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Abstract: This paper inspects the influence of Foreign Direct Investment (FDI) inflows on the catching up process developed by labour, physical capital, human capital, absorptive capacity, telecommunications investment, and export channel on Asia Pacific's sustainable productivity growth. A panel data from the period of 1970 to 2012 was used. The modified extensive growth theory model that is based on output approach was applied. Both growth accounting and econometric approaches were considered to estimating the parameters of variables in first step and in the second step productivity indicators were calculated. The results show that the FDI inflows and inputs used are input driven that was generally more predominant than total factor productivity (TFP) growth. Meanwhile, The GDP grew significantly during the periods of the study by development of human capital, export, and telecommunications investment (input driven) variables, which supported by FDI inflows. Accordingly, the impact of export channel on the TFP growth found to be positive with insignificant contribution in most the group selected countries.
Keywords: Sustainable productivity growth, Asia Pacific, export, FDI

1. Introduction

The Organisation for Economic Cooperation and Development (OECD), 2002 study is one of the first contributions to the literature to include the potential gained from FDI in a model of Multinational Enterprises (MNEs). MNEs are a source of capital, employment, technology, management skills and international distribution networks, among many other things. UNCTAD (2001) has therefore suggested that developing countries should actively seek to attract "the right FDI" in order to "tap into the new international production systems of TNCs, the perhaps most dynamic elements of international trade". As has been mentioned by Ahmed (2012a) based on the Mahadevan (2007), there are various contributions in the literature for an export-oriented economy. First, export oriented FDI will bring about financial resources which allowed to investing in human capital development, infrastructure, health, etc. Second, export expansion promotes capital accumulation and thus economic growth by increase in imports of the intermediate goods and services. Third, an outward-oriented approach contributes to productivity gains by new technology gains, access to learning-by-doing and better managerial practices. It is important in this context that export market considerations looks beyond the upfront investments in new capital equipment to make decisions to success in sustainability growth. The role of the export channel is particularly crucial because it is a conduit for conveying technological spillovers effect to the host economies.

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Economic transformation is a process requiring continuous productivity growth with significant technological advancement drive. The new production processes rely on the knowledge base economy (K-economy) supported by education and training policies which is driven by human capital. Human capital is defined as key determinant of growth by the skills and knowledge intensity of the labour force which are acquired through schooling and training, Holmes (2005). In this respect, the economic argument in favour of knowledge-based economy is linked to the assumption that economic growth and development are knowledge driven and human capital is considered to be the core of this economic growth issue besides of information and communication technology (ICT), Ahmed (2012). However, the strength of the effect of foreign technologies depends on the absorptive capacity of the host economies. Furthermore, the absorptive capacity in this study addresses the ability of local's human capital to improve new skills brought by multinational companies (MNCs).

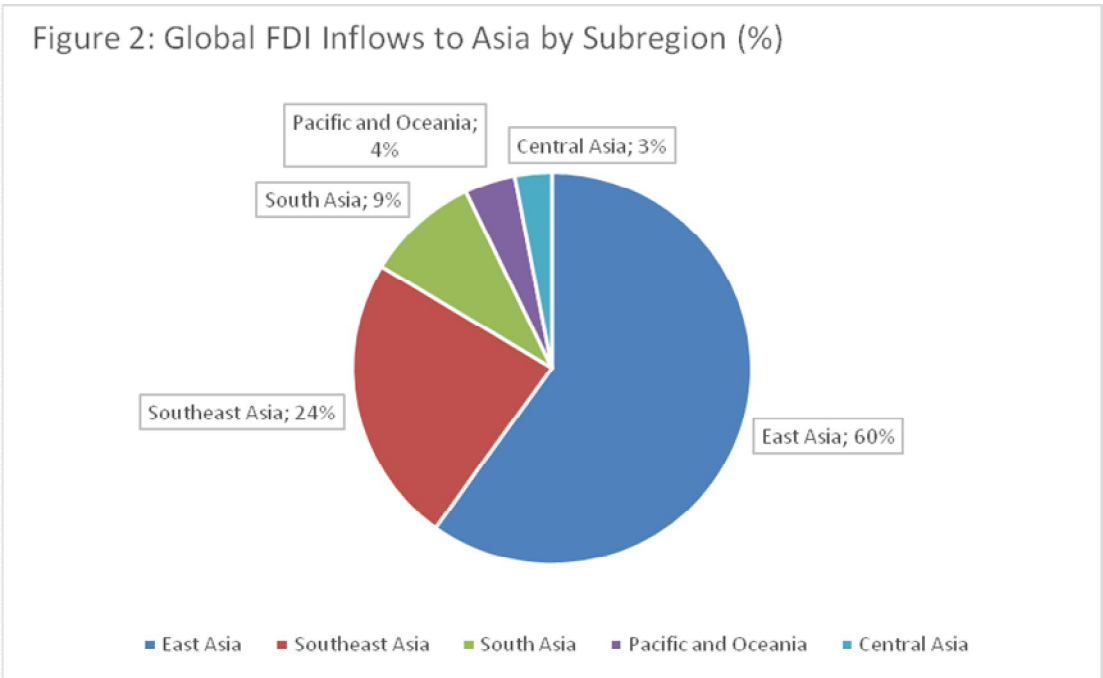## 1.1. FDI And Export Role In Asia Pacific's Economic Growth

It is impossible to ignore the explosion of high and sustained rates of growth in output and income in Asian economies. With many countries in the Pacific region, Asia has emerged as a regional leader in the global economy. ASEAN is one of the most open economic regions in the world, with a gross domestic product (GDP) of more than $2.3 trillion — 3.3% of the world total, Asian Development Bank (2014). The trade and investment liberalization was indeed one of the main reasons behind Asean economic success. Foreign direct investment (FDI) which not only welcomed, but also has been encouraged the export-oriented growth. Trade openness is high, at 110% of GDP. Singapore has the by far highest trade-to-GDP ratio, at close to 300% of GDP. Among its members, Malaysia and Thailand have trade-to-GDP ratios way above 100%, Syetarn Hansakul (2013).

Furthermore, Oguci et al. (2002), mention that FDI inflows have aided economic growth of many Asian countries during the 1970s and 1990s. FDI has also been growing in Importance as the most important contributing factor to Asean phenomenal economic growth since the 1970s. Between 1996 and 2012, FDI inflows to ASEAN as the engine for growth totaled about $880 billion. Importantly, ASEAN economies are also among the world most open, with merchandise exports over $1.2 trillion — nearly 7% of the global total.

Among the many reasons suggested to account for the East Asian success, the investment rate and the export orientation of these economies was support, Sarel (1996). East Asia (China, Japan, and South Korea) economies responded successfully to the globalization challenge and achieved with a gross domestic product (GDP) of more than $4.8 trillion, World Development Indicator (2012). As a consequence, the ratio of FDI inflows to these selected countries increased more than manifold. Over the last three decades, these countries also achieved a substantial increase in their exports, between developed and developing economies, World Development Indicator (2012). Figures 1 shows the FDI inflows to Asia and the rest of the world, while figure to shows globe FDI inflows to Asia by sub-region that cumulated by Asian Development Bank.
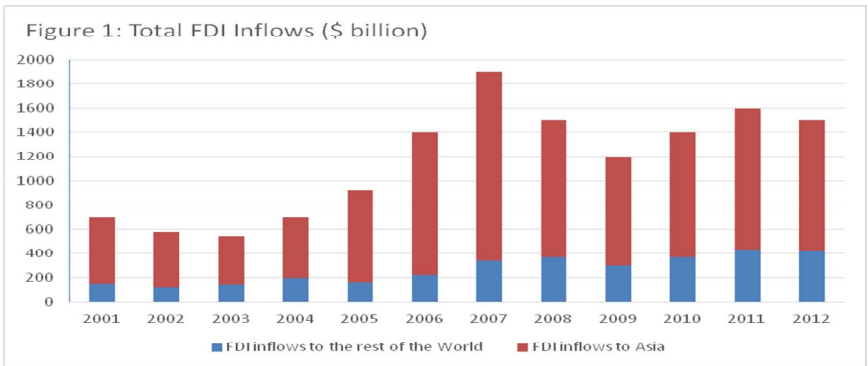
Figure 1: Total FDI Inflows ($ billion)

Sources: ADB calculations using data from Association of Southeast Asian Nations Secretariat; CEIC; Eurostat; and United Nations Conference on Trade and Development (2016).

Figure 2: Global FDI Inflows to Asia by Subregion (%)

Pacific and Oceania; 4%
Central Asia; 3%
South Asia; 9%
Southeast Asia; 24%
East Asia; 60%

■ East Asia   ■ Southeast Asia   ■ South Asia   ■ Pacific and Oceania   ■ Central Asia

Sources: ADB calculations using data from Association of Southeast Asian Nations Secretariat; CEIC; Eurostat; and United Nations Conference on Trade and Development (2016).

1.2 Export Spillover Effects And Productivity Growth

Expansion of international trade and international openness has triggered the resurgence of interest in determining productivity growth. Bernard et al (1999), states that exporting has been touted as a way to increase the sustained economic growth in the world economies. At the same time, intense debates have raged over the relative importance of trade and technology spillover (Absorptive Capacity) versus standard of living in productivity growth. Accordingly, the standard view about the success of the selected Asia Pacific countries emphasizes the role of technology in their high growth rates and focuses on the fast technological catch-up in these economies. While, the role of trade (Export and Import) in promoting economic growth has well-documented, the interaction between export channel and productivity growth is less well understood in the literature.

World Development Indicators (2012) affirms that empirical estimates of the contributions of factor inputs and total factor productivity (TFP) growth to selected Asia Pacific economies' output growth had fallen in a wide range, with capital accumulation generally found to have made the largest contribution. Productivity growth was found to have made smaller but still significant contributions. Since the early 1980s, on the other hand, TFP growth appeared to have played a larger role. Theoretically, the contribution of exports to economic growth manifests itself in the form of domestic operation of MNCs by one or more affiliates. These foreign affiliates interact with the local firms by building production facilities with respect to the new technology. This technology transfer improves quality of intermediate inputs in terms of greater economies of scale and reallocation of resources which affects on the level demand for local's intermediate input in the international market and thus impact on productivity through the expansion in exports.

Kunst and Marin (1989) in the literature on applied growth theory stress that export channel is key determinant in achieving productivity growth. Exports are deemed to bring productivity to the host economy were put forward. First, the gains from export are only based on the comparative advantage, in which it concentrates on the investment in more efficient sector. Second, the gains are based on the economics of scale in the international markets. Third, gains are based on the competitiveness activity in the international markets which introduces new technology to productivity growth. Fourth, export growth can be affected other sectors of economic sectors through externalities.

1.3 Literature Review

Aw et al (2000) state that export market reflect significantly productivity changes in Taiwan and the evidence of productivity change in South Korea can be seen weak to support of this factor. Lall (2000) argues that export-oriented FDI is consistent with productivity growth theories of FDI, especially in the context of development countries. It has also been argued that the productivity growth is important to the extent that it implies the productivity spillovers of the FDI are more deserving than others. For example, Wanger (2002) argues that exports channel have higher levels of productivity by absorbing productivity improvements in host firms. Liao et al (2009) indicates the long-run relationship between productivity growth and export for eight East Asian economies. Finally, Ahmed (2012) explained the impact of trade and trade intensity spillover effect on productivity growth of East Asian countries by including both export and import in the productivity model.

Young (1992), (1995) has argued that the growth capital accumulation of countries such as Hong Kong, Korea, Singapore, and Taiwan in East Asian benefited from expansion export markets and FDI inflows. In one study under taken by Lloyd (1997) in the area of the role of foreign investment in the success of Asian Industrialization remarked that starting with Japanese investment in the NIEs, foreign investment has led to as a source of savings to the Asian economies by focusing on the export-oriented industries. These knowledge spillover from FDI contributes to reduce sunk cost export market entry as discussed in Aitken, Hanson, and Harrison (1997). Therefore, MNCs usually have more knowledge-based assets in compared with domestic firms which able them to achieve new information associated with exporting activity.

Theory on the trade literature states that FDI can positively affect domestic firms through forward and backward spillover, labour mobility, or imitation and competition effects (Blomström & Kokko, 1998). In the other word, the knowledge spillover taking

place or through firm's homogeneity (intra industry, horizontal and forward) spillover, and firm's heterogeneity (inter industry, vertical and backward) spillover. Exports contribute the local firm's productivity through economies of scale due to increased market size and foreign competition. Exporting may also help to improvement innovation activities of domestic firms. In another study carried out by Ramstetter (1999) on the export propensies and foreign ownership shares in Southeast Asian manufacturing indicated that MNCs were the source of a large portion of the surge in manufactured exports and made important contributions to changes in export composition.

Robert and David (1999) examined the important source of productivity growth in Japan and South Korea during the period 1964 to 1973. Their results suggested that the impact of imports-led growth in Japan stems more than to export-led growth. The evidence for South Korea suggests that the exports channel not shown salutary impact on productivity growth. Kohpaiboon (2003) highlighted the role of trade openness in determinants impact of FDI on productivity growth. A time series data from the Thai economy for the period 1970-1999 is selected and the empirical analysis is in line with 'Bhagwati' hypothesis which implies the growth impact of FDI for the host countries significantly increased in an export-promoting regime. Hallward-Driemeier et al (2002) investigated relationship between exports and manufacturing productivity in five East Asia countries such as Indonesia, Korea, Malaysia, the Philippines, and Thailand. The results confirm that export-oriented manufacturing are significantly more productive than the firms that inward looking. It implies that further gains of foreign affiliates resulted in competition advantage in broad international markets induced improvements in productivity performance.

Bernard and Jensen (2004) explored the relationship between exporting and productivity in the US manufacturing sector. They have found the evidence that high productivity growth appears to come from the fact that local plants have to enter global market. Kneller and Pisu (2007) identified some export spillover effects including opening up a distribution system, accessing to international market, knowledge of consumer tastes, and development global marketable product. Juthathip (2007) examined the determinants of exports in eight East and Southeast Asian economies for the period 1993–2008. The results focus on the increasing importance of parts and components in total exports.

Mahadevan (2007) studies using Malaysian aggregate data as a case study is tested in terms of labour and TFP growth in which whether exports can affect on GDP growth or not. The results confirm the evidence that TFP as an important driver of economic growth are not influenced by export channel. James et al (2008) carried out extensive analysis in estimating Indonesian and Thai manufactured exports. Experimenting with different measures, especially the important contributions of MNCs to export growth in the machinery industries in electric, office, and computing machinery were documented. Their finding shows productivity would be consistent even in the presence of MNCs in manufacturing exports for both Thailand and Indonesia. As well as, Trade policy more relied on the outward-oriented manufacturing in both countries. A completed explanation to find out the link between foreign direct investment, exports, and aggregate productivity that supported by Rodrigue (2007). The empirical analysis carried out on the Indonesian manufacturing census data over the period of 1993-1996. The results suggest that FDI inflows will have a much larger impact on aggregate productivity compared to exports expansion. Despite many studies augmenting the FDI- growth nexus model to include intangible variables and employing different estimation techniques, the results of the impact of FDI on growth still remain controversial. For example, Kotrajaras (2010) uses data covering the 1990 to 2009 period for 15 East Asian countries and employs pooled

regression model and fixed effect model of estimation. He examined the observation of the interaction terms between FDI and levels of human capital, infrastructure investment, and international trade. The results show that the positive association of FDI inflows and economic growth is related to the countries that have the initial economic conditions.

Artige and Nicolini (2010), using disaggregated data of local determinants to foreign direct investment (FDI) inflows in three European regional countries. They introduced market size, productivity, export intensity, and market potential variables into the regression equation based on sector and by region classification on FDI inflows. They found that the regional demand and productivity are fundamental FDI determinants, along with importance of regional FDI inflows. In the last few years, the empirical studies on FDI effectiveness on export performance shows significantly positive. For example, Prasanna (2010) explores the impact of FDI inflows on the export performance of India. Using a sample of data covering the 16 year period from 1991-92 to 2006-07for the India, he obtains a positive coefficient of FDI inflows to export performance.

Though, empirically, there are potential factors that determine FDI inflows in host countries, the significance and magnitude of their effect on FDI inflows may wary. In this context, it is relevant to discuss Thangamani, Xu, and Zhong's (2011) investigation on the impact of foreign direct investment on GDP. Their results based on the data covering the 1995 - 2008 periods for a sample of four South Asian countries show that distance and characteristics of both domestic and foreigner country play significantly role in determining the FDI flows into the South Asian economies. They also suggested that trade openness, human development, population, and infrastructure contributed to motivation FDI inflow in South Asian region. One school of thought states that FDI inflow can contribute to raise the economic growth, productivity and export channel at the sectoral level by providing economic freedom in the Indian economy, Devajit (2012). In this regards, he argued that output, productivity and export factors observed slight contribution to this country. It can be explained greatly by the fact that the FDI had a low flow into the India both at the macro and at the sectoral level.

Meanwhile, Rahim et al (2014) stated that to answer the research question of what and to what extent are the social (inequality) impacts of FDI in the selected ASEAN countries? This paper finds out that FDI has helped the ASEAN nations to improve their incomes, living standards, life style and moved most of them from poverty to affordable life compare with any nations in the world including those in the developing nations. However, the drawback is that there are huge income inequalities between the rich and poor people in these nations. FDI made the richest more rich and the poor more poor just earning their basic needs and enjoy stable life compare with their counterparts even in the developed nations. Meanwhile, Ahmed (2010) mentioned that Malaysia's comparative advantage in unskilled labour intensive that helped to attract FDI in the latter half of the 1980s. Malaysia accelerated trade liberalisation policies and drastically eased restrictions with respect to capital ownership to foreign companies.

Moreover, Ahmed (2012) investigated the role of trade spillover effects on productivity growth of ASEAN 5 plus3 for the period of 1965-2006. His findings have shown that there was a little contribution of exports and imports to TFP growth of these economies. Xu and Sheng (2012) examine the spillover effects of foreign direct investment (FDI) inflows on the Chinese manufacturing sector for the 2000 – 2003 periods. Their analysis has shown that there is a positive spillover from FDI where forward linkages accrued to purchase high-quality intermediate goods by domestic firms.

East and South East Asian success story affirmed that FDI and export are two mechanisms that associated with increases in productivity. In particular, FDI is a powerful mechanism of export promotion by MNCs, although the direction of causation is still

under scrutiny. Above mentioned studies have shown that export promotion relied more heavily on foreign affiliates than domestic firms. In the other word, FDI along with exports has long been identified as the important sources of economic growth in the selected Asian Pacific countries but, hasn't show to internalise spillover effects of technology with domestic human capital and local firms. The interaction of spillover effects of technology with local absorptive capacity will appears in the form of TFP or technological change. TFP represents the output changes not accounted by inputs factor changes but also by change in technological progress. It should be mentioned that reviewed literatures ignored calculation of TFP contribution to show the impact of export oriented FDI on the productivity growth. This study aims to investigate the role of TFP growth in productivity driven growth by the contribution export Chanel along with other explanatory factors in selected group of Asia Pacific countries.

2. Methodology And Estimation Procedures

The paper attempted to modify the growth accounting framework by applying the modified extensive growth theory model which is using output approach to measure productivity indicators of the selected Asia Pacific economies by the contribution FDI inflows and export channel. This approach was initially utilised by Stigler (1947), Abramovitz (1956), Kendrick (1956), and Solow (1956), (1957), which was finally completed by Kendrick (1961). Moreover, the conventional growth accounting framework further purified by Denison (1962), Denison and Edward (1979), Griliches and Jorgenson (1962), Jorgenson et al. (1987)and finally modified by Ahmed (2006, 2007, 2008, and 2012).

The Cobb-Douglas production function is expressed as a function of FDI inflows, aggregate physical capital, labour force, human capital, Absorptive Capacity (FDI*HC), export of goods & services, telecommunication investment, and A. The production function for a group of the Asia Pacific economies adds wide space for decomposition of contributions of factor inputs and technological change to the economic growth. The Cobb-Douglas production function for these economies can be represented as follows:

$$GDP_{i,t} = AK_{i,t}^{\beta 1} L_{i,t}^{\beta 2} FDI_{i,t}^{\beta 3} HC_{i,t}^{\beta 4} AC_{i,t}^{\beta 5} Telint_{i,t}^{\beta 6} EPT_{i,t}^{\beta 7} \qquad (1)$$

Where aggregate output, gross domestic product (GDP) is a function of aggregate physical capital (K), labour (L), foreign direct investment (FDI), human capital (HC), absorptive capacity (AC), telecommunications investment (Telint), export of goods and services (EPT) and A, that proxies for total factor productivity (TFP) as a technological progress of the selected economies and indicator of spillover effects. According to Ahmed (2012), the divisia index decomposes the output growth into the contribution of changes in input terms and TFPG. In other words, the growth rate of aggregate output (GDP) for mentioned economies can be expressed as a weighted average of the growth rates of aggregate physical (K), labour force (L), FDI inflows, human capital (HC), absorptive capacity (AC), telecommunications investment (Telint), export of goods and services (EPT) plus a residual term typically referred to as the rate of growth of TFP.

The present study will fill the gaps highlighted by Ahmed (2012) that that available studies using growth accounting approach being not based on statistical analysis to show the reliability of the results generated in the first step as follows:

$$\Delta ln\ GDP_{i,t} = \beta 1. \Delta \ln K_{i,t} + \beta 2 \Delta \ln L_{i,t} + \beta 3. \Delta \ln FDI_{i,t} + \beta 4. \Delta \ln$$
$$HC_{i,t} + \beta 5. \Delta \ln AC_{i,t} + \beta 6. \Delta \ln Telint_{i,t} + \beta 7. \Delta \ln EPT_{i,t} + u_{i,t} \qquad (2)$$
$$i = 1, 2 \dots 11$$

$$t = 1, 2\ldots 473$$

Where

β_1 stands for output elasticity with respect to capital input

β_2 stands for output elasticity with respect to labour input

β_3 stands for output elasticity with respect to FDI inflows input

β_4 stands for output elasticity with respect to human capital input

β_5 stands for output elasticity with respect to absorptive capacity input

β_6 stands for output elasticity with respect to telecommunications investment input

β_7 stands for output elasticity with respect to export of goods and services input

Uit is proxies for total factor productivity as a technological progress

Ln stands for logarithm

Δ stands for the first difference

The second step was proposed, which calculates the TFP contribution and the contributions of GDP, physical capital, labour force, FDI inflows, human capital, absorptive capacity, export channel, and telecommunications investment indicators that is transforming Eq. (2) as

$$\Delta \ln TFP_{i,t} = \Delta \ln GDP_{i,t} - [\beta_1.\Delta\ln K_{i,t} + \beta_2 \Delta\ln L_{i,t} + \beta_3.\Delta\ln FDI_{i,t}$$
$$+\beta_4.\Delta\ln HC_{i,t} +\beta_5.\Delta\ln AC_{i,t} + \beta_6.\Delta\ln Telint_{i,t+}\beta_7.\Delta\ln EPT_{i,t}]$$
(3)

$$i = 1, 2\ldots 11$$
$$t = 1, 2\ldots 473$$

Therefore, the framework decomposes the contribution of *GDP* into the $\beta_1.\Delta\ln K$ that is the contribution rate of the aggregate physical capital; $\beta_2.\Delta\ln L$ is the contribution rate of labour force; $\beta_3.\Delta\ln HC$ is the contribution rate of the human capital; $\beta_4.\Delta\ln FDI$ is the contribution rate of FDI inflows; $\beta_5.\Delta\ln AC$ is the contribution rate of absorptive capacity; $\beta_6.\Delta\ln Telint$ is the contribution rate of the telecommunications investment; $\beta_7.\Delta\ln EPT$ is the contribution rate of export, and $\Delta\ln TFP$ is the TFP growth contribution.

3. Data Sources

Annual panel data over the period 1970-2012 for Gross Domestic Product (GDP), number of labour, gross fixed capital formation, FDI inflows, human capital (the expenditure education), export of goods and services, absorptive capacity (FDI*HC) and telecommunications investment are obtained from the World Development indicators (WDI), international financial statistics of International Monetary Fund yearbook, the International Labour Organization, the International Telecommunications Union (ITU) database, the UNCTAD (United Nations Conference on Trade and Development) database were employed in this study. This is a time series study which covers the period 1970 to 2012 using secondary data obtained mainly from the World Development Indicators as well as from relevant international organizations such as the International Telecommunications Union, United Nations, and the World Bank. The empirical aspects of this study were conducted based on annual data, reflected in an aggregated form. All data is in current U.S. dollars.

4. Results And Discussion

This section demonstrates the results of the unit root test conducted in this study and the coefficients obtained by applying OLS to the data by using Eq. (2). In this regard, based on Table 1, the result of the unit root test clearly indicates that all the variables in the first five standard methods are highly significant in the first difference with prob. 0.000., i.e. variables are stationary at I (1). In the Hadri (2000) method test, the variables are still stationary at I (1) even after first difference.

Table 1: Panel Unit Root Tests In Level and First Differenced; 1970- 2012

Method test	Level		First difference	
	Test statistic	Significance level for rejection	Test statistic	Significance level for rejection
Null: unit root (assumes common unit root process)				
Levin et al. t^a statistics				
Ln GDP $_{i,t}$	-0.668	0.252	-14.041^a	0.000
Ln FDI $_{i,t}$	3.782	0.999	-3.085^a	0.001
Ln K $_{i,t}$	-1.478	0.070	-9.405^a	0.000
Ln L $_{i,t}$	0.660	0.754	-9.983^a	0.000
Ln HC $_{i,t}$	-2.201	0.014^a	-10.327^a	0.000
Ln AC $_{i,t}$	-1.311	0.095^a	-9.394^a	0.000
Ln EPT $_{i,t}$	-2.041	0.021^a	-15.072^a	0.000
Ln Telint $_{i,t}$	-0.898	0.185	-11.475^a	0.000
Breitung t^a statistics				
Ln GDP $_{i,t}$	2.071	0.981	-9.214^a	0.000
Ln FDI $_{i,t}$	10.398	1.0000	-1.206^a	0.114
Ln K $_{i,t}$	-0.610	0.271	-8.802^a	0.000
Ln L $_{i,t}$	-0.137	0.445	-10.427^a	0.000
Ln HC $_{i,t}$	-0.338	0.368	-9.861^a	0.000
Ln AC $_{i,t}$	0.265	0.605	-9.194^a	0.000
Ln EPT $_{i,t}$	0.925	0.823	-10.171^a	0.000
Ln Telint $_{i,t}$	-0.202	0.420	-9.970^a	0.000
Null: unit root (assumes individual unit root process)				
Im et al. W statistic				
Ln GDP $_{i,t}$	1.504	0.934	-9.049^a	0.000
Ln FDI $_{i,t}$	10.113	1.000	-4.408^a	0.000
Ln K $_{i,t}$	-0.989	0.161	-7.276^a	0.000
Ln L $_{i,t}$	1.112	0.867	-8.526^a	0.000
Ln HC $_{i,t}$	-1.500	0.067	-11.076^a	0.000
Ln AC $_{i,t}$	0.120	0.548	-15.154^a	0.000
Ln EPT $_{i,t}$	-2.739	0.003^a	-12.638^a	0.000
Ln Telint $_{i,t}$	-0.208	0.417	-9.975^a	0.000
ADF-Fisher chi-				

square				
Ln GDP $_{i,t}$	14.163	0.895	118.216a	0.000
Ln FDI $_{i,t}$	7.454	0.998	63.449a	0.000
Ln K $_{i,t}$	32.159	0.075	91.500a	0.000
Ln L i,t	12.455	0.947	108.760a	0.000
Ln HC $_{i,t}$	36.375	0.028a	146.445a	0.000
Ln AC $_{i,t}$	21.420	0.495a	210.405a	0.000
Ln EPT $_{i,t}$	45.458	0.002a	168.206a	0.000
Ln Telint $_{i,t}$	23.610	0.368	129.400a	0.000
PP-Fisher chi-square				
Ln GDP $_{i,t}$	10.980	0.975	209.357a	0.000
Ln FDI $_{i,t}$	37.860	0.019a	120.416a	0.000
Ln K $_{i,t}$	15.643	0.833	124.449a	0.000
Ln L i,t	10.673	0.979	225.182a	0.000
Ln HC $_{i,t}$	15.749	0.828	225.726a	0.000
Ln AC $_{i,t}$	40.861	0.009a	214.476a	0.000
Ln EPT $_{i,t}$	39.964	0.011a	170.143a	0.000
Ln Telint $_{i,t}$	15.538	0.838	457.331a	0.000
Null: no unit root (assumes common unit root)				
Hadri Z statistics				
Ln GDP $_{i,t}$	8.796	0.000	2.110	0.017
Ln FDI $_{i,t}$	11.689	0.000	7.627	0.000
Ln K $_{i,t}$	7.373	0.000	0.333	0.369
Ln L i,t	7.327	0.000	0.714	0.238
Ln HC $_{i,t}$	6.210	0.000	1.917	0.028
Ln AC $_{i,t}$	7.215	0.000	2.999	0.001
Ln EPT $_{i,t}$	7.724	0.000	2.843	0.002
Ln Telint $_{i,t}$	5.437	0.000	0.578	0.281

a Indicates the rejection of the null hypothesis of non-stationary (Levin et al. , Breitung , Im et al. , Fisher-type test using ADF and PP test) or stationary at least at the 5 % level of significance.

Moreover, based on Table 2, Kao Residual Cointegration test shows that at 5% level of significance, null hypothesis of no cointegration can be rejected. In this regard, the p-value 0.00 which is highly significant that gives robust evidence that the variables have relationship in the long run. In the other word, in a panel framework for eleven countries, the test result shows that the economic series has long term equilibrium in this Equation.

Table2: Kao Residual Cointegration Test

Null hypothesis : No cointegration	Augmented Dickey-Fuller Statistic	
Series: *GDP, FDI, CAP, LAB, HC, AC, Telint, and EPT*	statistic	Prob.
	-3.128	0.000a

a Denotes significant level in 5%. Figures Showing in Percentage Variables. Trend Assumption: No deterministic trend

Hausman test is necessary in determining the most suitable model between fixed effect and random effect models. To test, the null hypothesis that pointed out random effect model is more appropriate and alternative hypothesis that allows for fixed effect model of the analysis to be appropriate. From Table 3, the Hausman test shows at 5% level

of significance, which the null hypothesis of random effect model is appropriate and p-value is 34.89 percent which is more than 0.05 gives robust evidence that the random effect model is more appropriate. According to the result obtained by Hausman test, it can be found that the GLS method with random effect should explain better relative to fixed effect model.

Table3: Hausman test

Test summary	Chi-square statistic	Chi-Sq. d.f.	Probability
Cross-section random	7.818481	7	0.3489

Figures Showing in Percentage Variables.

Furthermore, based on the Table 4, the result implies that, the coefficients of the FDI inflows, human capital, telecommunications investment, and export have positive correlation with GDP., i.e. one percent increase in FDI inflows would increase GDP by 2.770 percent, one percent increase in human capital would increase GDP by 3.762 percent, one percent increase in telecommunications investment would increase GDP by 0.009 percent, one percent increase in export of goods and services would increase GDP by 1.445 percent.

Moreover, the R^2 in this model is 0.409, which explains that 41% of the total variation in the amount of GDP can be explained by the changes of the combined variation in independent variables, which are GDP inflows, physical capital, labour force, human capital, export of goods and services and telecommunications investment. Furthermore, the adjusted R^2 0.400 takes into account the sample size and the number of independent variables included in this regression model.

Table4: Panel Estimation Results

	Fixed effect	Random effect
C	0.005 (0.342)	0.005 (0.379)
DFDI	2.883 (3.378)	2.770 (3.417)
DK	-0.715 (-5.107)	-0.729 (-5.221)
DL	-0.022 (-1.02)	-0.022 (-1.085)
DHC	3.842 (3.640)	3.762 (3.581)
DAC	-0.336 (-3.620)	-0.328 (-3.548)
D EPT	1.443 (10.569)	1.445 (10.627)
D Telint	0.011 (0.382)	0.009 (0.312)
R^2	0.449653	0.409039
Adjusted R^2	0.428581	0.400124
F	21.33905	45.88028

t values are in parentheses.
Figures Showing in Percentage Variables.

Though, from the result, labour force, physical capital, and absorptive capacity variables showed negative relationship on selected Asia Pacific economic growth which may be justified by improper employment of labour force, or hiring unskilled and semi-skilled labour force in this group countries. In this regard, the negative coefficients effects of the interaction variable (AC) may be due to measurement errors in education data, the

selected proxies for absorptive capacity and model missed-specification. Furthermore, the negative coefficients effects of the aggregate capital input may be arise by misspecification by the use of the proxy.

5. Productivity Indicators Contribution

The empirical analysis has been done to compare the productivity indicators used in selected Asia-Pacific countries over the entire period of 1970 – 2012. As it was mentioned earlier, these selected countries changed structural policies with particular attention on the FDI inflows and trade oriented policy. However, the contribution of the TFP to output growth by including FDI inflows, physical capital, labour input, human capital, absorptive capacity, export, and telecommunications investment is 1.043 percent in terms of annual average growth to GDP. The GDP grew significantly at (3.024) percent during the period of the study by development of human capital, export, and telecommunications investment variables which supported by FDI inflows.

Table5: Productivity Indicators of Selected Asia Pacific Countries; 1970-2012

	GDP	FDI	CAP	LAB	HC	AC	EPT	Telint	TFP
Panel	3.024	14.229	-1.179	-0.095	6.67	-21.29	3.633	0.013	1.04

Figures were calculated using Equation (2).
Figures Showing in Percentage of Variables.

The FDI inflows contribution was found an in terms annual average to be 14.229 percent over the period of 1970-2012.This reflects that productivity growth was found to be investment-driven policies that had been supported by reduction of barriers to investment across selected markets (as the share of foreign ownership) to absorbed the global capital. Meanwhile, the human capital contribution to output productivity in terms of average annual growth was found to be 6.670 percent to GDP growth. This reflects the improvement and skills upgrading of the human capital supported by expenditure in education in there selected Asia Pacific countries. Besides, the contribution of output productivity by including labour input seen as -0.095 in terms of annual average GDP growth which reflects the comparative advantage in unskilled labour that was not able to benefit from FDI inflows spillover effects. Further, the absorptive capacity contribution to productivity growth of selected panel countries was found to be -21.290 percent in terms of average annual growth between 1970 to 2012 period. This negative absorptive capacity contribution implies that the FDI spillover effect has not took place in most of the selected countries. Meanwhile, the contribution of export in terms of average annual growth was seen as 3.633 percent to output productivity growth. This shows that selected economies have higher output in average by including export channel. Finally, the contribution of telecommunications investment average annual growth is 0.013 percent to output productivity growth. It also, indicates that the telecommunications investment variable is a reliable factor in achieving technology driven economy as an indicator of ICT as the main driver of the new economy (K-economy).

6. Conclusion And Policy Implications

This paper contributes to available literature by applying the modified extensive growth theory model which is providing statistical measures to show its reliability by plugging the coefficients obtained to calculate the productivity indicators. This includes the growth rate of GDP, FDI inflows, physical capital, labour force, human capital, absorptive capacity, telecommunications investment, and export contributions, which are considered to be input driven indicators. Besides, the calculation of TFP contribution

which is indicated as the combined contribution of quality of the input terms applied in production function and an indicator of the unexplained portion of output (technological progress) that is showing the spillover effects to the hosting economy which is called productivity driven.

Foreign direct investment (FDI) inflow plays significant role in selected Asia Pacific's economic growth. This paper examines the effects of FDI inflow investment and export channel in mentioned economic growth in terms of GDP and other productivity indicators. In this respect, the econometric result as the first step of the analysis has shown that there is a positive relationship between FDI inflows and human capital (absorptive capacity), those tested to know the level of the spillover effects on GDP. Whereas, the influence of the physical capital and labour force on the group Asia Pacific's economic growth in terms of GDP growth was found to be negative. The influence of the telecommunications investment, and export channel was found to be positive correlation with GDP.

Moreover, this paper showed that human capital provides the potential effects of FDI to enhance the economic growth as an input driven economy. Meanwhile, the contribution of human capital offers the strongest evidence in influencing GDP. In addition the MNEs have played a major role in bringing economic development to selected countries. Furthermore, the New Economic Model (NEM) calls for the FDI inflows to integrate the more technologically-advanced foreign-owned into the economy to accelerate knowledge spillovers in the local economy. This involves conscious efforts to forge interaction of knowledge spillover and domestic human capital to upgrade their skills and firms to transfer the technology to the economy which drive high economic growth with spillover effects. This spillover effects might be helpful to enhance human capital development and eventually to contribute significantly economic growth.

Meanwhile, based on TFPG results of this paper, the selected Asian Pacific economic growth is considered to be input driven and highly dependent on FDI inflows and export channel. This is indicating that the FDI spillover effects (absorptive capacity) had insignificant impact on these economies. Taking a closer look at developed economies in general and in Japan and South Korea in particular, this technology transfer so called spillover effects has seen a large inflow of FDI spillover effects. Towards a New Economic Model for selected Asia Pacific economies to be a high income and knowledge driven economy, high-skilled human capital must be given top priority, as they will be crucial in making more rapid inroads towards creating productivity driven economy.

References

Abramovitz, M. (1956). Resource and Output Trends in the United States since 1870.

.*American Economic Review, 46(2),* 5-23.

Ahmed, E.M.. (2012). Are the FDI inflow spillover effects on Malaysia's economic growth input driven? *Economic Modelling, 29(4), 1498-1504.*

Ahmed, E.M.. (2012). Are trade spillover effects on East Asian economic growth productivity driven? *World Journal of Entrepreneurship, Management and Sustainable Development, 8*(4), 246-259.

Ahmed, E.M.. (2008) Foreign Direct Investment Intensity Effects on TFP Intensity of ASEAN 5 Plus 2, Journal of Economic Development, 33 (2), 155-166.

Ahmed, E.M.. (2010) the role of FDI Intensity in Achieving Productivity Driven Growth In Malaysian Economy, Applied Econometrics and International Development , 10(1), 195-208.

Ahmed, E.M.. (2007) Biochemical Oxygen Demand Emissions Impact On Malaysia's Manufacturing Productivity Growth, Global Economic Review, 36(4), 305 – 319

Ahmed, E.M.. (2006) The Impact of ICT and Human Capital In Achieving Knowledge-Based Economy: Applications on Malaysia's Economy, published at World Review of Science, Technology and Sustainable Development, 3(3), 270-283.

Aitken, B., Hanson, G. H., & Harrison, A. E. (1997). Spillovers, foreign investment,

and export behavior. *Journal of International Economics, 43*(1), 103-132.

Andrew B, B. a. J. B. J. (2004). Exporting and Productivity In The USA. *Oxford Review of Economic Policy, 20*(3).

Artige, L., & Nicolini, R. (2010). Market potential, productivity and foreign direct investment: Some evidence from three case studies. *European Planning Studies, 18*(2), 147-168.

Aw, B. Y., S. Chung, and M.J. Roberts (2000). Productivity and Turnover in the Export Market: Micro Evidence from Taiwan and South Korea. *The World Bank Economic Review, 14*, 65-90.

Bank, A. D. (2014). ASEAN 2030 Toward a Borderless Economic Community.

Bhavan Thangamani, C. X., and Chunping Zhong. (2011). Determinants and Growth Effect of FDI in South Asian Economies: Evidence from a Panel Data Analysis. *International Business Research, 4*(1).

Blomström, M., & Kokko, A. (1998). Multinational corporations and spillovers. *Journal of Economic surveys, 12*(3), 247-277.

Denison, E. F. (1962). "The sources of economic growth in the United States and the alternative before use". *New York: A Supplementary Paper, Committee for Economic Development*, 229-255.

Denison, E. F. a. E., P. (1979). Accounting of Slower Economic Growth; the United States in the 1970s. *The Brooking Institution, Washington, DC*.

Devajit, M. (2012). Impact of Foreign Direct Investment on Indian economy.*Research Journal of Management Sciences, 1*(2), 29-31.

Griliches, Z. a. J., D.W. (1962). "Capital theory: technical progress and capital structure, sources of measured productivity change capital input". *American Economic Review 52*(1), 50-61.

Hallward-Driemeier, M., Iarossi, G., & Sokoloff, K. L. (2002). Exports and manufacturing productivity in East Asia: A comparative analysis with firm-level data: National Bureau of Economic Research.

Hansakul, S. (2013). ASEAN Economic Community (AEC): A potential game changer for ASEAN countries.

Holmes, M. (2005). Ireland and the European Union: Nice, Enlargement and the Future of Europe. *Manchester University Press, Political Science*, 207

Indicators, W. D. (2012). *The World Bank*.

James, W. E., & Ramstetter, E. D. (2008). Trade, foreign firms and economic policy in Indonesian and Thai manufacturing. *Journal of Asian Economics, 19*(5), 413-424.

Jensen, A. B. B. J. B. (1999). EXPORTING AND PRODUCTIVITY. *NBER Working Paper No. 7135*.

Jorgenson, D. W., Gollop, F.M. and Fraumenri, B. (1987). Productivity and US Economic Growth,North Holland, Amsterdam.

Juthathip, J. (2007). Determinants of Export Performance in East and Southeast Asia*ERD Working Paper, Asian Development Bank No. 106*.

Kendrick, J. W. (1956). "Producative trends capital and labour". *Review of Economics and Statistics, 38*(3), 248-257.

Kendrick, J. W. (1961). Productivity Trends in the United States. *Princeton University Press,Princeton, NJ*.

Kneller, R., & Pisu, M. (2007). Industrial linkages and export spillovers from FDI. *The World Economy, 30*(1), 105-134.

Kohpaiboon, A. (2003). "Foreign Trade Regimes and the FDI-Growth Nexus: A case Study of Thailand," *The Journal of Development Studies, 40*(2), 55-69.

Kotrajaras, P. (2010). Foreign Direct Investment and Economic Growth: A Comparative Study among East Asian Countries. *Applied Economics Journal, 17*(2), 12-26.

Lall, S. (2000). 'Technological change and industrialization in the Asian NIEs', in L. Kim and R. R. Nelson (eds.), Technological Learning and Economic Development: The Experience of the Asian NIEs, Cambridge: Cambridge University Press.

Liu, H. L. a. X. (2009). Export-total factor productivity growth nexus in East Asian economies. *Applied Economics, 41*(1663–1675).

Lloyd, P. J. (1997). The role of foreign investment in the success of Asian industrialization. *Journal of Asian Economics, 7*(3), 407-433.

Mahadevan, R. (2007). "New evidence on the export-led growth nexus: a case study of Malaysia". *The World Economy, 30* (7), 1069-1083.

Marin, R. M. K. a. D. (1989). On Export and Productivity:A Causal Analysis. *Review of Economics and Statistics, 71*(4), 699-703.

Oguci, N., Amdzah, Bakar, Abidin, Shafii. (2002). Productivity of foreign and domestic firms in the Malaysian manufacturing industry. *Asian Economic Journal, 16* ((3)), 215–228.

Prasanna, N. (2010). Impact of Foreign Direct Investment on Export Performance in India. *Society Science, 24*(1), 65-71.

Rahim R, Noor M. and Ahmed M. A (2014) To What Extent Are the Social Inequality Impacts of FDI In The Selected ASEAN? Applied Econometrics and International Development, 14(1), 189-204.

Ramstetter, E. D. (1999). Trade propensities and foreign ownership shares in Indonesian manufacturing. *Bulletin of Indonesian Economic Studies, 35*(2), 43-66.

Rodrigue, J. (2007). FDI, Exports & Aggregate Productivity. *Economics of Transition*.

Sarel, M. (1996). Growth in East Asia: What We Can and What We Cannot Infer.

International Monetary Fund,Economic Issues No 1.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 65-94.

Solow, R. M. (1957). "Technical change and the aggregate production function". *Review of Economics and Statistics, 39*, 312-320.

Stigler, G. J. (1947). Trends in Output and Employment. *National Bureau of Economic Research,New York, NY.*

Wagner, J. (2002). "The Causal Effects of Exports on Firm Size and Labour Productivity: First Evidence from a Matching Approach,". *Economics Letters 77*, 287–292.

Weinstein, R. Z. L. a. D. E. (1999). Trade and Growth: Import Led or Export Led? Evidence from Japan and Korea. *Working Paper No. 165.*

Xu, X., & Sheng, Y. (2012). Are FDI spillovers regional? Firm-level evidence from China. *Journal of Asian Economics, 23*(3), 244-258.

Young, A. (1992). A tale of two cities: factor accumulation and technical change in Hong Kong and Singapore *NBER Macroeconomics Annual 1992, Volume 7* (pp. 13-64): MIT press.

Young, A. (1995). The tyranny of numbers: confronting the statistical realities of the East Asian growth experience. *The quarterly journal of economics.*