages industrial development that is beneficial to Thailand through both activity-based and merit-based investment incentives. Companies qualified for activity-based investment incentives receive exemptions from import duties on machinery and raw, or essential, materials used in the manufacturing of export products as well as other non-tax incentives. Whereas, companies qualified for merit-based investment incentives enjoy an extended tax holiday, of no longer than 8 years in total, and double deductions for transportation, electricity and water supply costs for 10 years.

Indonesia

The Indonesian government has introduced 16 stimulus packages to attract FDI inflow. The first 15 stimulus packages mainly focused on deregulation, interest rate cuts, energy tariff cuts for labour-intensive industries, tax incentives for investment in special economic zones, improving e-commerce logistics systems, improving infrastructure, strengthening the Indonesia National Single Window (INSW) authority, enhancing the ease of doing business in Indonesia by cutting procedures, permits and costs, subsidies and loans for export-oriented small & medium enterprises and reducing the number of prohibited and restricted goods. Whereas, the latest rendition was implemented in Nov 2018 to improve Indonesia's investment climate, a revision of the negative investment list, an expansion of tax holiday programs and tax incentives. The main objective of the revisions was to attract more direct investment into Indonesia, boosting Indonesian economic activity and reducing the country's dependence on imports.

Singapore

Singapore received a massive USD77.65 billion of FDI inflows in 2018 and was the fourth-largest recipient of FDI inflows in the world, in 2018 (UNCTAD, 2019). Among the factors that have made Singapore an attractive FDI destination are openness to trade, ease of doing business, a qualified workforce and a solid banking system. In terms of international trade, Singapore grants various tax breaks to companies in various industries related to the trading sector. Among them are; the Angel Investor Tax Deduction Scheme and the Double Tax Deduction scheme which benefit small and medium-sized enterprises. Additionally, in 2017, the Singaporean government mobilised more than US$8 billion (about 2.5% of the GDP) to improve productivity and boost innovation in 23 associated industries in growth sectors. Lastly, Singapore has signed Bilateral Investment Treaties (BITs) with 46 countries to protect the nationals or companies of either country against war and non-commercial risks of expropriation and nationalisation.

India

India overtook China and the United States as the world's top destination for FDI in 2015 (Financial Times, 2016). There are two routes via which India obtains FDI, which are; the automatic route and the government route. For sectoral lists falling under the government route (such as the defence sector, banking, and the public sector which is subject to the Banking Companies Acts 1970/80) prior approval by the government is required. Whereas, for sectors falling under the automatic route (such as the automobile sector and railway infrastructure sector). FDI inflows are allowed, without prior approval by the Indian government or the Reserve Bank of India. To increase the inflow of FDI, the Indian government increased the upper limit of foreign investment from 26% to 49% in the insurance sector and liberalised 25 other sectors in 2014. Among them were, foreign investment in scheduled or regional air transport services or domestic scheduled passenger airlines permitted at 100% ownership and 100% FDI was allowed under the automatic route in most areas of railway infrastructure.

China

FDI inflows to China remain significant three decades after the country opened its door to the world. Various factors contribute to the success of China in attracting FDI inflows. When establishing the policies to target FDI inflows in the early 1980s, the Chinese government established special economic zones and offered special tax incentives to foreign investors. China further liberalised its FDI policies in the 1990s with a more consistent and systematic FDI regulatory framework. China issued a series of new regulations after its entry into the World Trade Organisation (WTO) in 2002. In 2005, new Company Law was established and regulations covering the mergers and/or acquisitions of domestic enterprises by foreign investors were issued in 2006. In 2017, China introduced a national negative list, specifying the industries into which FDI is restricted or prohibited. Industries falling under the 'restricted' category are subject to controls, such as shareholding limits and must receive prior approval from the Ministry of Commerce.

South Korea

The process of FDI liberalisation in South Korea began in the early 1980s with altered policies, such as a lowered minimum investment level, deregulation, integration of the Foreign Capital Supervision Law and the New Foreign Capital Law, corporate tax reductions and the foreign ownership of land. These changes signified the efforts of the South Korean government to welcome FDI. The Korea Investment Service Centre (KISC) was established in 1998 which has served as a one-stop solution for foreign investors, providing administrative support for investment as well as counselling services and post-investment services. In 2007, the Korean government established an action plan to support the national effort to attract more foreign companies by expanding FDI-related infrastructure. These initiatives aimed to improve the efficiency and scope of the FDI promotion system by accentuating high-priority industrial sectors and creating cooperation mechanisms.

Japan

Under the strategic planning and guidance of the Ministry of Economy, Trade and Industry (METI), Japan has managed to achieve rapid and sustainable economic growth over the past few decades. Japan was the world's second-largest economy behind the USA before it was surpassed by its Asian counterpart China in 2010. Various proactive measures were introduced by Japan's Prime Minister, Shinzo Abe in late 2012, specifically, through improving corporate governance and lowering corporate taxes, to revitalise the Japanese economy and to welcome FDI. To realise sustainable corporate growth through strong governance, The Japanese government drew up a corporate governance code and formulated stewardship to promote transparency and constructive engagement with investors. Additionally, corporate tax was reduced to below the 30% mark in 2016 for companies engaging in wage increases and capital investment. To foster foreign business partnerships, administrative costs for business approvals, licenses and social insurance were reduced by 20% and a number of FDI seminars were hosted to disseminate information regarding FDI opportunities.

LITERATURE REVIEW

The following section highlights some of the previous literature on issues related to FDI inflows and economic growth.

Literature pro the link between FDI inflows and economic growth

Several studies have found that FDI inflows promote economic growth. Fadhil and Almsafir (2014) utilised Hierarchical Multiple Regressions (HMR) Analysis on time series data ranging from 1975 to 2010 to examine the impact of FDI inflows on the Malaysian economy. The results of their analyses suggest that FDI inflows and human capital development were significantly associated with the economic growth of Malaysia. Also, Almfraji and Almsafir (2014) found that FDI and economic growth were Granger Causally related in the long-term in Qatar. Likewise, John (2016), Pandya and Sisombat (2017) and Islami et al. (2016) concluded that

FDI inflows robustly affect economic growth. Anis and Amel (2015) utilised simultaneous equation models and reported that there was a bidirectional causality between FDI inflows and economic growth for Middle Eastern countries and three African countries, (namely, Tunisia, Morocco, and Egypt).

Besides, through the Autoregressive Distributed Lag (ARDL) approach, Sultanuzzaman et al. (2018) concluded that FDI inflows were positively correlated with the economic growth of Sri Lanka in both the short-run and long-run. Besides, exports were found to be positively associated with economic growth in the short-run but inversely associated with economic growth in the long-run. Their results confirmed that both exports and FDI inflows played an important role in shaping Sri Lanka's economy. However, Borensztein et al. (1998) found that FDI contributes to economic growth only if the host country has a minimum stock of human capital to absorb the advanced technologies brought in by foreign investors. Fadhil and Almsafir (2015) also concluded that FDI inflows together with human capital development contributed strongly to Malaysia's economic growth. But the technology spillovers of FDI inflows did not matter to the economic growth of the host country. Whereas, Wijeweera et al. (2010) concluded that FDI inflows exert a positive impact on economic growth in the presence of a highly skilled workforce. Corruption, on the other hand, is inversely correlated with economic growth.

Literature against the links between FDI inflows and economic growth

On the other hand, some studies have found that the impact of FDI on economic growth is not unanimous. Carbonell and Werner (2018) adopted the GETS econometric methodology on data from 1984 to 2010 and concluded that FDI was an insignificant determinant of economic growth in Spain's economy. Additionally, their studies also indicated that Spain's EU and euro entry were also found to be irrelevant to the nation's economic growth. Laura (2003) utilised cross-country data over the period 1981-1999 and suggested that FDI in the primary sector, tended to harm growth, while investment in manufacturing was positive. Hence, suggesting that the impact of FDI on economic growth may vary across sectors. Simionescu (2016) applied Bayesian regression models on data ranging from 2008-2015 and concluded that FDI was not a significant determinant of economic growth in Bulgaria and Romania but was significantly associated with economic growth in Croatia.

Similarly, Tang (2015) found that FDI flows did not contribute to EU economic growth, however, the interaction between FDI and stock market development increased the financing for FDI, thereby promoting growth. Rasiah et al. (2017) applied fully modified ordinary least squares (FMOLS) regressions and the Vector Error Correction Model (VECM) on data from 1970 to 2013 from the ASEAN-5 countries and concluded that not only was there a lack of evidence of FDI's impact on the economic growth of the ASEAN 5 but FDI inflows were inversely correlated with the economic growth of Thailand. Hence, suggesting that GDP growth drives the outflow of FDI rather than attracting FDI inflows.

The above discussions offer some insightful information on the impact of FDI inflows on economic growth, in their respective studies. Although various estimation methods were applied in previous studies to explore the impact of FDI inflows on economic indicators, there is still a debate as to what extent a country's economy relies on FDI inflows to progress. Hence, this study intends to fill the gap in the literature by exploring the asymmetric impact of FDI inflows on economic growth in three Asian Economic groups. Furthermore, this study also explores how human capital development and capital formation increases may promote economic growth

METHODOLOGY

The empirical model was based on both the exogenous and endogenous growth theories where economic growth is driven by both external factors, led by FDI inflows, and investment in human capital, innovation and technological changes within a country (Romer (1986, 1990); Lucas (1988) and Robelo (1991)).

The mathematical presentation of the exogenous and endogenous model is as follows:

$$Y(t) = K(t)^{\alpha}(A(t)L(t)^{1-\alpha}$$

t denotes time, *Y(t)* represents total production. *L* and *K* represent labour and capital, *A* refers to labour-augmenting technology or knowledge, thus, AL refers to effective labour.

$$Y = AK^{\alpha}L^{1-\alpha}$$

Y represents the total production of an economy. *K* refers to capital, whereas, *L* is labour, and α measures the output elasticity of capital.

The empirical model of our study investigates the impact of FDI inflows on the economic growth of three Asian economic groups through the asymmetric cointegration approach, suggested by Shin et al. (2014), This approach uses the nonlinear autoregressive distributed lag cointegration approach (NARDL) to capture the long-run and short-run asymmetries between FDI inflows and economic growth, where the FDI inflow variable is decomposed into two partial sum processes, cumulating in positive changes and negative changes. Besides, from the existing literature, capital stock investment and human capital development are often associated with economic growth (Kanayo (2013); Joshua (2016)), hence, we included both capital spending and the human capital development index as our control variables in the following model.

The asymmetric long-run equation is as follows:

$$RGDPC_t = \alpha_0 + \alpha_1 FDI_t^+ + \alpha_2 FDI_t^- + \alpha_3 CI_t + \alpha_4 HC_t + \varepsilon_t \quad (1)$$

where *RGDPC* is the real gross domestic product per capita, *FDI* is the foreign direct investment inflow, *CI* captures the capital stock investment and HC represents the human capital development index, and α_o, α_1, α_2, α_3, α_4 are the vectors of the long-run parameters to be estimated. Whereas, $FDI_t^+ and\ FDI_t^-$ are the partial sums of the positive and negative changes in the *FDI*.

$$FDI_t^+ = \sum_{i=1}^{t} \Delta FDI_t^+ = \sum_{i=1}^{t} \max(\Delta FDI_i, 0) \quad (2)$$

and

$$FDI_t^- = \sum_{i=1}^{t} \Delta FDI_t^- = \sum_{i=1}^{t} \min(\Delta FDI_i, 0) \quad (3)$$

where

$$FDI_t = FDI_0 + FDI_t^+ + FDI_t^- \quad (4)$$

Based on the above formulation, the long-run relationships between economic growth (real GDP per capita) and the foreign direct investment inflows are $\alpha_1$and α_2. Where α_1 captures the long-run relationship between economic growth and FDI inflow increases and α_2 captures the long-run relationship between economic growth and FDI inflow reductions. By default Equation (4) indicates that the current value of the FDI inflows (FDI_t) variable is given by the sum of its initial value and the positive and negative partial sums.

In the empirical implementation, the long-run equation (1) in an autoregressive distributed lag (ARDL) model, as proposed by Shin et al. (2014), is as follows:

$$\begin{aligned} \Delta RGDPC_t = {} & \beta_0 + \beta_1 RGDPC_{t-1} + \beta_2 FDI_{t-1}^+ + \beta_3 FDI_{t-1}^- + \beta_4 CI_{t-1} + \beta_5 HC_{t-1} \\ & + \sum_{i=1}^{p} \varphi_i \Delta RGDPC_{t-i} + \sum_{i=0}^{q} (\theta_i^+ FDI_{t-i}^+ + \theta_i^- FDI_{t-i}^-) \\ & + \sum_{i=0}^{r} \gamma_i \Delta CI_{t-1} + \sum_{i=0}^{s} \delta_i \Delta HC_{t-1} + \mu_t \end{aligned} \quad (5)$$

All of the variables were defined as previously described but with the addition of *p, q, r, s* which are the lag orders. The long-run parameters in Equation (1) were derived from Equation (5), i.e. $-\beta_2/\beta_1 = \alpha_1$ and $-\beta_3/\beta_1 = \alpha_2$. Also, $\sum_{i=0}^{q} \theta_i^+$ measured the short-run influences of FDI inflow increases on the real gross domestic product (*RGDP*) while $\sum_{i=0}^{q} \theta_i^-$measured the short-run influences of FDI inflow reductions on the real gross domestic product (*RGDP*).

The implementation of the nonlinear ARDL analysis applied the following steps. First, similarly to the ARDL error correction model, by Pesaran et al. (2001), the NARDL model does not allow I(2) variables. The presence of I(2) variables will cause the computed F-statistics for the cointegration test to be invalid. Hence, the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests were carried out to confirm that all of the variables were either I(0) or I(1). The Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test was also included to confirm the findings obtained from the ADF and PP unit root tests. Secondly, Equation (5) was estimated using the standard Ordinary Least Squares (OLS) estimation method. Third, we ran the nonlinear error correction model under the NARDL model using a two-step least squares estimation to obtain the optimum lags for the NARDL model. Fourth, to test for cointegration under the NARDL model, the bounds testing approach, suggested by Pesaran et al. (2001) and Shin et al. (2014), was carried out to identify the presence of cointegrating variables. Next, we performed the Wald test under the restriction $-\beta_2/\beta_1 = -\beta_3/\beta_1$ to examine the presence of asymmetry on the long-run impact of FDI inflows on economic growth among the observed countries. Lastly, we checked the robustness of the estimation with serial correlation and stability diagnostic tests. Besides, we also included the nominal term (Nominal GDP per capita) to investigate the relationship between FDI inflows and economic growth.

The Data

The economic nation groups, namely; the Asian Developed countries, the newly industrialised Asian countries and the emerging Asian giants were categorised based on their respective per capita income. As of July 1, 2019, countries were classified as developed nations if their income per capita was greater than USD12,375 and classified as middle income/developing countries for those countries with income per capita between USD1,026 to USD 12,375. India and China are perceived as Asian emerging giants, as together, they are home to 40% of the world's population and both are fast-growing world economies (Mahtaney, (2007). Due to data availability, annual data ranging from 1970 to 2017 were employed in this analysis. All of the variables are expressed in natural logarithms, the real gross domestic product per capita (RGDPC) was used to capture economic growth and the data was taken from the World Development Indicators (WDI). The real gross domestic product (RGDP) was utilised to reflect the true value of all of the goods and services produced by an economy in a given year. Foreign direct investment is represented by the FDI inflow data taken from the World Development Indicators (WDI). The human capital index, which is based on the average years of schooling and an assumed rate of return to education was obtained from the Penn World Table. Lastly, capital stock investment which is regarded by Classical and Neoclassical economists as one of the factors of production, and, hence, is a vital element in the production process and economic growth. The capital stock investment variable in our study represents the capital stock at current PPPs (in mil. 2011USD) was obtained from the Penn World Table. Table 1 presents the descriptive statistics of the datasets. The standard deviation of all of the variables was high, which indicated that all of the variables had high variations. To find the possible correlation between the explanatory variable (FDI inflows) with the dependent variable, a simple Ordinary Least Squares (OLS) regression was employed and the results are reported in Tables 2 and 3 respectively. Table 2 presents the estimation result of the OLS estimation on the impact of FDI inflows on the real GDP per capita, whereas, the estimation results of the FDI inflows on the Nominal GDP per capita are highlighted in Table 3. From the results reported in both Tables 2 and 3, FDI inflows were found to be significantly associated with both the real GDP per capita and the nominal GDP per capita, which is in parallel with the Endogenous Growth Theory which indicates that FDI inflows should be able to augment the economic growth of a host country.

Table 1 Summary Statistics

	Mean	Std. Dev	Min	Max	Observations
Japan					
NGDPC	29677.48	12481.71	6335.79	48603.48	41
FDI	8.78E+09	8.89E+09	6.03E+08	4.40E+10	41
RGDPC	38638.37	7406.20	23225.44	48438.83	41
Capital	15071883	6109622	5815788	23490298	41
HC	3.2842	0.1916	2.9420	3.5723	41
Singapore					
NGDPC	21710.54	18807.22	925.80	60297.79	48
FDI	1.78E+10	2.46E+10	93000000	9.48E+10	48
RGDPC	28048.37	15213.74	6786.93	56740.75	48
Capital	554533.40	652934.20	22442.23	2099482	48
HC	2.3792	0.6562	1.6509	3.9742	48
South Korea					
NGDPC	12084.57	9114.59	830.70	29742.84	42
FDI	5.01E+09	5.13E+09	6000000	1.79E+10	42
RGDPC	13264.34	7520.66	2962.75	26152.03	42
Capital	3286901	2688642	338859.80	8896485	42
HC	3.0242	0.4301	2.2180	3.6945	42
Malaysia					
NGDPC	4211.70	3319.62	357.66	11319.08	48
FDI	3.90E+09	4.03E+09	94000000	1.51E+10	48
RGDPC	5889.93	2816.41	1915.87	11720.74	48
Capital	839726	764716.40	92148.50	2807267	48
HC	2.3092	0.4917	1.4985	3.0341	48
Indonesia					
NGDPC	1479.14	1186.24	442.22	3836.91	37
FDI	5.49E+09	8.13E+09	-4.55E+09	2.51E+10	37
RGDPC	2364.05	817.75	1296.90	4120.43	37
Capital	4353646	5424457	605246.10	17984676	37
HC	2.0934	0.2649	1.5575	2.4168	37
Thailand					
NGDPC	2555.13	1910.20	351.62	6578.19	43
FDI	3.98E+09	4.15E+09	55280865	1.59E+10	43
RGDPC	3294.52	1554.70	1070.561	6128.66	43
Capital	1959599	1620430	202700.50	5103972	43
HC	2.1326	0.3824	1.4957	2.7435	43
China					
NGDPC	2330.26	2754.68	203.33	8759.04	36
FDI	8.78E+10	9.48E+10	4.30E+08	2.91E+11	36
RGDPC	2531.01	2107.51	386.89	7308.07	36
Capital	25670531	29358083	2674804	1.06E+08	36
HC	2.1294	0.2566	1.7221	2.5664	36
India					
NGDPC	637.94	508.36	158.36	1981.50	43
FDI	1.05E+10	1.53E+10	-36060000	4.45E+10	43
RGDPC	857.15	448.18	404.24	1987.34	43
Capital	8184805	9375898	1585100	33385420	43
HC	1.6493	0.2854	1.2265	2.1238	43

Notes: NGDPC is the Nominal Gross Domestic Product per Capita (USD), FDI is Foreign Direct Investment (inflows/USD millions) and RGDPC is the Real Gross Domestic Product per Capita (USD)

Table 2 OLS Table 2 OLS Estimation on the FDI inflows and Economy Growth (Dev: Real GDPC)

Variable	Value	P-value
Japan		
Constant	7.6869***	0.0000
FDI	0.1269***	0.0004
Singapore		
Constant	3.1901***	0.0000
FDI	0.3089***	0.0000
South Korea		
Constant	2.7075***	0.0000
FDI	0.3115***	0.0880
Malaysia		
Constant	2.1958***	0.0006
FDI	0.2985***	0.0000
Indonesia		
Constant	-7410.50***	0.0000
FDI	454.30***	0.0000
Thailand		
Constant	1.7135***	0.0000
FDI	0.2952***	0.0000
China		
Constant	-3.1335***	0.0000
FDI	0.4399***	0.0000
India		
Constant	3.1232***	0.0000
FDI	0.1682***	0.0000

Notes: ***, ** and * denote the significance at the 1%, 5% and 10% levels.

Table 3 OLS Estimation on the FDI inflows and Economy Growth (Dev: Nominal GDPC)

Variable	Value	P-value
Japan		
Constant	3.8022*	0.0830
FDI	0.2828***	0.0049
Singapore		
Constant	-3.7329***	0.0000
FDI	0.5920***	0.0000
South Korea		
Constant	-0.8413	0.2011
FDI	0.4647***	0.0000
Malaysia		
Constant	-3.7442***	0.0006
FDI	0.5503***	0.0000
Indonesia		
Constant	-11542.13	0.0000
FDI	608.59***	0.0000
Thailand		
Constant	-2.1760***	0.0033
FDI	0.4577***	0.0000
China		
Constant	-7.1290***	0.0000
FDI	0.5869***	0.0000
India		
Constant	1.4614***	0.0000
FDI	0.2276	0.0005

Notes: ***, ** and * denote the significance at the 1%, 5% and 10% levels.

EMPIRICAL RESULTS

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were applied to verify the stationarity of the underlying variables and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test was used to verify the findings obtained from the ADF and PP unit root tests. The ADF and PP tests check the null of a unit root, whereas, the KPSS test tests the null of stationary against the alternative hypothesis of a unit root. The results of the tests have been compiled and summarised in Table 4. As displayed in Table 4, both the ADF and PP tests indicated that all of the variables were integrated at order 0 (I(0)) or order 1 (I(1)). Additionally, all of the

variables (except two) obtained from the KPSS unit root test can verify the findings of both the ADF and PP unit root tests. The absence of an I(2) variable is vital as such data will invalidate the computed F-statistics for testing cointegration. Given the absence of I(2) variables, allowed us to proceed to perform the NARDL model estimation, as suggested by Pesaran et al. (2001).

Table 4 ADF and PP unit root test results

Variable	Level			First Difference		
	ADF	PP	KPSS	ADF	PP	KPSS
Asian Developed	t-statistics	t-statistics	t-statistics	t-statistics	t-statistics	t-statistics
Japan						
RGDPPC	-4.2686***	-3.9997***	0.7178**	--4.8720***	-4.1099***	0.1215
FDI Inflows	-3.6972***	-3.6572***	0.0820	--5.9728***	-23.4305***	0.4152*
NGDPC	-3.1718**	-2.9776**	0.6344**	--5.0701***	-5.0958***	0.0716
Capital	--4.0863**	-1.5979	0.1298*	--4.6869***	-2.7590***	0.1739
HC	--2.4271	-9.1678***	0.2114**	--2.1658**	-2.8651***	0.1049
Singapore						
RGDPPC	-1.7570	-4.9658***	0.2338***	-5.5371***	-5.3866***	0.0902
FDI Inflows	-1.3016	-4.5919***	0.2141**	-14.1788***	-20.0700***	0.3289
NGDPC	-1.2298	-3.2067**	0.2065**	-3.8521***	-3.6747***	0.0648
Capital	-0.9790	-0.9869	0.1122	-2.0320*	-4.3780**	0.1009
HC	-1.5512	-1.7088	0.2141**	-2.6015*	-5.5759***	0.0835
South Korea						
RGDPPC	-3.5360**	-3.4462**	0.2063**	-4.7742***	-4.7963***	0.0853
FDI Inflows	-2.5421	-2.4806	0.1749**	-5.6819***	-7.6476***	0.0943
NGDPC	-2.6183*	-2.7209*	0.1896**	-5.3248***	-4.9648***	0.0546
Capital	-1.4178	-1.2327	0.1567**	-3.4285**	-2.6307*	0.0769
HC	-3.4925*	-4.4311***	0.2077**	-1.5461	-2.4619**	0.0905
NICs						
Malaysia						
RGDPPC	-1.7366	-1.7056	0.1532*	-5.8675***	-5.8664***	0.0561
FDI Inflows	-5.2795***	-5.2795***	0.1193*	-7.1516***	-18.0648***	0.2489
NGDPC	-3.4636*	-2.4300	0.1359*	-5.2302***	-5.2600***	0.0752
Capital	-4.0566**	-2.2040	0.1004	-2.5646	-2.7456*	0.0400
HC	-2.0905	-3.7095***	0.2266	-2.1838*	-2.2401	0.1380
Indonesia						
RGDPPC	-2.2494	-1.9522	0.0838	-4.4835***	-4.3976***	0.0888
FDI Inflows	-2.0588	-3.2032	0.0589	-2.7779*	-8.5816***	0.0883
NGDPC	-2.3105	-2.3117	0.1486**	-5.9090***	-5.9090***	0.0553
Capital	-1.7710	-1.5098	0.1808**	-2.2789*	-2.7608**	0.0917
HC	-1.6505	-5.0995***	0.2149**	-2.3414*	-1.8426*	0.0981
Thailand						
RGDPPC	-1.8045	-1.4517	0.1703**	-3.6266***	-3.7547***	0.0544
FDI Inflows	-3.0183	-2.9978	0.2216***	-5.7592***	-14.6282***	0.0639
NGDPC	-2.7818	-2,2467	0.1002	-3.9554***	-3.9963***	0.0562
Capital	-1.9766	-1.1457	0.1263*	-2.0393**	-2.9644*	0.0954
HC	-2.2984	-1.0258	0.1798**	-9.5921***	-2.5688*	0.0773
Emerging Giants						
China						
RGDPPC	-3.6795**	-2.0829	0.0701	-4.1879***	-2.7613*	0.0710
FDI Inflows	-3.1678**	-2.9002*	0.1888**	-3.7373***	-3.6625***	0.0510
NGDPC	-2.4485	-1.9141	0.1725**	-3.3840**	-3.4540**	0.1066
Capital	-1.8112	-2.4662	0.1839**	-2.3309*	-2.3816*	0.1052
HC	-2.6241	-1.4051	0.1386*	-27941*	-.1.9116*	0.0510
India						
RGDPPC	--1.4036	-1.3747	0.2201***	-7.6013***	-5.7751***	0.1555*
FDI Inflows	-3.2070*	-3.2930*	0.1100	-5.4075***	-8.6105***	0.2352
NGDPC	-0.8581	-1.1180	0.1708**	-5.7862***	-5.8702***	0.1009
Capital	-2.7516	-1.6553	0.2068**	-2.3186*	-3.3186*	0.1259
HC	-2.1531	-1.1850	0.1425*	-2.1867*	-2.2547*	0.1758

Notes: RGDPPC represents the real GDP per capita where NGDPC refers to the nominal GDP per capita. HC represents human capital index and capital represents the capital stock investment. Coefficients displayed are the T-statistics obtained from Eview. The null hypothesis of the ADF and PP test is unit root, and the null hypothesis of the KPSS test is stationarity. The constant and trend terms are included in the test equation and the SIC is utilised for optimal lag order in the ADF test equation. ***, ** and * denote the significance at the 1%, 5% and 10% levels.

The cointegration tests on the FDI inflows-economic growth nexus equation were performed by regressing Equation (5) with the OLS estimation method and the non-linear error correction model (ECM) under the NARDL model setting, through the two-step least squares method, to arrive at the model's final specification. The maximum lag order considered was 6. Table 5 summarises the results of the model specification. In the NARDL framework, the existence of long-run cointegration can be tested with bounds testing F-statistics, as suggested by Shin et al. (2014), to compare with the critical values provided by Pesaran et al. (2001) if the observation is greater than 100. Whereas for a small sample size (< 100 observations), to compare with the critical value provided by Narayan (2005). If the calculated F-statistics are greater than the upper bound critical value then there is evidence of cointegration. The *F-statistics* reported in Table 6 are strongly significant for all of the countries, except for Singapore, thus, rejecting the null of non-cointegration for all of the countries, except for Singapore.

Unlike the long-run cointegration tests, the p-values of the long-run asymmetry tests obtained for Japan, South Korea, Malaysia, Thailand and China were less than 0.10. Thus, indicating that there was asymmetry in the long-run impact of FDI inflows on the economic growth of the above five countries. The results presented in Table 5 are not the long-run coefficients. To obtain the long-run coefficients, we divided the negative coefficient of each of the explanatory variables by the coefficient of the RGDPC (-1). The long-run coefficients of the explanatory variables are presented in Table 7. The *F- test* for asymmetry confirmed that the two long-run elasticities for Malaysia and Thailand differed at 5% and 10% respectively. In short, the economic growth of Malaysia and Thailand reacted to both increased and reduced FDI inflows. However, economic growth responded more to increases in FDI inflows (0.0335 and 0.0461) than it did to reduced FDI inflows (0.026 and 0.0177). In the cases of Indonesia and India, although the long-run elasticity for positive changes in FDI inflows was significant at the 5% level, while for negative changes it was significant at the 5% level for India and the 10% level for Indonesia, the *F- test* for asymmetry failed to confirm that the two elasticities were significantly different. On the other hand, the influence of FDI inflows on the level of economic growth of Japan, Singapore, South Korea and China was restricted to the positive change of FDI inflows, hence, suggesting that the spillover effects of reduced FDI inflows on economic growth may not be immediate in the cases of Japan, Singapore, South Korea and China.

Additionally, we included the Bruesch-Godfrey serial correlation LM statistics for autocorrelation up to order 4 to serve as the diagnostic statistics to justify the adequacy of the model specification. These are presented in the right panel of Table 6. We also present, in Figure 3, the CUSUM and CUSUM squares statistics diagrams for testing the structural stability of the model. From the results that unfold in Table 6, all of the countries, except for Singapore, confirmed the absence of autocorrelation. The diagrams of the CUSUM and CUSUM squares indicate that the test statistics were within the 5% confidence interval bands, suggesting there was no structural instability in the residuals.

Human capital index and Capital stock investment

The results displayed in Table 6 indicate that the capital stock investment of the host country is significant with the expected sign. Specifically, the coefficients of the capital stock investment variables were found to be in the range of 0.0993 to 1.1504. The result, hence, was in parallel with the theoretical argument that capital stock is one of the factors of production, hence, it is a vital element in the production process and economic growth. Interestingly, the human capital index appeared to have a mixed impact on economic growth. In particular, a 1 per cent increase in the human capital index in Japan, South Korea, Malaysia and India could lead to a higher percentage increase (5.6928, 1.4469, 1.341 and 2.8649) in economic growth. However, for China and Indonesia, the result suggested that positive growth in the human capital index had a detrimental effect on economic growth. Hence, this suggested that further investigation on this matter, based on single-country case studies, is required.

Table 5 Nonlinear ARDL Estimation Results (Dependent Variable – RGDPC)

Variables	Asia Developed Countries			Asia Developing			Emerging Asian Giants	
	Japan	Singapore	South Korea	Malaysia	Indonesia	Thailand	China	India
Intercept	-2.3205***	-3.5777**	4.9311***	8.4484***	19.1692**	2.8664***	-	-1.2356***
	(0.0007)	(0.0121)	(0.0001)	(0.0000)	(0.0251)	(0.0000)	-	(0.0068)
RGDPC(-1)	-0.6621***	0.1781**	-1.2993***	-1.4669***	-2.1809**	-1.1536***	1.4959**	0.8107**
	(0.0000)	(0.0471)	(0.0001)	(0.0000)	(0.0356)	(0.0000)	(0.0162)	(0.0111)
FDI_POS(-1)	0.0306***	-0.1404**	0.0496***	0.0492***	0.4648**	0.0531***	-0.3514*	0.1022***
	(0.0003)	(0.0399)	(0.0017)	(0.0008)	(0.0307)	(0.0002)	(0.0098)	(0.0024)
FDI_NEG(-1)	-0.0048	-0.0432	0.0052	0.0382**	0.4008*	0.0204*	0.0055	0.0849**
	(0.1201)	(0.1595)	(0.7943)	(0.0170)	(0.0534)	(0.0551)	(0.8227)	(0.0250)
HC	3.7691***	0.2897	1.8800**	1.9671***	-0.8852**	-0.0917	0.9858***	-2.3225***
	(0.0000)	(0.3994)	(0.0199)	(0.0000)	(0.0291)	(0.6899)	(0.0082)	(0.0013)
Capital	0.2830***	0.2049*	0.3440***	0.1801*	-0.2165**	0.4307***	-0.6747**	-0.2160**
	(0.0033)	(0.0634)	(0.0011)	(0.0783)	(0.0262)	(0.0000)	(0.0126)	(0.0237)
ΔRGDPC(-1)	0.5632***	-0.4740*	0.3476*	0.5779***	1.0027*	-	0.7899**	-1.1381***
ΔRGDPC(-2)	-0.4800***	-0.8085***	0.3651*	0.4370**	1.5592**	-	-1.1545***	-0.7177**
ΔRGDPC(-3)	-	-	0.4443**	-	1.9847**	-	-	-0.5295*
ΔRGDPC(-4)	-0.5377***	-0.4157**	0.2357	-	0.3451*	0.3535***	-	-
ΔRGDPC(-5)	-	-	-	0.2269**	-	-	-	-
ΔRGDPC(-6)	0.4821***	-	-	-	-	-	-	-
ΔFDI_POS	0.0102***	-	-	-0.0243*	0.1018**	0.0540***	0.1238***	0.0434**
ΔFDI_POS(-1)	-	0.1107*	-0.0263**	-0.0282**	-0.2642**	-	0.3729***	-
ΔFDI_POS(-2)	-0.0294***	0.1074**	-	-0.0171***	-0.1492**	-	0.3028***	-0.0277*
ΔFDI_POS(-3)	-0.0358***	-0.0821**	-	-0.0162***	-0.1811**	-	0.0970**	-0.0432**
ΔFDI_POS(-4)	-0.0199***	0.0521*	-	-0.0501***	0.3451*	-	0.0840***	-0.0251**
ΔFDI_POS(-5)	-	0.0448*	-	-	-	-	-	-
ΔFDI_POS(-6)	-	-	-	-	-	-	-	-
ΔFDI_NEG	-	0.0627**	-	0.0152***	-0.0401**	-	-	-0.0453**
ΔFDI_NEG(-1)	-	0.0606**	-0.0265	-0.0673***	-0.3308*	-0.0262*	-	-0.1046***
ΔFDI_NEG(-2)	0.0286***	-	-	-0.0193	-0.5056**	-0.0346***	-	-
ΔFDI_NEG(-3)	-	-	-	-	-0.7646**	-0.0184**	-	-0.0600***
ΔFDI_NEG(-4)	-0.0362***	-	-	-	-0.5633**	-	-0.1394***	0.0366**
ΔFDI_NEG(-5)	-	-	-	-0.0516***	-	-	-	-
ΔFDI_NEG(-6)	-	-	-	-	-	-	-	-
ΔHC	60.3982***	-	-8.5388**	-3.1770*	-26.8475**	1.9486***	7.7261***	-2.9003**
ΔHC(-1)	-	-1.4706**	-	-	13.8516**	1.4457*	1.4961	-
ΔHC(-2)	5.5355***	-0.8581***	-	1.5279*	3.6532*	-	5.4292*	-
ΔHC(-3)	19.8835**	-1.5547**	-5.6359	-	-19.4384**	2.2211**	7.6436**	-
ΔHC(-4)	-	-	-5.3241	-7.1514***	4.8576**	-	-	-
ΔHC(-5)	-	-0.8244	-	-	-	-	-	-
ΔHC(-6)	-	-	-	-	-	-	-	-
ΔCapital	-2.93E-08***	-	0.3301***	1.0289***	1.6754**	0.3019*	0.7806**	0.3424*
ΔCapital(-1)	-4.84E-08***	-0.4383**	-	-	-0.7930**		1.0975***	0.6891**
ΔCapital(-2)	-3.29E-08**	-	-0.4074***	0.3625*	-1.2505**	1.0122***	0.7899**	-
ΔCapital(-3)	4.62E-08***	-	-	0.5445**	-0.2420	-	1.8892***	1.4092***
ΔCapital(-4)	-2.94E-08***	-0.4157**	-0.1140	-	-0.1779	-0.7897***	0.8896*	-
ΔCapital(-5)	-	-0.8581**	-	-0.2280	-	-	-	-
ΔCapital(-6)	-	-	-	-	-	-	-	-

Notes: RGDPC represents the real GDP per capita where NGDPC refers to the nominal GDP per capita. HC represents human capital index and capital represents the capital stock investment. Figures in the parentheses are *p-values*. The intercept for China was dropped due to an insufficient number of observations. *, ** and *** denote the significance at 10%, 5% and 1% significance level.

Table 6 Long-Run Cointegration, Asymmetric Test and LM test (Dependant Variable – Real GDP Per Capita)

Countries	ARDL Bound Test Narayan (2005)	Long-run asymmetric		Breusch-Godfrey Serial Correlation LM Test:			
	F-statistics	Coefficient	P-value	Lag 2	P-value	Lag 4	P-value
Asia Developed Countries							
Japan	44.3543***	33.8267***	0.0002	6.5572	0.2063	5.4259	0.2333
Singapore	2.3719	1.8626	0.1883	6.5430***	0.0078	4.9932***	0.0092
South Korea	7.1649**	2.8219*	0.0930	3.3618	0.4450	3.6429	0.7990
New Industrialisation Countries (NICs)							
Malaysia	15.9766***	4.6869**	0.0469	6.1497	0.1320	5.3632	0.1210
Indonesia	9.2167***	0.1498	0.7035	3.7321	0.3945	5.6059	0.6116
Thailand	15.1494***	22.4413***	0.0001	7.3309	0.2009	9.7727**	0.0392
Asia Emerging Giant							
China	7.1347**	369.5230***	0.0000	8.4507**	0.0249	3.6901	0.1560
India	9.1289***	-0.8444	0.3749	5.4344	0.1144	9.7998**	0.0224
Narayan (2005) (K=4, n=36)	Lower Bound	Upper Bound					
1%	4.590	6.368					
5%	3.276	4.630					
10%	2.696	3.898					

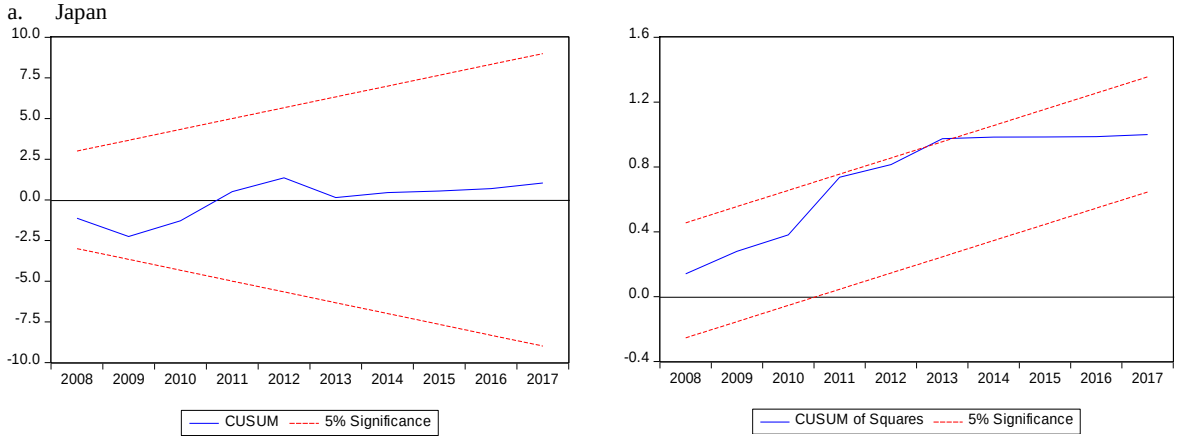
Notes: The test statistic of the cointegration tests are compared against the critical values reported in Narayan (2005). *, ** and *** denote the significance at the 10%, 5% and 1% significance levels.

Table 7 Long-Run Coefficients (Dependant Variable – Real GDP Per Capita)

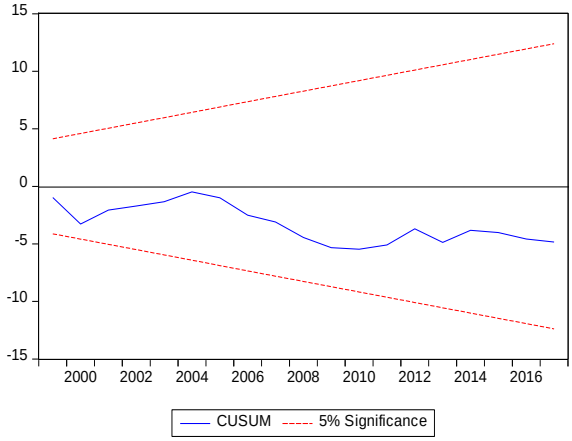
Countries	Long-Run Coefficients							
	FDI_ Pos	P-value	FDI_Neg	P-value	HC	P-value	Capital	P-value
Asia Developed Countries								
Japan	0.0462***	0.0003	0.0073	0.1201	5.6928***	0.0000	0.4275***	0.0000
Singapore	0.7882**	0.0399	0.2424	0.1595	-1.6263	0.3994	1.1504*	0.0634
South Korea	0.0382***	0.0017	0.0048	0.7943	1.4469**	0.0199	0.2647***	0.0011
New Industrialisation Countries (NICs)								
Malaysia	0.0335***	0.0008	0.0260**	0.0170	1.3410***	0.4049	0.1228*	0.0783
Indonesia	0.2131**	0.0307	0.1838*	0.0534	-0.4059**	0.0291	0.0993**	0.0262
Thailand	0.0461***	0.0002	0.0177*	0.0551	-0.0795	0.6899	0.3734***	0.0000
Asia Emerging Giant								
China	0.2349***	0.0098	0.0037	0.8227	-0.659***	0.0082	0.4510**	0.0126
India	0.1260**	0.0111	0.1047**	0.0250	2.8649***	0.0013	0.2665**	0.0237

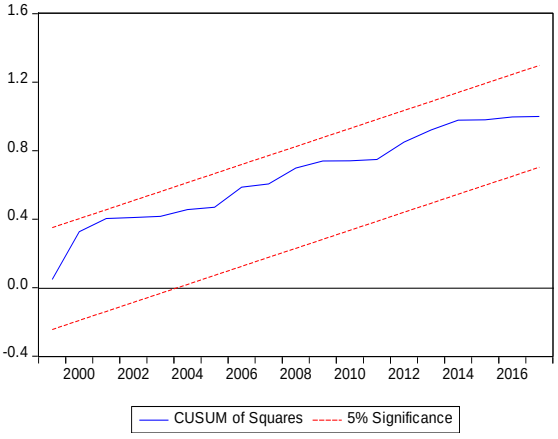
Notes: *, ** and *** denote the significance at the 10%, 5% and 1% significance levels.

a. Japan

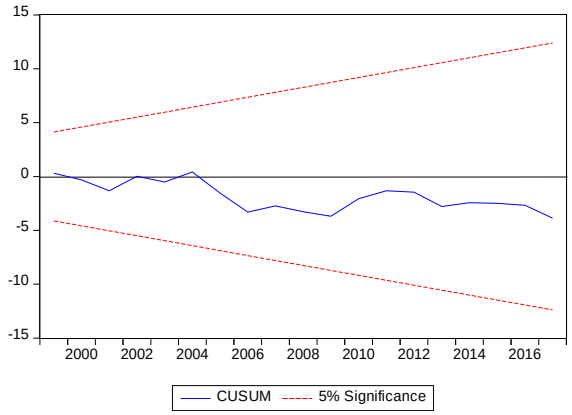


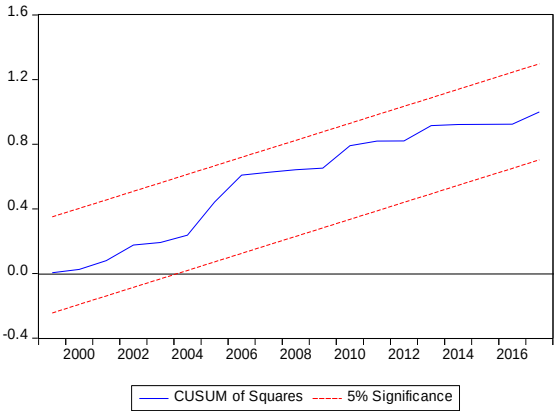
b. Singapore



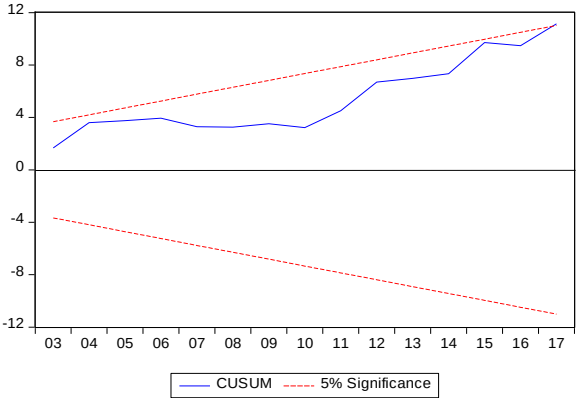


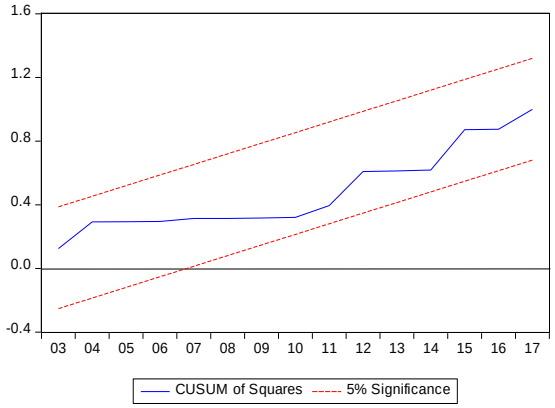
c. South Korea



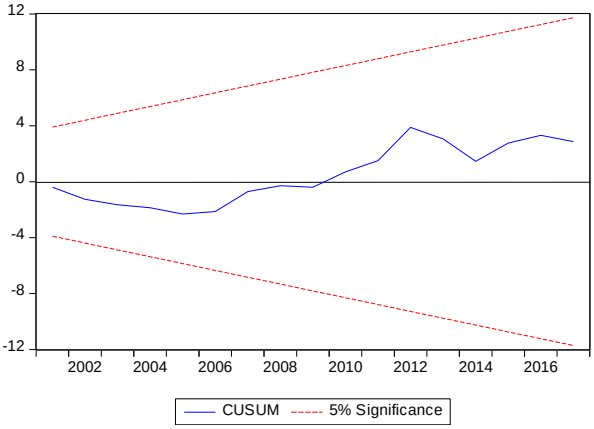


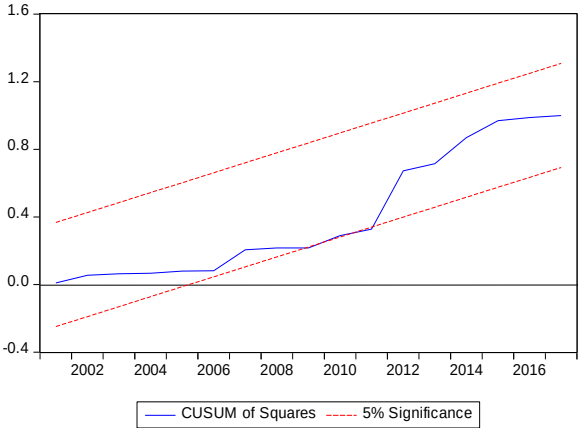
d. Malaysia



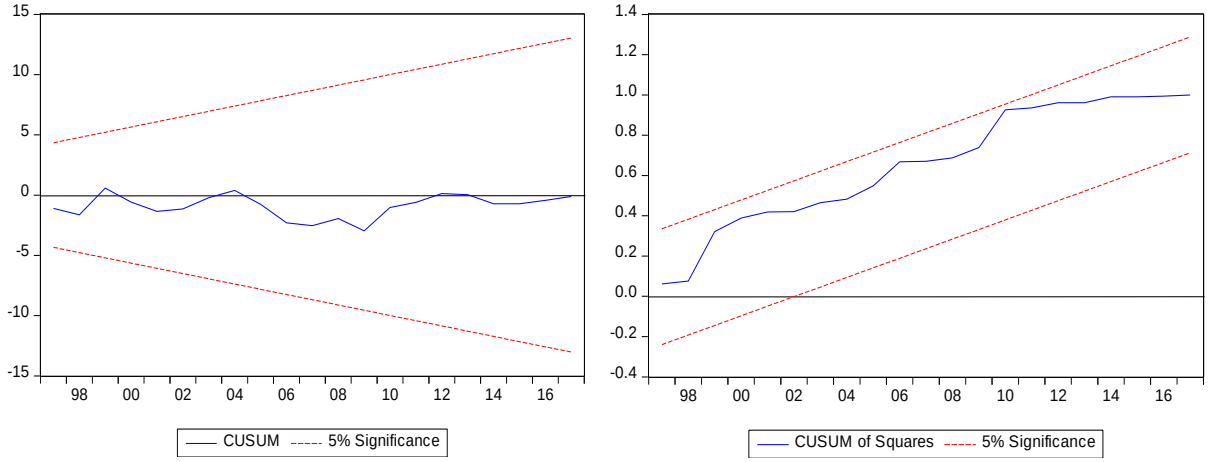


e. Indonesia

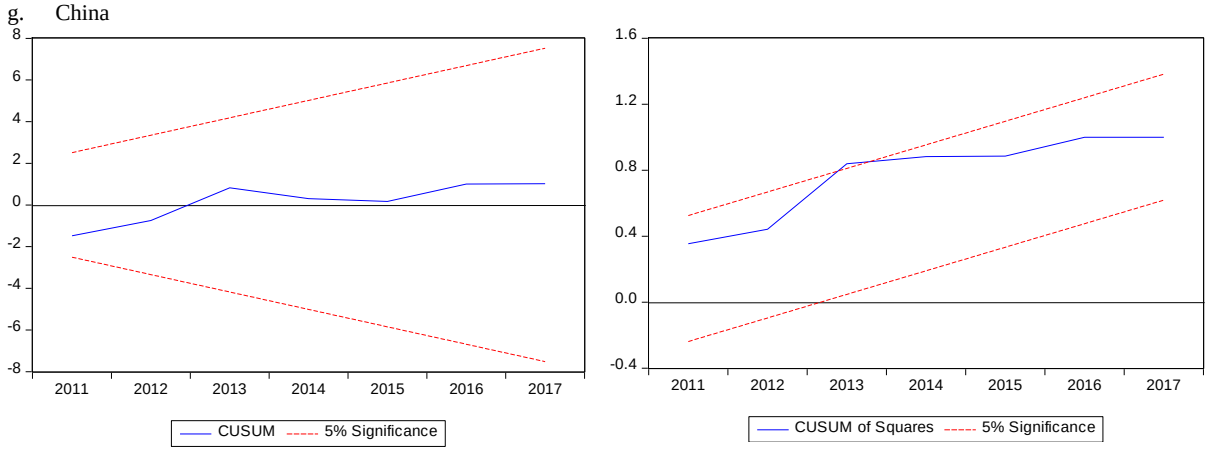




f. Thailand



g. China



h. India

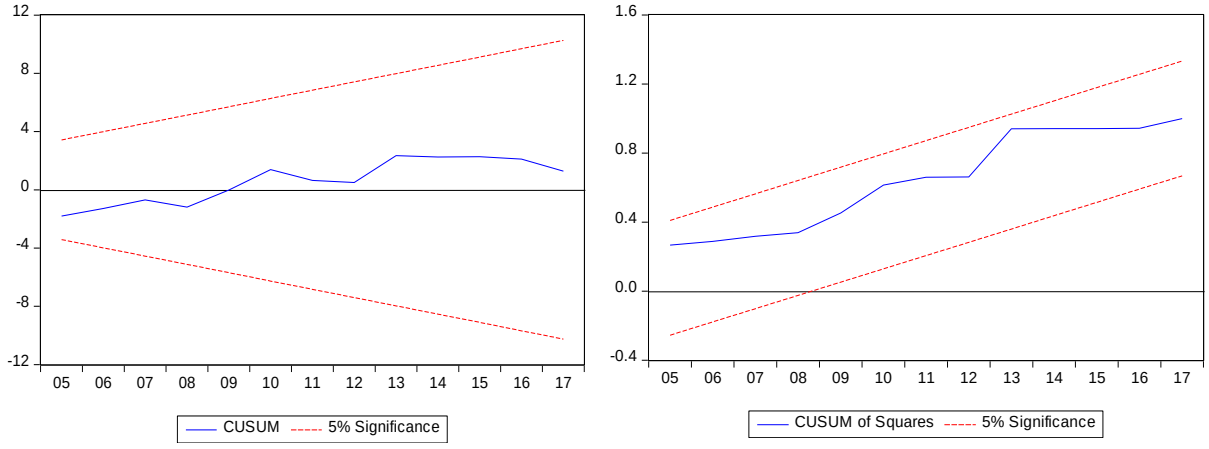


Figure 3 CUSUM and CUSUM^2 tests

Discussion and robustness check

This section presents the main implications of the results obtained from the three national economic groups, followed by a robustness check by replacing the determinant variable, as suggested by Bermejo and Werner (2017).

From the results which are summarised in Table 6. FDI inflows were found to be significantly cointegrated with economic growth, hence, suggesting that FDI inflows play an important role in determining the economic growth of the Asian region. Turning to the long-run asymmetries of the FDI inflows, the

coefficients reported in Table 7 point out that, the newly industrialised Asian countries group and India were more vulnerable to the variations of FDI inflows, where a percentage reduction in FDI inflows lead to a 0.026, 0.1838 and 0.0177 percentage reduction in the economic growth of Malaysia, Indonesia and Thailand. This finding is highly plausible for developing countries, as FDI is the key element of economic growth because it is the main source of technological transfer from developed countries. (Chenaf-Nicef and Rougier, 2016). Hence, a reduction of FDI inflows would dampen the economic growth of developing countries. Taking Malaysia as an example, during the Asian Financial Crisis, that hit the Asian region in 1997-98, a 58% reduction of FDI inflow ($513.65 million to $216.24 million) was accompanied by a 10% drop in the RGDPC (from $7041 to $6360) in the year 2018. Thus, it is unsurprising that the two elasticities of FDI inflows are significantly different for developing countries.

FDI inflows appear to have mixed effects but have the same outcome on the economic growth of the emerging Asian giants, namely; India and China. As for the former, the results obtained failed to reject the null hypothesis of no asymmetric effects of FDI inflows on economic growth. This suggested that the economic growth of India was not affected by a reduction of FDI inflows. On the other hand, in the case of China, although the null hypothesis of no asymmetric cointegration was rejected at the 1% significance level, the coefficient of reduced FDI inflows was not significant at the 10% significance level. On the other hand, the increase of FDI inflows had a significant positive impact on the economic growth of the emerging Asian giants. The results, therefore, highlighted the importance of additional FDI inflows and at the same time discarded the role of reduced FDI inflows on the economic growth of India and China. Our results also suggest that higher FDI inflows have a positive effect on the economic growth of the three Asian developed countries included in our study, namely; Japan, Singapore and South Korea. Whereas, reduced FDI inflows did not have a detrimental effect on the economic growth of the Asian developed countries.

To examine the robustness of our analysis, we, therefore, repeated the procedure by replacing the explanatory variable with the nominal GDP per capita (NGDPC). The results of the estimation, as reported in Tables 8, 9 and 10, strongly display long-run cointegration for Singapore, South Korea, Indonesia and China. Hence, this verified our finding that FDI inflows are significantly cointegrated with economic growth. On the other hand, although the *F-test* for asymmetry confirmed that the two elasticities of FDI inflows were significantly different at the 1% significance level for Singapore, South Korea, Indonesia, Thailand and China, and at the 10% significance level in the case of Japan. An increment of FDI inflows was found to have a detrimental impact on the economic growth of Japan, Singapore, South Korea and Thailand. Hence, suggesting that the nominal GDP per capita, which is subject to price fluctuations is the correct variable as the proxy of economic growth. Lastly, we also included the CUSUM and CUSUM Squares diagrams for testing the structural stability of the nominal term model in Figure 4. The results indicated that the test statistics lie within the 5% confidence interval bands (except for the CUSUM diagram of Malaysia and CUSUM squares diagram of Thailand), suggesting structural stability.

Table 8 Nonlinear ARDL Estimation Results (Dependent Variable – NGDPC)

Variables	Asia Developed Countries			Asia Developing			Emerging Asian Giants	
	Japan	Singapore	South Korea	Malaysia	Indonesia	Thailand	China	India
Intercept	-7.3428	-12.3769***	-8.7011***	-1.8750	13.8791***	-0.6856	-	-6.5654**
	(0.1949)	(0.0010)	(0.0000)	(0.3495)	(0.0007)	(0.4871)	-	(0.0329)
NGDPC(-1)	-0.2805*	-0.3525***	-0.9532***	-0.6127***	-1.9276***	0.5741***	-0.4310***	-0.4321
	(0.0592)	(0.0015)	(0.0000)	(0.0002)	(0.0000)	(0.0041)	(0.0008)	(0.1711)
FDI_POS(-1)	-0.2275***	-0.2512**	-0.0701***	0.0891*	0.8365	0.0700	0.2217***	0.1520**
	(0.0094)	(0.0383)	(0.0005)	(0.0705)	(0.0002)	(0.1574)	(0.0006)	(0.0200)
FDI_NEG(-1)	-0.1773**	0.4000***	0.2850***	0.0753	0.4630***	0.1506***	-0.0961	0.2152**
	(0.0171)	(0.0002)	(0.0001)	(0.1366)	(0.0045)	(0.0040)	(0.2819)	(0.0251)
HC(-1)	8.9990**	1.8755***	5.7832***	-0.5890	-11.5791***	-1.5402	0.2970	-5.2718***
	(0.0131)	(0.0010)	(0.0001)	(0.4049)	(0.0001)	(0.122)	(0.4378)	(0.0068)
Capital(-1)	0.0242	1.3675***	0.8304***	0.5064**	0.3335**	-0.1476	0.1337***	0.7435**
	(0.9474)	(0.0002)	(0.0000)	(0.0367)	(0.0402)	(0.1283)	(0.0038)	(0.0323)
ΔNGDPC(-1)	-	-	0.3977***	-	1.3996***	-0.9803***	-0.3544**	-0.5997**
ΔNGDPC(-2)	-	-	0.2576***	0.4925***	0.7191***	-1.0962***	-0.4218***	-0.4346
ΔNGDPC(-3)	-0.4952**	0.6189***	-	-	0.6853***	-0.3849**	0.1380	-0.4814**
ΔNGDPC(-4)	-	0.2959*	-0.0994***	0.2690*	-	-	-	-0.3941
ΔNGDPC(-5)	-	0.6429***	-	-	-	-	-	-
ΔNGDPC(-6)	-	-	-	-	-	-	-	-
ΔFDI_POS	-0.0989*	-	-0.0373**	-	0.1876**	-	0.0553**	-
ΔFDI_POS(-1)	0.1631***	0.3789***	-	-	-0.4654***	-0.0948***	-	-
ΔFDI_POS(-2)	0.1257***	0.1920**	0.0403***	-	-0.3695***	-	0.0647*	-
ΔFDI_POS(-3)	0.1300***	0.1650**	-	-0.1028*	-0.6782***	-0.1000***	0.1580**	-0.0660
ΔFDI_POS(-4)	0.1059***	0.1622***	-0.0332***	-	-	-0.0806**	0.0874***	-0.0927*
ΔFDI_POS(-5)	-	-	-	-	-	-	-	-
ΔFDI_POS(-6)	-	-	-	-	-	-	-	-
ΔFDI_NEG	-	0.0996**	0.1382***	-	0.2323**	0.0644*	0.2700***	-
ΔFDI_NEG(-1)	-	-0.2731***	-0.0961***	-0.1437**	-	-0.1644***	0.2932**	-0.2124**
ΔFDI_NEG(-2)	-	-0.0934	-0.1036***	-	-0.6543**	-	0.2434**	-
ΔFDI_NEG(-3)	-	-0.2385***	-	-	0.2639	-	0.1476*	0.1433**
ΔFDI_NEG(-4)	-	-0.2229***	0.0547***	-0.1230*	-	-0.0806**	0.1902**	0.0891
ΔFDI_NEG(-5)	-	-0.0762*	-	-	-	-	-	-
ΔFDI_NEG(-6)	-	-	-	-	-	-	-	-
ΔHC	-	-	-	-	-	-	-6.2618**	-
ΔHC(-1)	-	-4.6710***	-	11.7254**	-	-	2.8322	11.2604*
ΔHC(-2)	-	-	18.3613***	-	-30.9359**	-	-7.1944***	-8.6229
ΔHC(-3)	-	-3.3314***	12.9519***	-	4.0507***	-5.0473*	-7.1177***	-
ΔHC(-4)	-	-0.2229***	4.7605*	-	-	-5.4103**	-3.1377*	9.6849
ΔHC(-5)	-	2.1870	-	-	-	-	-	-
ΔHC(-6)	-	-4.9988***	-	-	-	-	-	-
ΔCapital	-	3.6025***	0.6311***	3.3288***	6.2928***	2.0595***	-1.9767***	3.0988**
ΔCapital(-1)	-	-3.3360***	-	-1.9523**	-7.6383***	-	-	2.0555
ΔCapital(-2)	-4.38E-08	-	-	-	0.7192***	1.2983*	0.3254	-1.7940
ΔCapital(-3)	-	-3.0494***	0.4722***	-	-	-	-	-
ΔCapital(-4)	-	-	0.2135**	-	-	-3.4526***	1.0438*	-
ΔCapital(-5)	-	-1.5909***	-	-	-	-	-	-
ΔCapital(-6)	-	-	-	-	-	-	-	-

Notes: NGDPC represents the Nominal GDP per capita where NGDPC refers to the nominal GDP per capita. HC represents human capital index and capital represents the capital stock. Figures in the parenthesis are *p-values*. The intercept for China was dropped due to an insufficient number of observations. *, ** and *** the denote significance at the 10%, 5% and 1% significance levels.

Table 9 Long-Run Cointegration, Asymmetric Test and LM test
(Dependant Variable – Nominal GDP Per Capita)

Countries	ARDL Bound Test Narayan (2005)	Long-run asymmetric		Breusch-Godfrey Serial Correlation LM Test:			
	F-statistics	Coefficient	P-value	Lag 2	P-value	Lag 4	P-value
Asia Developed Countries							
Japan	1.8960	3.0016*	0.0972	2.2942	0.1268	6.3182**	0.0233
Singapore	7.7585***	12.8932***	0.0030	6.7355	0.1090	5.3514	0.1440
South Korea	9.4018***	212.1187***	0.0000	1.1033	0.3921	1.6334	0.2409
New Industrialisation Countries (NICs)							
Malaysia	3.8530*	1.1479	0.2931	2.7384*	0.0833	1.4926	0.2358
Indonesia	8.4968***	9.7240***	0.0089	5.8886	0.2040	3.2460*	0.0734
Thailand	3.5018	9.0779***	0.0078	9.6826***	0.0020	7.8692***	0.0009
Asia Emerging Giant							
China	23.1603***	27.3366***	0.0034	2.0846	0.2707	7.7749	0.2624
India	4.6289*	0.6449	0.4375	2.7134	0.1228	2.9878*	0.0878
Narayan (2005) (K=4, n=36)	Lower Bound	Upper Bound					
1%	4.590	6.368					
5%	3.276	4.630					
10%	2.696	3.898 (3.772 (n=48))					

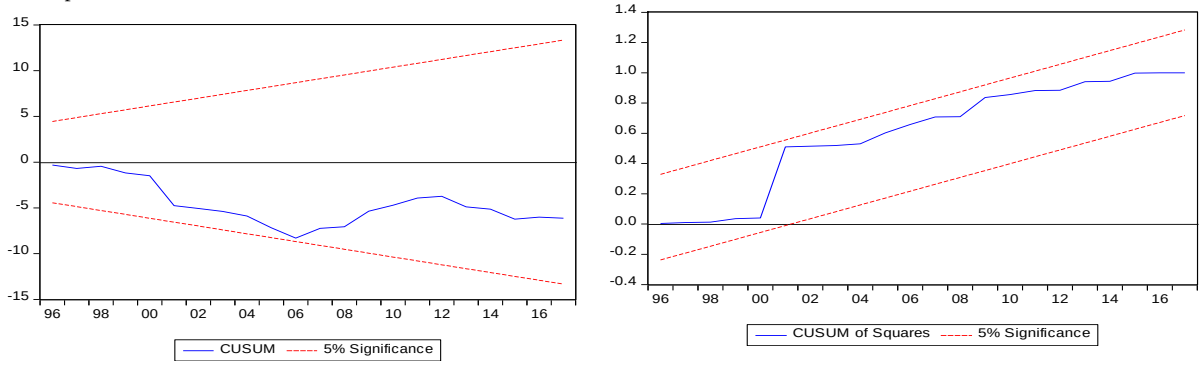
Notes: The test statistic of the cointegration tests are compared against the critical values reported in Narayan (2005). *, ** and *** denote the significance at the 10%, 5% and 1% significance levels.

Table 10 Long-Run Coefficients (Dependant Variable – Nominal GDP Per Capita)

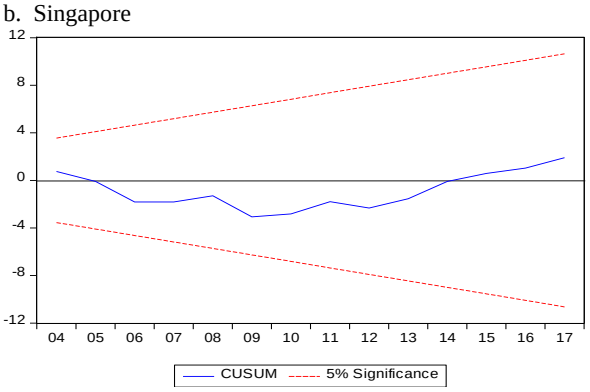
Countries	Long-Run Coefficients							
	FDI_ Pos	P-value	FDI_Neg	P-value	HC	P-value	Capital	P-value
Asia Developed Countries								
Japan	-0.8111***	0.0094	0.6321**	0.0171	32.0879**	0.0131	0.0862	0.9474
Singapore	-0.7124**	0.0383	1.1348***	0.0002	5.3202***	0.0010	3.8792***	0.0002
South Korea	-0.0736***	0.0005	0.2990**	0.0001	6.0673***	0.0001	0.8712***	0.0000
New Industrialisation Countries (NICs)								
Malaysia	0.1454*	0.0705	0.1229	0.1366	-0.9613	0.4049	0.8265**	0.0367
Indonesia	0.4340***	0.0002	0.2402***	0.0045	-6.0071***	0.0001	0.1738**	0.0402
Thailand	-0.1220	0.1574	0.2623***	0.0040	2.6828	0.1212	0.2571	0.1283
Asia Emerging Giant								
China	0.5144***	0.0008	0.0223	0.2819	-0.6892	0.4378	0.3102***	0.0038
India	0.3518**	0.0200	0.4979**	0.0251	-12.1992***	0.0068	1.7206**	0.0323

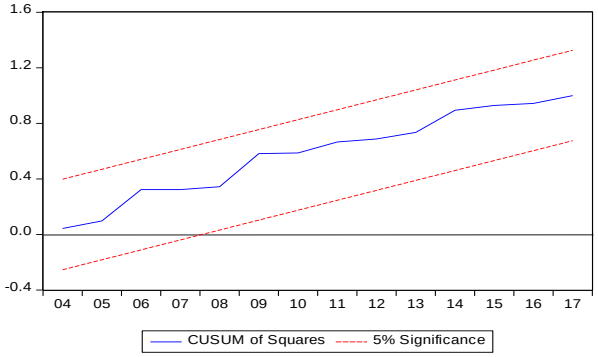
Notes: *, ** and *** denote the significance at the 10%, 5% and 1% significance levels.

a. Japan

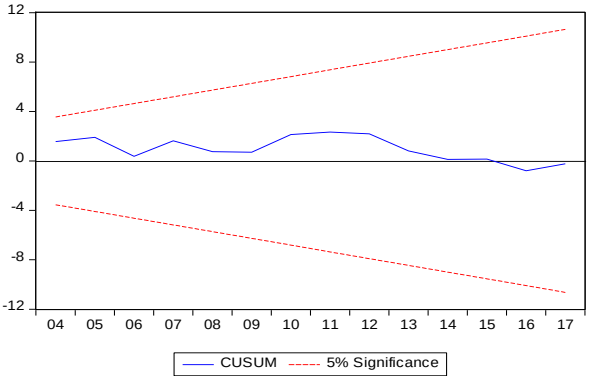


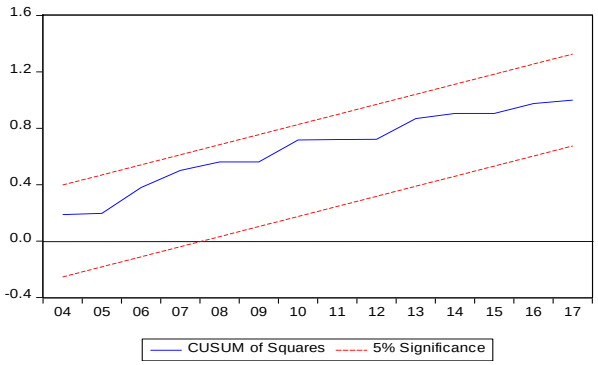
b. Singapore



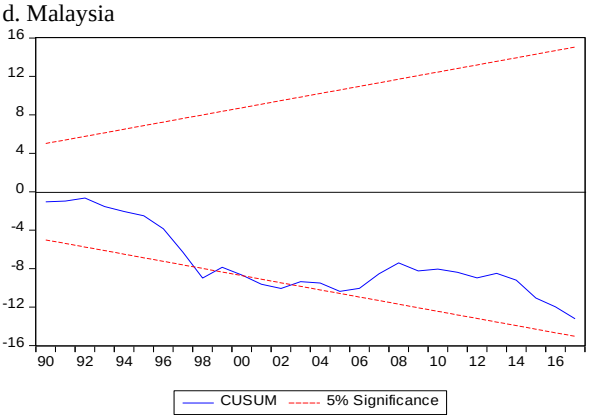


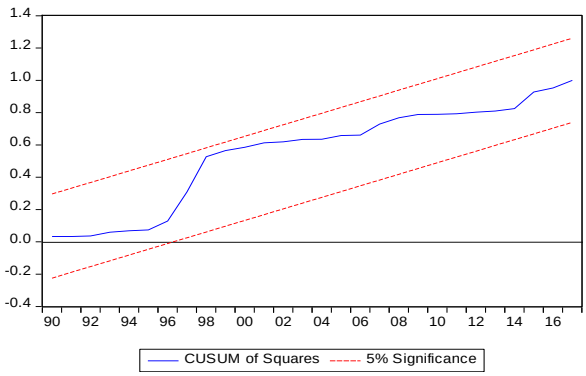
c. South Korea



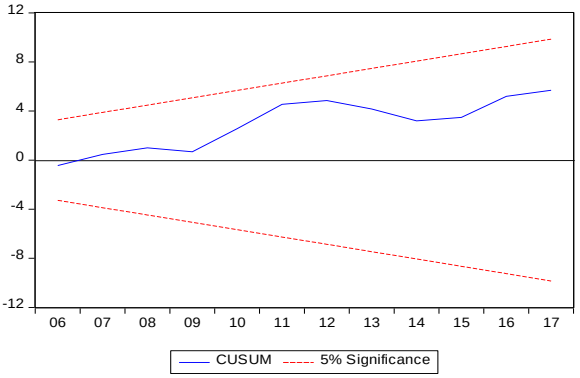


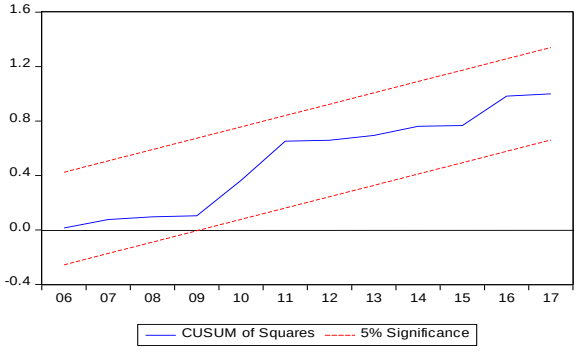
d. Malaysia



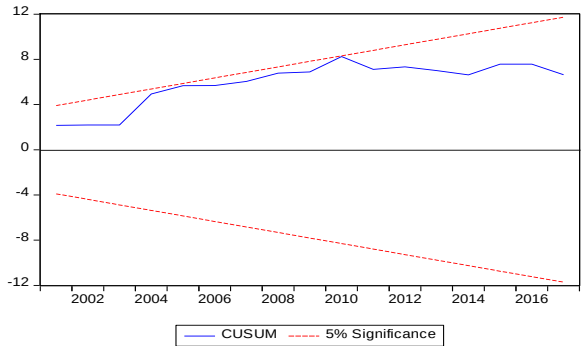


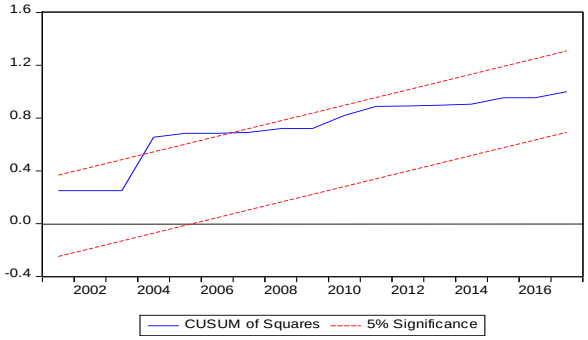
e. Indonesia



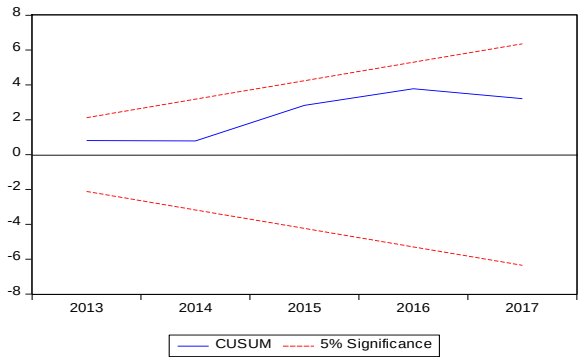


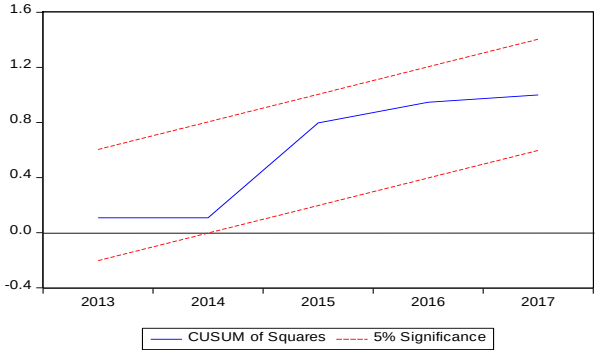
f. Thailand



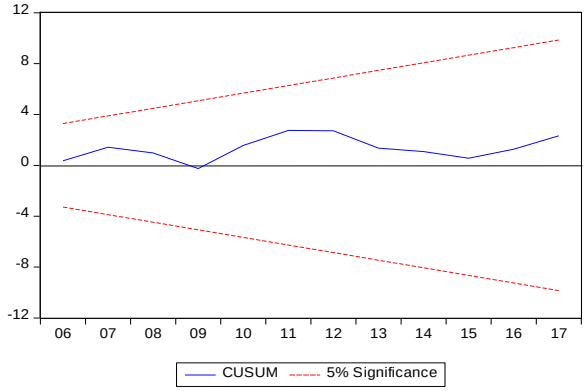


g. China





h. India



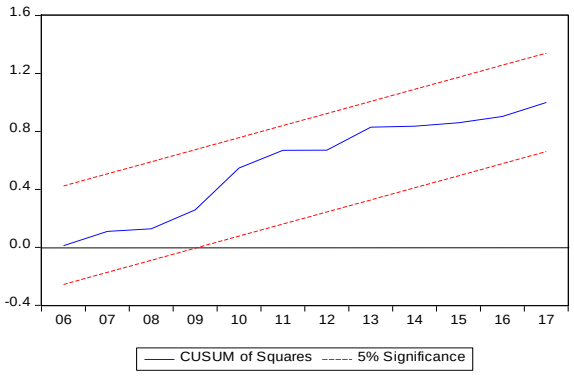


Figure 4 CUSUM and CUSUM^2 tests

CONCLUSION

This study contributes to the literature in three important aspects. First, we adopted the nonlinear autoregressive distributed lags (NARDL) model by Shin et al. (2011) to highlight the potential long-run asymmetries in the economic growth-FDI inflow nexus. Second, in view of FDI inflows fluctuating across time, this study may prompt the policymakers of the Asian region to explore alternative ways to achieve sustainable growth instead of relying heavily on FDI. Third, this study investigates the pass-through effects of the FDI inflows on host countries' economic growth in the Asian region.

Recognising that financial crises, political instability and trade wars may shape the asymmetric behaviour of FDI inflows, this paper utilises the NARDL model by Shin et al. (2014) to capture the asymmetric cointegration between FDI inflows and the economic growth of three national economic groups in the Asian region, namely; the Asian Developed countries, the newly industrialised Asian countries and the emerging Asian giants. The results indicate that there is significant evidence of the asymmetric effects of FDI

inflows on the economic growth of Asian developing countries. More specifically, an increase in FDI inflows tends to lead to an increase in economic growth, while a reduction in FDI inflows is detrimental to economic growth. Thus, suggesting that the economic growth of Asian developing countries is vulnerable to FDI inflows. On the flip side, while an increase in FDI inflows is associated with the economic growth of both the Asian developed countries and the emerging Asian giants, a reduction in FDI inflows did not hinder their respective economic growth.

The positive spillover effects of FDI inflows on the economic growth of host countries may be attributed to better local governance and the rise of global value chains (GVCs), that facilitate a better transfer of technology while stimulating job creation and output performance (Endriga, 2017). Also, over the years', various approaches have been adopted by Asian countries to facilitate the spillover effects of FDI inflows. For instance, the Workfare Training Support Scheme (WTS) in Singapore, Thailand's 20-Year National Strategy (2017-2036) and the Central China Foreign Investment Promotion Plan (2009-2014) are all aimed to facilitate the spillover effects of FDI inflows to increase their respective national productivity, raise innovation capabilities and competitiveness, leading to economic growth.

As pointed out in the discussion of the results, the significance of the human capital index and capital stock investment, with respect to economic growth, is consistent with the Endogenous and Exogenous Growth Theory developed by Romer (1986, 1990); Lucas (1988) and Robelo (1991), where human capital development reduces the diminishing return to capital accumulation, hence, increasing the growth rate and FDI inflows should augment economic growth in the host country through capital accumulation and technology transfer. As a result, we can safely hypothesise that the human capital index and capital stock investment of a host country have a positive impact on the economic growth of a host country.

The first policy implication of our findings is that an increase in competitiveness, through human capital development, is the remedy to boost economic growth. From the existing literature, human capital development can occur through both formal and informal training (Moura and Forte, 2010). Thus, policymakers should pay attention to developing policies that are associated with human capital development and skills accumulation to continue to attract FDI inflows into the region. As an example, the existing education system of host countries may undergo a major reformation to improve the quality of their talent pool. Besides, higher learning institutions should collaborate with industry through joint research projects to avoid any mismatch of the skills required by industry.

As for developing countries, policy attention should be directed to facilitate FDI inflows and to attract FDI to remain in the country. One way to attract FDI inflows is to set up an investment promotion agency which can act as a one-stop centre for foreign investors to gather information, access skilled workers and provide after-investment services to investors. The main task of such an investment promotion agency is to create an attractive, friendly and easy investment destination for potential investors. Besides, policymakers should ensure the provision of sufficient infrastructure and credit facilities, as required by foreign investors. Most importantly, policy attention should be directed to facilitate the spillovers from FDI inflows and the positive externalities brought by FDI.

REFERENCES

Almfraji, MA & Almsafir, KM 2014, 'Foreign direct investment and economic growth literature review from 1994 to 2012', *Procedia-Social and Behavioral Sciences*, vol. 29, pp. 206-213.

Anis, O & Amel, ST 2015, 'Linking FDI inflows to economic growth in North African Countries', *Journal of the Knowledge Economy*, vol. 6, no. 1, pp. 90-104.

Batten, JA & Vo, XV 2009, 'An analysis of the relationship between foreign direct investment and economic growth', *Applied Economics*, vol. 41, no. 13, pp. 621–41.

Carbonell, JB & Werner, RA 2018, 'Does foreign direct investment generate economic growth? A new empirical approach applied to Spain', *Economic Geography*, vol. 94, no. 4, pp. 425-456.

Chenaf-Nicet, D & Rougier, E 2016, 'The effect of macroeconomic instability on FDI flows: A gravity estimation of the impact of regional integration in the case of Euro-Mediterranean agreements', *International Economics*, vol. 145, no. C, pp. 66-91.

Cushman, DO 1985, 'Real exchange rate risk, expectations and the level of direct investment', *Review of Economics and Statistics*, vol. 67, no. 2, pp. 297-308.

Dunning, JH 1973, 'The determinants of international production', *Oxford Economic Papers*, vol. 25, no. 3, pp. 289-336.

Dunning, JH 1980, 'Toward an eclectic theory of international production: Some empirical tests', *Journal of International Business Studies*, vol. 11, no. 1, pp. 9-31.

Dunning, JH 1988, 'The Eclectic Paradigm of International Production: A restatement and some possible extensions', *Journal of International Business Studies*, vol. 19, pp. 1-31.

Endriga, B 2017, *What we learned about foreign direct investment in Asia (Part I)*, Asia Economic Integration Report.

Fadhil, AM & Almsafir, KM 2014, 'The role of FDI inflows in economic growth in Malaysia', *Business, Economics, Management and Tourism*, pp. 30 – 31.

Fadhil, AM & Almsafir, KM 2015, 'The role of FDI inflows in economic growth in Malaysia (Time Series: 1975-2010)', *Procedia Economics and Finance*, vol. 23, pp. 1558-1566.

Fontagne, L 1999, 'Foreign Direct Investment and International Trade: Complements or Substitutes?', OECD Science, Technology and Industry Working Papers.

Herzer, D 2012, 'How does foreign direct investment really affect developing countries' growth?', *Review of International Economics*, vol. 20, no. 2, pp. 396–414.

Islami, X, Skenderi, N & Mulolli 2016, 'Relationship in between FDI inflow and economic growth in Kosovo', *European Journal of Economics and Business Studies*, vol. 4, no. 1, pp. 49-56.

Itagaki, T 1981, 'The theory of multinational firms under exchange rate uncertainty', *Canadian Journal of Economics*, vol. 14, pp. 276–297.

Jayanthakumaran, K 2016, Industrialization and Challenges in Asia. Germany: Palgrave Macmillan.

John, EI 2016, 'Effect of foreign direct investment on economic growth in Nigeria', *European Business and Management*, vol. 2, no. 2, pp. 40-46.

Joshua, OO 2016, 'The impact of physical and human capital development on economic growth in developing and developed countries: A comparative panel data approach', *Economy, Asian Online Journal Publishing Group*, vol. 3, no. 1, pp. 1-18.

Kanayo, O 2013, 'The impact of human capital formation on economic growth in Nigeria', *Journal of Economics*, vol. 4, pp. 121-132.

Lamsiraroj, S & Doucouliagos, H 2015, 'Does Growth Attract FDI?' *Economics: The Open-Access, Open-Assessment E-Journal*, vol. 9, pp. 1–35.

Laura, A 2003, Foreign direct investment and growth: does the sector matter?, Harvard Business School.

Li, X & Liu, X 2005, 'Foreign direct investment and economy growth: An increasing endogenous relationship', *World Development*, vol. 33, no. 3, pp. 393-407.

Lucas, RJ 1988, 'On the mechanics of economic development', *Journal of Monetary Economics*, vol. 22, no. 1, pp. 3-42.

Mahtaney, P 2007, 'India, China and globalization: The emerging superpowers and the future of economic development', doi: 10.1057/9780230591547.

Mencinger, J 2003, 'Does foreign direct investment always enhance economic growth?', *Kyklos, International Review of Social Sciences*, vol. 56, no. 4, pp. 491–508.

Moura, R & Forte, R 2010, 'The effects of foreign direct investment on the host country economic growth - theory and empirical evidence', *FEP Working Papers 390*, Universidade do Porto, Faculdade de Economia do Porto.

Mundell, RA 1957, 'International Trade and Factor Mobility', *American Economic Review*, vol. 47, pp. 321-335.

Najabat, A & Hussain, H 2017, 'Impact of foreign direct investment on the economic growth of Pakistan', *American Journal of Economics*, vol. 7, no. 4, pp. 163-170.

Narayan, PK 2005, 'The saving and investment nexus for China: Evidence from cointegration test', *Applied Economics*, vol. 27, pp. 1779-1790.

OECD 2018, FDI in figures.

Pandya, V & Sisombat, S 2017, 'Impacts of foreign direct investment on economic growth: Empirical evidence from Australian economy', *International Journal of Economics and Finance*, vol. 9, no. 5, pp. 121-131.

Pesaran, MH, Shin Y & Smith, RJ 2001, 'Bounds testing approaches to the analysis of level relationships', *Journal of Applied Econometrics*, vol. 16, pp. 289–326

Rasiah, R, Asirvatham, J & Adamu, IM 2017, 'Foreign direct investment, GDP growth and trade liberalization: Evidence from pioneering ASEAN members', *Journal of Economic Cooperation and Development*, vol. 38, no. 1, pp. 97-126.

Robelo, S 1991, 'Long-run policy analysis and long-run growth', *Journal of Political Economy*, vol. 99, no. 3, pp. 500-521.

Romer, P 1986, 'Increasing returns and long-run growth', *Journal of Political Economy*, vol. 94, no. 5, pp. 1002-1037.

Romer, P 1990, 'Endogenous technological change', *Journal of Political Economy*, vol. 98, no. 5, pp. 71-102

Shin, Y, Yu, B & Greenwood-Nimmo, M 2014, 'Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework', In: Sickles R., Horrace W. (eds) Festschrift in Honor of Peter Schmidt. Springer, New York, NY.

Simionescu, MD 2016, 'The relationship between foreign direct investment and economic growth in Bulgaria, Romania and Croatia during the recent economic crisis', *Internal Auditing and Risk Management*, vol. 42, no. 1, pp. 149-158.

Solow, RM & Swan, TW 1956, 'Economic Growth and Capital Accumulation', *Economic Record*, vol. 32, pp. 334-361.

Sultanuzzaman, MR, Fan, HZ, Akash, M, Wang, BB & Shakij, USM 2018, 'The role of FDI inflows and export on economic growth in Sri Lanka: An ARDL approach', *Cogent Economics & Finance*, vol. 6, no. 1, doi: 10.1080/23322039.2018.1518116

Tang, D 2015, 'Has the foreign direct investment boosted economic growth in the European Union countries?' *Journal of International and Global Economic Studies*, vol. 8, no. 1, pp. 21-50.

Turkcan, B & Yetkiner, IH 2008 'Endogenous determination of FDI growth and economic growth: The OECD Case', *Working Papers 0807*, Izmir University of Economics.

UNCTAD 2013, *World Investment Report*.

UNCTAD 2018, *World Investment Report*.

UNCTAD 2019, *World Investment Report*.

Vernon R 1966, 'International investment and international trade in the product cycle', *Quarterly Journal of Economics*, vol. 80, pp. 190-207.

Wijeweera, A, Villano, R & Dollery, B 2010, 'Economic growth and FDI inflows: A stochastic frontier analysis', *The Journal of Developing Areas*, vol. 43, pp. 143-158.