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FDI spillover effects on Asia-Pacific sustainable productivity growth

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ABSTRACT

Purpose: The objective of the study is to examine the impact of Foreign Direct Investment (FDI) spillover effects on sustainable productivity growth of selected Asia-Pacific countries such as (Malaysia, Indonesia, Singapore, Philippines, Thailand, China, Japan, Korea, India, Australia and New Zealand).

Design/methodology/approach: The extensive growth theory that is expressed the decomposition of contribution of changes in labour force, physical capital, FDI, Human Capital (HC), telecommunications investment and Total Factor Productivity (TFP) growth on selected Asian Pacific countries output growth is used in this study. In this respect, an annual time series data over the period of 1970 to 2012 for the aforementioned variables is employed.

Findings: The study found that the FDI spillover effects through the TFP, considered being productivity driven economic growth in which FDI spillover effects has significant effect on productivity growth of the majority of these countries. It should be noted that most of these countries showed technological progress through FDI spillover effects that is translated into form of technology transfer and HC skills development.

Originality: This study empirically compared the FDI spillover effects on sustainable productivity growth of the most growing countries in Asia-Pacific region by using modified extensive growth theory that closed the gaps in the past studies and addressed the issues of technology transfer, HC development and sustainable productivity growth brought by the technical progress in these countries through the FDI spillover effects on productivity growth.

***Keywords*:** Foreign Direct Investment (FDI) spillover effects; Asian Pacific selected countries; sustainable productivity growth.

INTRODUCTION

According to the Organization for Economic Cooperation and Development (OECD)

> "Beyond the initial macroeconomic stimulus from the actual investment, Foreign Direct Investment (FDI) influences growth by raising Total Factor Productivity (TFP) and, more generally, the efficiency of resource use in the recipient economy. This works through three channels: the linkages between FDI and foreign trade flows, the spillovers and other externalities vis-à-vis the host country business sector, and the direct impact on structural factors in the host economy (OECD, 2002)".

Moreover, Asian Pacific region considered to be one of the most growing regions in the world. FDI inflows help these countries to grow faster than Industrialised countries. It should be note that the productivity of an economy specifies its ability to capturing a high level of income, which is one of the key factors explaining an economy's growth.

In this respect, there are many factors driving productivity in a competitive economy. Further, understanding the factors determining productivity had occupied the minds of researchers and economists. In this regard, classical economists' such as Adam Smith focus on investment in physical capital and infrastructure, and, more recently, to interest in education and training, technological progress, macroeconomic stability, among others. The former can be called input driven and latter productivity driven. It should be noted that productivity driven countries showed positive technological progress through significant contribution of TFP to their economics such as Japan and Korea in East Asia. In the sense that, the spillover effects of interaction between foreign technology, local Human Capital (HC) and local firms has taken place in Japan and South Korea. Input driven which there is no significant technology progress by using input to produce output, these includes the economic growth took place the rest of East Asian Countries and India.

Moreover, the productivity perspective in Asia Pacific remains very mixed. The area is host to some of the competitive countries, including three members of the top 10 (Singapore, Hong Kong and Japan) and some of the most dynamic and rapidly improving economies in terms of competitiveness, such as Indonesia and the Philippines. It should be recalled that the declining in the global economic growth, will have an effect on a country's productivity performance due to the lower international investment flow in which will result in a slower global growth. Global productivity growth declined in 2012 at 1.8% (Szirmai, 2012). However Japan's labour productivity grew at the rate of 0.5% to a value of USD 76,340 in 2012. Meanwhile South Korea registered at 0.8% at a value of USD 65,505, China reported its labour productivity grew at the rate of 7.4% to the value of USD 18,325 in 2012, India's productivity growth was 3.7% at a value of USD 11,048 in 2012, while Thailand gained productivity grow by 4.9% to a value of USD 18,432.

Furthermore, Singapore and Malaysia have achieved at the rate of 0.03% to a value of USD 100,278 and 2% to a value of USD 36,139, respectively. Beside, Indonesia's labour productivity grew listed 4.2% at USD 11,904 in 2012. While New Zealand's labour productivity grew at the rate of 1.1% to a value of USD. Australia experienced at the rate of 2.6% to a value of USD. Russia's labour productivity grew at the rate of 3.4% to a value of USD (The Conference Board, 2012).

METHODOLOGY AND ESTIMATION PROCEDURE

Extensive growth theory (Output productivity model) is applied in this study as an effort to investigate the influence of labour force, physical capital, FDI, HC and Absorptive Capacity (AC) on productivity growth of selected Asian Pacific countries. In the growth accounting literature theory, the above-mentioned model indicated the decomposition of GDP growth derived from definition accounting. Stigler (1947), Abramovitz (1956), Kendrick (1956) and Solow (1957) did a pioneering study on the growth accounting models. After providing more details this model by Kendrick (1961) an attempted is made to refine by Denison (1962, 1979), Griliches and Jorgenson (1966) and Jorgenson et al. (1987), that finally modified Ahmed (2006, 2013). By making use of primal growth accounting model, it can be more extent in support of decomposition of contributions of input driven factors and TFP to achievement higher economic growth. Therefore, this section covers the extensive growth theory (contribution of capital, labour, FDI, HC, AC and technology on GDP). In this regard, production function an economy can be written as follows:

$$GDP = AK^{\alpha 1}L^{\alpha 2}\ FDI^{\alpha 3}\ HC^{\alpha 4}\ AC^{\alpha 5}\ Telint^{\alpha 6} \quad (1)$$

Here, GDP as a function of Physical capital, labour, FDI, HC, AC shows the ability to develop the skills of local people through FDI inflows in-

vestment and Telecommunications Investments. As a matter of fact, AC (spillover effect) is the interaction of HC with FDI activities to translate it into technological progress or what so called (TFP) in order to develop productivity of an economy in the international level and (*A*) is proxies for TFP growth. This study following Ahmed (2006, 2013) that developed the growth accounting model into two steps. The following first step estimates the parameters of the variables to fill the gap of growth accounting as being not based on statistical analyses that cast doubt in the results generated. Equation one can be transferred as follows:

$$\begin{aligned}&\Delta \ln \mathrm{GDP}_{i,t} = \ln A + \alpha_1 \Delta \ln K_{i,t} + \alpha_2 \Delta \ln L_{i,t} + \alpha_3 \Delta \ln \mathrm{FDI}_{i,t} + \\ &\alpha_4 \Delta \ln \mathrm{HC}_{i,t} + \alpha_5 \Delta \ln \mathrm{AC}_{i,t} + \alpha_6 \Delta \ln \mathrm{Telint}_{i,t} + u_{i,t} \\ &i = 1,2 \ldots 11;\ t = 1,2 \ldots 43\end{aligned} \tag{2}$$

By assuming constant returns to scale, the parameters are the elasticity coefficients for growth of GDP relative to the respective input factors. Therefore, the rate of output in this model simply depends on the accumulation of physical capital and employment, telecommunications investment, which in turn depends on FDI and other sources of input factors.

The next step is to calculate the TFP and its combined contribution from capital, labour, HC, FDI, AC and telecommunications investment in terms on their quantities and qualities. The estimation procedures of TFP growth is expressed as follows:

$$\begin{aligned}\Delta \ln \mathrm{TFP}_{i,t} = \Delta \ln \mathrm{GDP}_{i,t} - \big(&\alpha_1 \Delta \ln K_{i,t} + \alpha_2 \Delta \ln L_{i,t} + \alpha_3 \Delta \ln \mathrm{FDI}_{i,t} + \\ &\alpha_4 \Delta \ln \mathrm{HC}_{i,t} + \alpha_5 \Delta \ln \mathrm{AC}_{i,t} + \alpha_6 \Delta \ln \mathrm{Telint}_{i,t}\big)\end{aligned} \tag{3}$$

According to Ahmed (2012a,b) this approach decomposes the growth rate of aggregate output into the respective shares of input factors. In the other word, the framework breakdown the growth rate of aggregate output into contribution growth rate of aggregate physical capital, labour, HC, FDI, AC, telecommunications investment and the combined contributions of the quality of them that is expressed as TFP or technological progress.

RESULTS AND DISCUSSION

This study applies the modified extensive growth theory model which is using output approach to examine the productivity growth indicators of the most important Asia Pacific Economies as modified by Ahmed (2006, 2013). In this regard, output productivity investigates the influence of labour force, physical capital, FDI, HC, AC and telecommunications investment on productivity growth of selected Asian Pacifica countries for the period of 1970 to 2012.

In this respect, this study applied time series data for 11 Asia-Pacific countries for the period 1970—2012, in order to assess the potential linkage between FDI spillovers effect and productivity growth. This period was followed by the structural change policies in these countries in improving productivity growth that — mostly thanks to the manufacturing sector — had been supported by FDI. Nevertheless, the contribution of the TFP growth on the long run productivity growth of these countries — excluding Japan and Korea — was less important role due to the fact that took placed the economic recession of 1973, 1985 and the financial crisis of 1997; in addition, the quality of HC and the technology applied in these countries Ahmed (2012a,b).

As a result, the contribution of TFP to the selected Asia-Pacific economy by including FDI inflows, capital, labour, HC, AC (interaction variable between FDI and HC), and telecommunications investment in the model was slight (Table 1). The countries like Korea and Japan had achieved their economic growth based on the productivity-driven economies along with technological progress. By looking at the TFP contribution of the Japan and Korea with other countries, it can be found that there is no significant difference between these countries in term of average annual growth rates. This result can be interpreted as low and insufficient quality of the inputs used in the production function of these economies.

The highest contribution of GDP to the productivity growth of the selected Asia-Pacific countries is observed for china's economy which includes a period investment-driven policy along with particular focus on the HC, and telecommunications investment variables. As a result the productivity of the Chinese economic growth was rapid compared with the period before the structural change policy of that had been supported by FDI. Moreover, the highest contribution of the FDI inflows to the selected economies' productivity growth through TFP growth was seen in the Singaporean economic growth. This implies that the quantity growth of FDI inflows can be explained by input driven policies contributed to its economy's productivity growth.

In addition, the highest contribution of the aggregate physical capital to GDP in terms of average annual productivity growth of these economies has been observed. In the other word, the quantity of aggregate physical capital is reflected in GDP growth and not the quality of physical capital applied in productivity driven economies. The highest contribution of the labour input to GDP in terms of average annual productivity growth of these countries was made by Indonesian economy. This shows that the comparative advantage in unskilled labour intensive was beneficial in favour of attracting FDI inflows.

Further, the highest contribution of HC to GDP in terms of average annual productivity growth of these group countries was recorded by China and Malaysia, respectively. By considering the contribution of HC

at arrive productivity driven economy, it can be found that there was a slight contribution of HC to TFPG of these economies (Table 1). This indicates the input driven productivity being based on the quantity of this factor and not through the new skills development achieved by productivity driven economies.

Finally, the highest contribution of AC to GDP in terms of average annual productivity growth of mentioned countries was seen by India and South Korea among others respectively. The highest contribution of telecommunications investment to GDP in terms of average annual productivity growth of these economies was found by China. This reflects that increasing of telecommunications investment in order to achieve sustainable economic growth to develop knowledge-based economies.

Concisely, the productivity of the Malaysian economic growth was found to be input driven with particular focus on HC improvement and growth in telecommunications investment as a proxy for ICT. On the other hand, the economic growth for the period of 1970—2012 was rapid compared with the period before the structural change policy of that had been supported by FDI inflows. Whilst, the productivity of the Indonesian and Singaporean economic growth was found to be labour driven and capital oriented policy that had been supported by Multi-National Companies (MNCs) investment in particular.

It should be noted that in Philippines case, the productivity of the economic growth is perceived investment driven policy for the entire period of 1970 to 2012. Whereas, Thailand that was labour driven economic growth and investment driven with particular attention on the HC and telecommunications investment supported by FDI inflows.

Table 1 Productivity Indicators of Selected Asia Pacific Countries; 1970—2012

Country	*GDP*	*FDI*	*CAP*	*LAB*	*HC*	*AC*	*TELINT*	*TFP*
Malaysia	1.590	0.047	0.497	−0.058	0.167	−0.001	0.008	0.932
Indonesia	1.650	0.041	0.082	0.185	−0.026	−0.023	−0.015	1.405
Singapore	1.974	0.195	0.586	0.162	−0.135	−0.0009	−0.009	1.175
Philippines	0.597	−0.005	0.566	−0.110	−0.116	−0.001	−0.015	0.280
Thailand	1.748	0.0002	0.737	0.009	0.127	−0.006	0.009	0.872
China	3.142	0.122	0.531	−0.197	0.262	−0.060	0.050	2.437
Japan	0.890	0.0007	0.353	0.011	−0.007	−0.002	−0.051	0.587
Korea	2.150	0.019	0.730	0.034	0.030	0.037	−0.036	1.336
India	1.413	0.119	0.308	−0.006	−0.140	0.056	0.040	1.035
Australia	0.723	−0.004	0.532	−0.068	−0.492	0.0005	−0.003	0.758
New Zealand	0.508	−0.003	0.290	0.158	−0.106	−0.002	0.025	0.146

Notes: Figures were calculated using Equation (3); Figures Showing in Percentage of Variables.

Moreover, the China, Australia, and Indian economies experienced their economic growth through investment driven policies. Finally, the New Zealand productivity growth was found to be based on the combination of investment driven along with labour driven policies with particular investment in telecommunications.

CONCLUSION AND IMPLICATIONS

The results showed that productivity growth of significant Asia Pacific's economies in aggregate output model that input driven was generally more prevalent than TFP growth driven when the results of TFP were compared with that of output growth without considering single productivity indicators for period 1970 to 2012. Although the results are mixed, an important conclusion that can be drawn is that growth rates output in were positive but depend on a variety of input terms. Moreover, this paper showed that HC provides the potential effects of FDI to enhance the economic growth as an input driven economy. Meanwhile, the contribution of HC 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 HC 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 HC development and eventually to contribute significantly to economic growth.

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BIOGRAPHICAL NOTES

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