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Foreign Direct Investment, GDP Growth and Trade Liberalization: Evidence from Pioneering ASEAN Members

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This paper revisits the argument on the contentious causality relationship between net FDI inflows and GDP among the pioneering Association of Southeast Asian Nations (ASEAN-5) members using data from 1970 till 2013. Although two-way correlations exist between these two variables in these countries, a careful analysis of these relationships using the fully modified ordinary least squares (FMOLS) regressions and the Vector Error Correction (VEC) model shows that causality exists only with on Thailand but the relationship is negative. The evidence from Thailand shows that GDP growth drives FDI outflows more than attracting FDI inflows. The results of all other members were not significant.

Keywords: Foreign direct investment, GDP, trade, tariff deregulation, ASEAN

JEL Classification: F14, F15, F21, F63

1. Introduction

Governments have aggressively promoted inflows of foreign direct investment (FDI) to stimulate economic growth (UNCTAD, 2014). The extant literature, (which supports a positive role by governments to attract FDI), posits that it will be an important source of scarce capital, technology transfer, demonstration effect and competition (Caves, 1974; Rasiah, 1995). However, some governments have targeted national firms to stimulate economic growth on the grounds that FDI could crowd out national firms by flooding the domestic market with their sales,

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poaching human capital, and other resources, and at the same time cause balance of payment problems through imports of goods and services and repatriation of profits (Amsden, 1991). Despite such arguments, most countries (including the formerly closed communist nations of China (until 1978), Vietnam (until 1986), Cambodia (until 1992) and Laos (until 1992) have already begun promoting FDI (Rasiah and Schmidt, 2009).

While the positive arguments on FDI have convincingly outweighed those of the critics (Rasiah, 1995; Dunning, 2005), the empirical support has remained contested. On the one hand, South Korea and Taiwan, two of the dynamic economies that became developed in one generation drove rapid growth largely through national firms (though, these firms benefited strongly from technology licensing and subcontract linkages with multinationals (Amsden, 1989; Chang, 1995; Wade, 1990). On the other hand, the industrialization thrusts of Singapore and Malaysia have largely been propelled by FDI (Rasiah, 1995; Rodan, 1990; Rasiah and Schmidt, 2009). Because a number of instruments deployed by South Korea and Taiwan are no longer regarded as possible following the introduction of the trade-related intellectual property rights (TRIPS) and trade-related investment measures (TRIMs) agreement of the World Trade Organization that was formed in 1995, governments have targeted FDI as a major source of both scarce capital and embodied technology (UNCTAD, 2014). The pioneering members of the Association of Southeast Asian Nations (ASEAN), i.e. Indonesia, Malaysia, the Philippines, Singapore and Thailand are no different.

An assessment of the determinants of FDI inflows among the ASEAN economies is also useful because all five countries have undergone liberalization. The major watershed in this process is the establishment of the ASEAN Free Trade Area (AFTA) in 1992 (ASEAN, 2015). While the pioneering ASEAN members and Brunei were behind its original formation, the transition economies of Cambodia, Laos, Myanmar and Vietnam became members subsequently. We confine the analysis in this paper to the pioneering members only because of their longer experience with liberalization and FDI inflows than the transition economies.

Therefore, this paper seeks to analyze the determinants of net FDI inflows in the five pioneering ASEAN members using time series and panel data. The subsequent parts of the paper is organized as follows.

Section 2 reviews past work on FDI inflows into the ASEAN economies. Section 3 presents the methodology and data used in the paper. Section 4 analyzes the results while Section 5 presents the conclusions.

2. Significance of FDI Inflows

All the ASEAN-5 countries have reduced tariff rates to a maximum of 5% by 2008. Thus, it is important to examine if the fall in the common effective preferential tariffs (CEPT) and most favoured nation (MFN) tariff rates have had a bearing on GDP growth, FDI and trade. A common development from the AFTA process is the bigger market that has resulted from the AFTA process. While the common market and efforts to coordinate investment and trade flows has emerged among these countries, such collaboration often broke down during moments of crisis. The Asian financial crisis of 1997-98 is one example where economic collaboration declined (Rasiah, 2001). Also, member countries still attempt to compete to attract FDI from abroad. The competition has become stiffer since the emergence of China and India as growth nodes in the regional economy. Furthermore, the high growth rate of inter-ASEAN FDI inflows of the late 1980s and 1990s tapered off following the ASEAN-China and ASEAN-India trade collaboration initiatives. Table 1 indicates a slight drop in the share of FDI in Gross Fixed Capital Formation (GFCF) in 2005 due to competition from other countries. The average growth rates of FDI in ASEAN-5 suffered a negative growth from 2001 to 2004 before showing positive growth again in the year 2005.The Asian Financial Crisis and fierce competition from China and India during the period after AFTA implementation had caused a decrease in FDI inflows.

Table 1: FDI/GFCF, ASEAN-5, 1970-2013 (%)

Year	1970	1975	1980	1985	1990	1995	2000	2005	2010	2013
ASEAN-5	2.41	6.19	5.88	4.37	12.04	12.19	21.46	19.23	16.64	20.79

Source: Author's compilation from UNCTAD and IFS, various years.

Table 2 shows that the ASEAN-5 managed to enjoy positive growth in FDI inflows, GFCF and GDP from 1970 to 1997 due to cheap labor and low production costs. After 1997, FDI inflows and GDP have experienced slower growth rates. While the Asian financial crisis started the slow down the persistence of slow growth can also be attributed to the exhaustion of labour reserves in Malaysia and Thailand, and the emergence of Cambodia, Myanmar, Laos and Vietnaam (CMLV).

Table 2: FDI, GFCF and GDP, Mean Growth Rates, ASEAN-5, 1970- 2013(%)

Five year periods	**FDI**	**GFCF**	**GDP**
1971-1975	25.97	10.13	19.36
1976-1980	17.42	8.62	14.04
1981-1985	-8.39	5.95	0.98
1986-1990	33.95	7.30	11.33
1991-1995	14.15	6.46	10.61
1996-2000	-0.88	6.19	-5.63
2001-2005	10.97	11.53	9.04
2006-2010	30.29	33.23	25.72
2011-2013	18.57	22.01	14.90
Ten Year			
1971-1980	20.37	12.46	18.81
1981-1990	13.20	14.31	4.87
1991-2000	7.11	13.50	3.32
2001-2013	23.67	16.81	5.73

Source: Authors' compilation from UNCTAD, World Bank and IFS, various years.

While FDI inflows into the ASEAN-5 have fallen following the Asian financial economic crisis and structural change, it is important to analyze the endogenous effect of FDI on economic growth. Does increased liberalization bring about endogenous growth effects among the ASEAN-5?

Net FDI to the ASEAN-5 increased rapidly before AFTA implementation over the period 1961 to 1990. These economies benefited from the effective of China, the CLMV economies and India to FDI until the 1990s. Data in the period 1961-1990 show that among the ASEAN countries, the largest private FDI inflows went to Singapore, (42.7%) followed by Malaysia (27.6%), Thailand (13.7%), Indonesia (10.5%) and the Philippines (5.5

%) (Table 3). Except for Indonesia, which faced a political fallout in 1998-2001, net FDI inflows remained positive in the remaining ASEAN-5 over the period 1990-2013. These figures rose even more sharply since the 1990s with Singapore, Thailand and Malaysia recording the highest net inflows with the sharpest growth in 2013. The volume of FDI inflows in ASEAN in the 1980s was 4.3 times that of the 1970s. Among the individual countries, the growth has been the fastest in Thailand (7.9 times), followed by Singapore, Philippines, Malaysia, and Indonesia (2.0 times).

Table 3: Net FDI Inflows, ASEAN-5, 1961-2013 ($Millions)

Year	Indonesia	Malaysia	Phililippines	Singapore	Thailand	ASEAN-5
1961-80	2,163	4,453	452	3,728	1,186	11,982
1981	133	1,265	172	1,675	288	3,533
1982	225	1,397	16	1,298	189	3,125
1983	292	1,261	105	1,085	348	3,091
1984	222	797	9	1,210	400	2,638
1985	310	695	12	809	162	1,988
1986	258	489	127	1,533	261	2,668
1987	385	423	307	2,696	182	3,993
1988	576	719	936	2,710	1,082	6,023
1989	682	1,846	563	3,963	1,727	8,781
1990	961	2,958	530	4,489	2,236	11,177
1991	1,482	3,998	544	4,887	2,013	12,924
1992	1,777	5,183	228	2,204	2,113	11,505
1993	2,004	5,005	1,238	4,686	1,804	14,737
1994	2,109	4,341	1,591	8,550	1,366	17,957
1995	4,346	4,178	1,478	11,535	2,067	23,601
1996	6,194	5,078	1,517	9,682	2,335	24,806
1997	4,677	5,136	1,222	13,752	3,894	28,681
1998	-240	2,163	2,287	7,313	7,314	18,837
1999	-1,865	3,895	1,247	16,577	6,102	25,956
2000	-4,550	3,787	2,240	16,484	3,365	21,326
2001	-2,977	553	195	15,086	5,067	17,924
2002	145	3,203	1,542	6,401	3,341	14,632
2003	-596	2,473	491	11,941	5,232	19,541
2004	1,896	4,624	688	21,026	5,860	34,094
2005	8,336	3,924	1,664	18,090	8,055	40,069
2006	4,914	7,690	2,707	36,923	9,454	61,688
2007	6,928	9,071	2,918	47,733	11,326	77,976
2008	9,318	7,572	1,340	12,200	8,538	38,968
2009	4,877	114	2,064	23,821	4,853	35,729
2010	15,529	10,885	1,070	55,075	9,103	91,662
2011	20,564	15,119	2,007	48,001	2,468	88,159
2012	21,200	9,733	3,215	56,659	12,894	103,701
2013	23,281	11,582	3,737	64,793	14,305	117,698

Source: International Monetary Fund, International Financial Statistics Yearbook 1991 (Washington, D.C., 1991), World Bank (2013).

Although net FDI inflows to Indonesia recorded an absolute contraction in 1998-2001, it is obvious that FDI inflows to the ASEAN-5 over the period 1961-2013 has been impressive. Besides, all five countries show strong conviction to attract FDI (ASEAN, 2015). Hence, using these countries as a laboratory, we examine we examine causality relationships between FDI and GDP growth.

3. Causality Relationship between GDP and FDI

In this section we review past research examining causality issues between GDP and FDI in general, with a focus on the pioneering ASEAN-5 members. In so doing, we also review the robustness of the data used, models deployed and length of the empirical series.

The intensity of FDI in an economy is normally measured by the ratio of FDI inflows over the Gross Fixed Capital Formation (GFCF). FDI inflows are considered to be a major stimulant of economic growth, and hence, it will be useful to examine if the AFTA process has stimulated greater FDI inflows into the ASEAN-5. Borensztein et al. (1998) examined the relationship between FDI and economic growth in 69 developing countries over the period spanning from1970 to 1989. They found that FDI has a positive impact on economic growth, but that the nexus is partly dependent on the availability of human capital in the host country. Li and Liu (2005) found similar results from a sample of 84 countries over the period 1970-1999. Obwona (2001),as well as Bengoa and Sanchez-Robles (2003) suggested that, for FDI to have a positive impact on economic growth, the host country must have macroeconomic and political stability, policy credibility, and an increase in the openness of their economy. Coe (1997) found a positive association between FDI and economic growth, but suggested that the host country should have attained a sufficient level of development to help it to reap the benefits of higher productivity.

Alfaro (2003) found that FDI inflows into three different sectors of the economy (primary, manufacturing and services) exert different effects on economic growth. He found that FDI inflows into the manufacturing sector give a positive effect on economic growth. A one percent increase in FDI in the manufacturing sector leads to a 1.7% increase in manufacturing GDP growth.

From purely the standpoint of capital scarcity, the importance of FDI should be higher in the developing countries rather than the developed countries because of their inability to generate internal savings to finance development (Brecher and Bhagwati, 1981). There is evidence to suggest that FDI is one of the most effective ways by which developing economies can integrate with the rest of the world as it provides not only capital, but also technology and management know-how necessary for restructuring the firms in the host countries (Rasiah, 1995; Pradhan, 2006). Also, FDI usually helps to achieve developmental goals by solving the savings-investment gap (Vadlamannati et al., 2009). Indeed, empirical data from Rasiah (2010) shows that Southeast Asia's economic growth has been strongly driven by FDI. Wang (2009) found it his assessment of the nexus between FDI and economic growth in a sample of 12 Asian countries over the period 1987-1997 that FDI in the manufacturing sector had a significant positive impact on economic growth. Meanwhile, Choe (2003) found bi-directional causality between FDI and growth for a sample of 80 countries over the period 1971-1995, but suggested that the effect is more apparent from economic growth to FDI. Chowdhury and Marvrotas (2005) examined the causal association between FDI and growth from Chile, Malaysia and Thailand. They find unidirectional causality from economic growth to FDI in Chile and a two-way causation between the two in Malaysia and Thailand.

However, Zhang (2007) tested the FDI economic nexus using countries in East Asia and Latin America but found that FDI caused GDP growth in some countries while it was the other way around in some countries. Furthermore, Carkovic and Levine (2002) analyzed the relationship between FDI and economic growth in a sample of 72 countries and found that FDI does not exert any independent influence on economic growth in either developed or developing countries. Also, Duasa (2007) found no causal relationship between FDI and economic growth in Malaysia, but suggested that FDI does contribute to stability of growth. These findings show that the nexus between FDI and economic growth is far from straightforward (Vu and Noy, 2009). It differs from country to country and even within countries over different time periods.

The two-way link between FDI and economic growth stems from the fact that higher FDI inflows stimulate economic growth in the host country. Consequentially, higher economic growth in the host countries attracts more FDI. The empirical evidence on the relationship between

FDI and economic growth, however, provides very contradictory results. Karimi and Yusop (2009) found co-integration between FDI and economic growth in Singapore and Thailand, both at the individual level, and in a panel of five ASEAN countries. The results confirm that FDI and economic growth share a long run relationship in the ASEAN countries, which indicates that there is possibility of a causal relationship occurring between FDI and economic growth. Moreover, the existence of no co-integration between the two variables in Indonesia, Malaysia and the Philippines does not mean the absence of a causal relationship or any relationship in the short run. Among countries whose economic growth and FDI inflows do not move together in the long run (i.e. co-integration), they may affect each other in the short run. Therefore, we can develop the null hypothesis that economic growth is a function to FDI inflows. Additionally, an assumption can be made that economic growth has a positive relationship with FDI.

Most published works examine the relationship, either between the GDP and exports, GDP and FDI, or exports and FDI. Despite their interrelationships (Bhagwati and Srinivasan 1975; Krueger, 1980) relatively few published empirical work deal with causal relations between the three variables simultaneously among a group of countries, while even fewer works have used panel data VAR causality analysis techniques.

Several papers on individual country studies have examined the Granger causality direction of GDP, FDI and trade. For example, Liu, Burridge and Sinclair (2002) found bidirectional causality between each pair of real GDP, real exports and real FDI for China using seasonally adjusted quarterly data from 1981 to 1997. Kohpaiboon (2003) found that, in export promotion (EP) regime, there is unidirectional causality from FDI to GDP for Thailand using annual data from 1970 to 1999. Alici and Ucal (2003) found only unidirectional causality from exports to output for Turkey using seasonally unadjusted quarterly data from 1987.1 to 2002.4. The empirical literature is summarized by Lewer and Van den Berg (2003),in which the results are remarkably consistent, not only in terms of a positive association between the openness of economies and higher economic growth but also about the magnitude of the effect.

Dritsaki (2004) found bidirectional causality between real GDP and real exports, unidirectional causality running from FDI to real exports, and

FDI to real GDP for Greece, using annual International Monetary Fund (IMF) data from 1960 to 2002. In addition, Ahmad, et al., (2004) found unidirectional causality from exports to GDP and FDI to GDP for Pakistan using annual data from 1972 to 2001. Cuadros, Orts, and Alguacil (2004) found unidirectional causality running from real FDI and real exports to real GDP in Mexico and Argentina, and unidirectional causality running from real GDP to real exports for Brazil using seasonally adjusted quarterly data for the three countries between the late 1970s to 2000. Chowdhury and Mavrotas (2006) found unidirectional causality running from GDP to FDI for Chile and bidirectional causality running between GDP and FDI for Malaysia and Thailand using data from 1969 to 2000.

Makki and Somwaru (2004) found a positive impact of exports and FDI on GDP using data from 66 developing countries averaged over a ten year period of 1971-1980, 1981-1990 and 1991-2000 by introducing an instrumental variable. Wang, Liu, and Wei (2004) used panel data analysis on 79 countries from 1970-1998 and found that FDI was relatively more beneficial to high-income countries, while international trade was more important to low-income countries. However, they did not address the stationarity of the variables to avoid spurious conclusions and did not apply the panel data causality analysis. Also, as Basu, Chakraborty, and Reagle (2003) had pointed out, the above two works only looked at one-way determinants of FDI through regression analyses, rather than at two-way causal linkages between GDP, exports, and FDI, and hence, are not strictly robust.

Nair-Reichert and Weinhold (2000) found that the Holtz-Eakin causality tests show FDI, and not exports, causes GDP using data from 24 developing countries between 1971 and 1995 and applying mixed fixed and random (MFR) effects models. Hansen and Rand (2006), using data for 31 countries from 1970-2000 and the neoclassical growth model, found a strong bidirectional causality relationship between FDI ratio (FDI/GDP) and GDP. However, they did not take into account exports. Moreover, this paper covered too many countries with different stages of development, and thus, the results may have been affected by the problem of missing variables and endogeneity. Hsiao and Hsiao (2006) examined the Granger causality relationship between GDP, exports, and FDI among eight rapidly developing East and Southeast Asian economies (four newly industrialized economies, three ASEAN

economies, and China) using panel data from 1986 to 2004. They did not find systematic causal relationships among the three variables of GDP, exports and FDI at the individual country level.

Meanwhile, the panel data causality test results of Hsiao and Hsiao (2006) revealed that FDI has unidirectional effects on GDP directly and indirectly through exports, and there also existed bidirectional causality between exports and GDP among the ASEAN countries. In doing so, he found panel data analysis to be superior to time series analysis. Using this method Cho (2005) and Hsiao (2006), applied the panel data causality analysis on nine countries and found only a strong unidirectional causality running from FDI to exports among the three variables. In Cho's model, however, GDP growth is examined using the Malmquist productivity index. However, statistical data released by the IMF in 2009 indicated that the entire group of the pioneer ASEAN members enjoyed significant GDP growth rates (see Table 2.1).

It light of a lack of consensus from past evidence, it will be interesting to analyze again the relationship between economic growth, AFTA-based tariff deregulation and FDI inflows in the ASEAN-5 where there is a long enough data series to deploy the Vector Error Correction Model (VECM) model proposed by Engle and Granger (1987).

4. Methodology and Data

To investigate the causal relationship between FDI and its determinants in the ASEAN-5, we consider the following multivariate model:

$$fdi_t = (gdp_t, exp_t, imp_t, tn\text{-}t_t) \quad (1)$$

Where *fdi, gdp, exp,imp and tn-t* refers to net foreign direct investment, growth, exports, import (variables are in real terms), and *tn-t* is the tariff rate. However, for the empirical examination, all variables are transformed into a log-linear form. As argued by Engle and Granger (1987) and Granger (1988), the vector error correction (VEC) model is the best econometric model available to analyse causality issues between a dependent variable, and one or more independent variables. However, it is most appropriate when there is panel data. Hence, we deploy this model to evaluate the impact of tariff deregulation and net FDI inflows on GDP.

The study deployed annual time series data for the ASEAN-5, namely, Malaysia, Indonesia, Thailand, Philippines, and Singapore over the period 1970 to 2013 (44-year observations). Data was collected from the United Nations Conference on Trade and Development (UNCTAD), World Development Indicators, World Bank and ASEAN secretariat data base. Data on *fdi, gdp, exp, imp* are measured in constant 2005 US dollars using GDP deflators, while the data for *tn-t* from 1970- 1992 i.e. the period prior to the introduction of AFTA takes the value of zero as this is the period before AFTA was formed, while data from 1993 to 2013 on mean tariff rates are compiled from the ASEAN secretariat data base.

5. Results and Discussion

Prior to testing Granger causality, time series properties of the variables have to be examined to ascertain the order of integration. We conducted the stationarity test base on country-by- country case and followed by panel data test. This can let all the parameters to vary across countries, at the same time maintaining the assumption of common structure (Hansen and Rand, 2006). There are several methods for unit root tests. For this study, we deployed the Augmented Dickey Fuller (ADF) unit root test (Dickey and Fuller, 1981) for the individual countries, and for the panel data (Levin, Lin and Chu, 2002; Maddala and Wu, 1999; Choi, 2001; Breitung, 2000; Hadri, 2000; Im, Pesaran and Shin, 2003) The results of the ADF tests for the individual countries are presented in Table 4. As can be observed all the five variables are non-stationary in the level, i.e. $I(0)$. The data series become stationary after the first difference, i.e. $I(1)$. Moreover, Table 5 presents the panel unit root test of the six different types of statistics confirming the rejection of the null hypothesis of non stationarity in the series at the 1% and 5% significance level.

Having examined the orders of integration and found that all the series follows $I(1)$ process, the next step is to find out whether or not the variables under consideration have a long run equilibrium relationship. For this, we deployed the Johansen and Juselius (1990) test for the individual countries, and the Pedroni (1999) cointegration test for the panel data, which permit cross sectional interdependency of distinct individual effects (Lee et al., 2008). Table 6 presents the results of the individual country cointegration tests. As indicated from the Johansen cointegration test results, the null hypothesis of no long run relationship

is rejected for all the five countries at the 5% and 10% significance levels. The cointegration relationship for Malaysia and Indonesia appear weak when compared to Thailand, Philippines and Singapore. The results of the Pedroni (1999) heterogeneous panel data cointegration test provides strong evidence of a long run equilibrium relationship between the variables at the 1%, 5% and 10% significance level (Table 7). Thus, the rejection of the null hypothesis of no long run equilibrium relationship among the variables in Tables 3 and 4 implies the co-movement of the variables over time.

Table 8 presents the long run elasticities of each of the five countries and the ASEAN-5 as a whole using the Fully Modified Ordinary Least Squares (FMOLS) method proposed by Phillip and Hansen (1990) and the Pedroni (2000) for the heterogeneous cointegrated panel. The relationship between *gdp* and *fdi* of Malaysia, the Philippines and Singapore is positive and statistically significant. Whereas the same relationship was negative and significant for Thailand, while not significant for Indonesia. The panel regressions for the ASEAN-5 as a whole was significant, but negative at the 10% level.

The relationship between *exp* and *fdi* is positive for the Philippines and Singapore. However, this relationship was not significant for Malaysia, Indonesia and Thailand, and the ASEAN-5 as a whole. The relationship between *imp* and *fdi* was positive and statistically significant for Malaysia, Indonesia and Thailand, and ASEAN-5 as a whole but was not significant for the Philippines and Singapore.

The coefficient of *tn-t* is positive and statistically significant in Malaysia, the Indonesia, Philippines, and Thailand, and ASEAN-5 as a whole. It was not significant for Singapore. This implies that increased *tn-t* would lead to an increase in *fdi*, which suggests the importance of domestic markets. This is possible in a number of large industries among the ASEAN-5 as domestic markets was the initial attraction for the relocation of automobile assemblers in Indonesia, Malaysia, the Philippines and Thailand. Consequently, these results pave the way for the estimation of causal relationship among the variables, which is undertaken in the next section.

Accordingly, confirmation of cointegrating relations does not mean causality among the variables. Thus, we conducted Granger-causality

test based on a VECM framework with one lag period as proposed by Engle and Granger (1987) to investigate the causal relationship between foreign direct investment (*fdi*), economic growth (*gdp*), exports (*exp*), imports (*imp*) and tariff (*tn-t*) among the ASEAN-5. According to Granger (1988) a significant value of *t*-statistics of the error correction term signify long run causality, while the significance of the *F*-value of the coefficients in the short run shows the direction of causality. Table 9 presents the estimated results of the Granger causality test for the individual countries.

Unidirectional causality was observed from the results running from Δ*gdp* to Δ*fdi* (*p*-value=0.0288) in the case of Thailand.In view of this, we conclude that our results support the hypothesis that Δ*gdp* Granger-cause Δ*fdi* inflow in Thailand, i.e. increase in *gdp* causes an increase in *fdi* inflow. However, no causality either short run or long run was observed with Indonesia, Malaysia, Singapore and Thailand. Hence, causality only exists between Δ*gdp* and Δ*fdi* running from the former to the latter. Taking the negative sign of the coefficient from Table 5, we can then say *gdp* growth leads to a fall in net FDI. This evidence is supported by the higher pace of growth of FDI outflows over FDI inflows since 2000 suggesting that Thailand's GDP has reached a high level to generate strong FDI outflows from the country. Indeed, FDI inflows to and outflows from Thailand reached USD10.7 billion and USD12.9 billion respectively in 2012 compared to USD8.5 and USD4.1 billion respectively in 2008 (UNCTAD, 2014: 206).

Conversely, Table 10 presents the panel causality test whereby a long run causality is observed, which indicate a rejection of one period lagged error correction term (ect_{t-1}) in the Δ*fdi* equation. The significance of the ect_{t-1} implies that the shock introduced by the system converging to the long run equilibrium is moving at a moderate speed of 38% (-0.376) in the Δ*fdi* equation. Apart from this, causality does not hold in the rest of the results.

Table 7 presents the *F*-test results of the panel data VECM Granger causality test for the ASEAN-5 for both short run and long run. Starting with the short run, we can observe that no short run causality exists between the variables in both *fdi*, *gdp*, *exp*, *imp* and *tn-t* equations, which means that all the *p*-values corresponding to the short run coefficients are insignificant. Therefore, we conclude that causality does

not exist in the ASEAN-5 panel data. Since all the countries have in place generous incentives to attract FDI, the lack of causality could be a consequence of a sluggish macroeconomic environment faced by these economies. Turning to the long-run causal relationship, the *t*-values corresponding to *fdi* and *tn-t* equation are negative and significant at the 5% and 1% levels. This supports the long run causality relationship between *fdi*, *tn-t* and the variables for the ASEAN-5 panel as a whole. The long run causality also affirmed that variables are cointegrated in the long run. However, no long run causality is detected in the *gdp, exp* and *imp* equations.

Table 4: ADF Unit Root Test, ASEAN-5

Variable	**Malaysia**		**Indonesia**		**Thailand**		**Philiphines**		**Singapore**	
***I*(*d*)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
fdi	-1.715	-6.527***	-1.737	-5.084***	-1.323	-4.219**	-2.202	-3.645**	-1.576-	-6.543***	*I*(1)
gdp	-1.687	-6.599***	-1.691	-6.540***	-1.685	-6.593***	-1.704	-6.582***	-1.650	-6.594***	*I*(1)
exp	-1.772	-6.405***	-1.673	-6.652***	-1.720	-6.411***	-1.689	-6.718***	-1.616	-6.561***	*I*(1)
imp	-1.766	-6.363***	-1.659	-6.601***	-1.645	-6.506***	-1.738	-6.348***	-1.684	-6.656***	*I*(1)
tn-t	-2.189	-6.474***	-2.189	-6.474***	-2.189	-6.474***	-2.189	-6.474***	-2.189	-6.474***	*I*(1)

Notes: *** and ** Indicates 1% and 5% significance level. All variables are in logarithmic form.
Source: Computed by authors

Table 5: Panel Unit Root Test, ASEAN-5

Variable	LLC	B	IPS	ADF-Fisher	PP-Fisher	HADRI
At level, I(0)						
fdi	-0.581(0.280)	-0.335(0.368)	-0.092(0.463)	8.352(0.594)	2.689(0.987)	6.008(0.000)***
gdp	0.369(0.644)	-0.665(0.252)	1.361(0.913)	2.994(0.981)	3.044(0.980)	5.780(0.000)***
exp	0.361(0.641)	-0.505(0.306)	1.322(0.906)	3.073(0.979)	2.914(0.983)	5.795(0.000)***
imp	0.362(0.641)	-0.574(0.282)	1.309(0.904)	3.099(0.979)	2.901(0.983)	5.795(0.000)***
tn-t	1.009(0.843)	-3.552(0.863)	-0.042(0.483)	7.271(0.699)	8.560(0.574)	5.799(0.000)***
At first difference, I(1)						
fdi	-9.642(0.000)***	-7.725(0.000)***	-7.971(0.000)***	75.079(0.000)***	122.976(0.000)***	-0.240(0.595)
gdp	-15.405(0.000)***	-13.730(0.000)***	-12.221(0.000)***	115.463(0.000)***	117.071(0.000)***	-0.593(0.723)
exp	-15.131(0.000)***	-13.551(0.000)***	-12.131(0.000)***	114.447(0.000)***	116.163(0.000)***	-0.679(0.751)
imp	-15.168(0.000)***	-13.476(0.000)***	-11.981(0.000)***	112.700(0.000)***	113.936(0.000)***	-0.672(0.749)

Notes: *** Indicate significance at the 1% level. *P*-values are in parenthesis. LLC, B, IPS denotes Levin, Lin and Chu (2002), Breitung (2000) and Im, Pesaran and Shin (2003). ADF Fisher chi-square and PP Fisher chi-square indicate Maddala and Wu (1999) respectively.
Source: Computed by authors

Table 6: Johansen Cointegration Test, ASEAN-5

Hypothesis	**Malaysia Trace statistics**	**Indonesia Trace statistics**	**Thailand Trace statistics**	**Philipines Trace statistics**	**Singapore Trace statistics**
=0	88.462*(87.31)	106.278**(87.31)	104.529**(87.31)	101.080**(87.31)	96.877**(87.31)
r≤1	50.608 (62.99)	66.032* (62.99)	55.032 (62.99)	48.173 (62.99)	50.104 (62.99)
r≤2	27.568 (42.44)	33.611 (42.44)	34.113 (42.44)	23.729 (42.44)	21.868 (42.44)
r≤3	11.017 (25.32)	13.169 (25.32)	16.581 (25.32)	10.598 (25.32)	10.486 (25.32)
r≤4	4.657 (12.25)	6.201 (12.25)	7.536 (12.25)	4.596 (12.25)	4.121 (12.25)
	Max-eigen value statistics	Max-eigen value statistics	Max-eigen value statistics	Max-eigen value statistics	Max-eigen value statistics
r=0	37.854*(37.52)	40.245*(37.52)	49.496**(37.52)	52.907**(37.52)	46.773**(37.52)
r≤1	23.040 (31.46)	32.420* (31.46)	20.918 (31.46)	24.444 (31.46)	28.235 (31.46)
r≤2	16.550 (25.54)	20.441 (25.54)	17.532 (25.54)	13.130 (25.54)	11.382 (25.54)
r≤3	6.360 (18.96)	6.968 (18.96)	9.044 (18.96)	6.002 (18.96)	6.365 (18.96)
r≤4	4.657 (12.25)	6.201 (12.25)	7.536 (12.25)	4.596 (12.25)	4.121 (12.25)

Note: ** and * indicate significance at 1% and 5% levels. *r* indicates the number of cointegrating vectors. The critical values [*C(5%)*] for the cointegration test are in parenthesis.
Source: Computed by authors

Table 7: Pedroni Heterogeneous Panel Data Cointegration Test, ASEAN-5

Test statistics	**Statistics**	***P*-value**
Within dimension		
Panel *v*	1.458*	0.072
Panel *ρ*	-3.503***	0.000
Panel PP	-6.651***	0.000
Between dimension		
Panel ADF	0.000	0.000
Group *ρ*	-1.635**	0.051
Group PP	-6.905***	0.000
Group ADF	-6.598***	0.000

Notes: ***, ** and * indicate rejection of null hypothesis of no cointegration at the 1%, 5% and 10% significance levels.
Source: Computed by authors

Table 8: FMOLS results, ASEAN-5**,** *Dependent variable: fdi*

Countries	**Estimated**		**Coefficients**	
	gdp	*exp*	*imp*	*tn-t*
Malaysia	0.636(2.406)**	-0.132(-0.334)	0.447(2.156)**	0.023(0.00)***
Indonesia	0.054(0.827)	-0.782(0.321)	1.698(0.080)*	0.019(2.300)**
Thailand	-2.134(-2.398)**	0.582(0.646)	2.490(2.129)**	0.034(1.755)*
Philippines	0.401(2.860)***	1.103(3.303)***	0.299(0.641)	0.040(3.206)***
Singapore	0.375(2.860)***	0.606(6.477)***	0.082(0.628)	0.000(0.291)
Panel	-0.520(-1.838)*	0.433(1.298)	1.066(2.979)***	0.027(3.422)***

Notes: ***, ** and * indicate significance at 1%, 5% and 10% levels. Figures in parentheses refer to t- statistics .
Source: Computed by authors

Table 9: Individual Country VECM Granger Causality Test

Country	**Short run**		**Long run**		**(*p*- value)**	**(*t*-value)**
Variables	**Δ*fdi***	**Δ*gdp***	**Δ*exp***	**Δ*imp***	**Δ*tn-t***	**ect_{t-1}**
Malaysia, VECM (3)						
Δ*fdi*	-	0.086	0.021	0.031	0.003	-0.192
		(0.768)	(0.882)	(0.858)	(0.950)	(-0.366)
Δ*gdp*	0.004	-	0.012	0.0197	0.008	-0.099
	(0.947)		(0.909)	(0.888)	(0.928)	(-0.178)
Δ*exp*	0.008	0.015	-	0.003	0.014	-0.177
	(0.928)	(0.901)		(0.953)	(0.902)	(-0.321)
Δ*imp*	0.006	0.018	0.011	-	0.010	-0.132
	(0.933)	(0.890)	(0.919)		(0.919)	(-0.246)
Δ*tn-t*	0.916	0.232	0.010	0.216	-	0.675
	(0.657)	(0.629)	(0.919)	(0.641)		(0.560)
Indonesia, VECM (3)						
Δ*fdi*	-	0.350	0.091	0.062	0.023	-0.242
		(0.839)	(0.955)	(0.969)	(0.998)	(-0.398)
Δ*gdp*	0.004	-	0.005	0.003	0.019	-0.101
	(0.997)		(0.997)	(0.998)	(0.990)	(-0.158)
Δ*exp*	0.050	0.137	-	0.087	0.010	0.080
	(0.975)	(0.933)		(0.957)	(0.994)	(0.127)
Δ*imp*	0.042	0.079	0.023	-	0.009	0.023
	(0.979)	(0.961)	(0.988)		(0.995)	(0.038)
Δ*tn-t*	3.494	0.209	2.285	1.549	-	3.782
	(0.174)	(0.900)	(0.319)	(0.460)		(3.265)
Thailand, VECM (1)						
Δ*fdi*	-	7.096	0.996	1.754	0.314	-3.132
		(0.028)**	(0.607)	(0.41)	(0854)	(-1.107)
Δ*gdp*	0.017	-	0.006	0.008	0.011	-0.044
	(0.991)		(0.996)	(0.995)	(0.994)	(-0.039)
Δ*exp*	0.068	0.063	-	0.072	0.061	0.161
	(0.966)	(0.968)		(0.964)	(0.969)	(0.141)
Δ*imp*	0.068	0.083	0.027	-	0.040	0.055
	(0.966)	(0.959)	(0.986)		(0.980)	(0.050)
Δ*tn-*	1.385	1.553	4.302	0.785	-	7.772
	(0.501)	(0.459)	(0.116)	(0.675)		(3.711)
Philippines, VECM (1)						
Δ*fdi*	-	0.578	0.152	1.090	0.118	-0.008
		(0.749)	(0.926)	(0.579)	(0.942)	(-0.186)
Δ*gdp*	0.004	-	0.103	0.104	0.013	-6.36E-0
	(0.997)		(0.949)	(0.949)	(0.993)	(-0.001)
Δ*exp*	0.018	0.217	-	0.154	0.014	-0.001
	(0.990)	(0.896)		(0.925)	(0.992)	(-0.140)
Δ*imp*	0.004	0.163	0.157	-	0.042	0.001
	(0.997)	(0.921)	(0.924)		(0.978)	(0.223)
Δ*tn-*	0.157	2.527	3.044	1.888		-0.006
	(0.924)	(0.283)	(0.218)	(0.389)	-	(-0.730)
Singapore, VECM (1)						
Δ*fdi*	-	0.052	0.029	0.280	0.013	-1.081
		(0.974)	(0.985)	(0.869)	(0.993)	(-0.378)
Δ*gdp*	0.003	-	0.050	0.015	0.027	-0.327
	(0.998)		(0.974)	(0.992)	(0.986)	(-0.117)
Δ*exp*	0.005	0.033	-	0.062	0.092	-0.581
	(0.997)	(0.983)		(0.969)	(0.954)	(-0.212)
Δ*imp*	0.029	0.011	0.029	-	0.054	-0.625
	(0.985)	(0.994)	(0.985)		(0.973)	(-0.219)
Δ*tn-*	0.982	0.902	0.204	0.610	-	-2.120
	(0.611)	(0.637)	(0.902)	(0.736)		(-0.345)

Note: Figures in parenthesis for short-run coefficients are p-values, and long run coefficients are t-statistics; ** refer to 5% significance level Source: Computed by authors

Table 10: Panel Data VECM Granger Causality Tests

ASEAN-5			**Short run (*p*- value)**			**Long run (*t*-value)**
Variables	Δ***fdi***	Δ***gdp***	Δ***exp***	Δ***imp***	Δ***tn-t***	ect_{t-1}
Δ*fdi*	-	0.3422	1.015	0.695	0.429	-0.376**
		(0.8427)	(0.602)	(0.706)	(0.806)	(-2.171)
Δ*gdp*	0.013	-	0.057	0.032	0.059	0.010
	(0.993)		(0.971)	(0.983)	(0.970)	(0.055)
Δ*exp*	0.030	0.231	-	0.026	0.236	-0.020
	(0.984)	(0.890)		(0.986)	(0.888)	(-0.109)
Δ*imp*	0.086	0.224	0.022	-	0.072	0.050
	(0.957)	(0.894)	(0.988)		(0.964)	(0.270)
Δ*tn-t*	3.538	2.538	0.274	2.755	-	-1.100
	(0.170)	(0.281)	(0.871)	(0.252)		(-2.639)

Notes: ** indicate 5% significance level.
Source: Computed by authors

6. Conclusions and Policy Implications

This paper examined if a causal relationship existed between FDI, trade, GDP and tariffs in the ASEAN-5 of Indonesia, Malaysia, Philippine, Singapore and Thailand. In the first step, we tested the variables order of integration using the individual country and panel series. All the variables were not stationary at level $I(0)$, but were stationary when first differenced ($I(1)$. Second, both time series and panel cointegration tests support the existence of a unique long run equilibrium relationship between FDI, trade, GDP and tariffs. Third, the existence of a cointegrating relationship allowed us to deploy the Granger causality test based on the VECM framework.

When analyzed by individual countries, unidirectional causality was found from GDP to FDI in Thailand at the 5% level, but no causality, neither unidirectional nor bidirectional were found in Indonesia, Malaysia, Philippine and Singapore. Equally, the panel causality test suggests no short run causality, but a long run causality in the FDI equation is observed with a moderate speed of adjustment of about 38% when converging to the long run equilibrium. Also, the negative coefficient in Thailand's FMOLS regression shows that GDP growth drives net FDI but one where it fuels more outflows than inflows. Hence, GDP growth in Thailand reduces net FDI inflows.

The lack of causality between net FDI, and exports, and imports in all the countries suggest that the propellants of net FDI in these countries are not driven by trade. The same thing can also be said between net FDI inflows and GDP in Indonesia, Malaysia, the Philippines and Thailand. Quite clearly other factors are more important in explaining GDP growth in these countries. Thus, future studies should examine if other dynamic factors, such as human capital development, R&D expenditure, industrial policies, and diffusion of knowledge from abroad are key stimulants of economic growth in these countries. After all, Johnson (1982), Amsden (1989, 1991), Wade (1990), and Saxenian (2006) have shown succinctly that these factors were instrumental in the rapid economic growth rates achieved by Japan, South Korea and Taiwan.

Hence, having used arguably the most robust econometric methodology it can be argued that there existed no causal relationship between net FDI, and GDP, and trade in four of the five ASEAN-5 with only

Thailand demonstrating the existence of causality running from GDP to net FDI inflows. Also, in this relationship GDP growth stimulates greater FDI outflows than FDI inflows so that the relationship between these variables is negative.

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