Influence of Foreign Direct Investment on Tax Revenue in Selected Asian Countries

Kunofiwa Tsaurai[1]

Abstract: This study examined the influence of foreign direct investment on tax revenue in five selected Asian countries. Three panel data (1988-2020) analysis approaches were employed in this study, namely the fully modified ordinary least squares (FMOLS), fixed effects (FE) and the pooled ordinary least squares (POLS). Whether economic growth and trade openness are channels through which tax revenue generation is enhanced by foreign direct investment is another objective of this study. The existing literature on the relationship between foreign direct investment, tax revenue and absorption capacities in the host country produced results which are inconclusive, mixed, divergent and far from authoritatively showing consensus. Pooled OLS (all three models) showed that tax revenue generation was enhanced significantly by foreign direct investment whilst FMOLS and fixed effects indicate a non-significant positive relationship running from foreign direct investment towards tax revenue. The complementarity between foreign direct investment and economic growth was found to have a significant enhancing effect on tax revenue under the pooled OLS. On the other hand, a non-significant positive relationship between the complementarity variable (foreign direct investment x economic growth) and tax revenue running from the former to the latter. Across all the three econometric estimation methodologies, the combination between foreign direct investment and trade openness was observed to have had an insignificant enhancing influence on tax revenue generation. The study urges the selected Asian nations to design and implement economic growth strengthening policies to enhance the positive impact of foreign direct investment on tax revenue. Investigating foreign direct investment threshold levels that enhances significant tax revenue generation should be part of further research related to this study.

Keywords: Foreign Direct Investment; Asia; Tax Revenue; Panel Data

JEL Classification: F21; H2; N15

1. Introduction

According to Binha (2021), foreign direct investment is internationally seen as a main source of economic growth in most developing countries. Foreign direct investment inflow enhances economic growth through its ability to alleviate challenges of financial liquidity, skills, technology, consistent with Nasibu (2022). In line with Camara (2022)'s argument, foreign direct investment promotes human capital development, managerial skills, technology and physical capital hence enhancing economic growth. The economic growth benefits from foreign direct investment inflow into the host country are clear and remains undisputable, as observed by empirical research done by Ibara (2020), Gudaro et al (2012), Zain (2019), Dinh et al (2019), Gochero and Boopen (2020), Forte and Moura (2013), Mamingi and Martin (2018), Baiashvili and Gattini (2019) and Mehdi (2011), among others.

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[1] Professor, Department of Finance, Risk Management and Banking, University of South Africa, South Africa, Corresponding author: tsaurk@unisa.ac.za

Despite the existence of overwhelming literature which shows that foreign direct investment is a vital cog in the economic growth process of any host country, there is a serious concern regarding the welfare influence of foreign direct investment (Binha. 2021). The crucial question that has been asked regards the influence of foreign direct investment on tax revenue in the host country. Apart from the fact that the impact of foreign direct investment on tax revenue is ambiguous from a theoretical angle, the positive technological spill-overs arising from foreign direct investment and resultant domestic firms' productivity boosts the generation of tax revenue for the host country (Binha, 2021, p. 16). On the other hand, host countries may not be able to benefit from foreign direct investment related spill-overs if certain absorption capacities lack and or are not available in the right quality or quantity (Nguyen et al., 2022). The fierce competition which foreign investors bring into the host country may drive the domestic firms out of business (negative competition effect), hence promoting an inverse relationship between foreign direct investment and tax revenue, argued Binha (2021).

Few empirical researchers which examined the relationship between foreign direct investment and tax revenue are quite scant. They produced results which are mixed, far from reaching consensus, divergent and inconclusive. The first group noted that foreign direct investment enhances tax revenue generation (Protono, 2020; Ola, 2021; Oladele, 2020; Binha, 2021; Camara, 2022; Gnangnon, 2021; Nalyanga et al., 2020; Olaniyan et al., 2020). The second one produced result which support the existence of an inverse relationship between the two variables (Nasibu, 2022; Gaspareniene et al., 2022; Alalawneh, 2020). The third group supported the view that foreign direct investment can enhance tax revenue generation if only certain absorption capacities exists in the host country (Nasibu, 2022). The fourth group found no relationship between the two variables (Nasibu, 2022). This study attempted to contribute towards literature to help address these apparent contradictions and diverging views.

Specifically, this study examined whether economic growth and trade openness have a moderating effect on the impact of foreign direct investment on tax revenue in Asia. This study is the first of its kind to focus on Asia as a unit of analysis. This paper also studied whether trade openness and or economic growth are avenues or channels through which tax revenue in Asian countries was affected by the inflow of foreign direct investment. Similar empirical research did not investigate such a phenomenon, more so, in the Asian context. Unlike similar research studies, this study considered the fact that the relationship between tax revenue and foreign direct investment is modelled in a non-linear fashion. This study made use of the most recent data (1988-2020).

The remaining portion of the paper is organized into six sections. Section 2 discusses the literature on the influence of foreign direct investment on tax revenue. Control variables of the tax revenue function are explained in Section 3. Tax revenue and foreign direct investment trends are presented, described and analysed in Section 4. Research methodological framework of this study is described and explained in Section 5. The results of the study are presented, analysed and interpreted in Section 6. Section 7 summarizes the study.

2. Impact of Foreign Direct Investment on Tax Revenue

Consistent with Nguyen et al (2022), the inflow of foreign direct investment creates employment thereby contributing to more income tax raised in the host country. The increased economic growth brought by foreign direct investment inflow promotes the growth of small businesses and enable the expansion, growth and profitability of many companies. This enhances company tax revenue collection efforts (Nguyen et al. 2022, p. 6).

In line with Rodrik (1998), foreign direct investment facilitates linkages, connectivity and networking between domestic firms in the host country and foreign companies. This promotes international trade, exporting of domestic products, generation of foreign currency and growth and expansion of local firms thereby enabling them to contribute more towards company tax revenue.

Certain factors must prevail in the host country to enable foreign direct investment to have a positive effect on tax revenue generation, consistent with Nguyen et al (2022). The latter implied that the absence of tax incentives and the availability of trade openness promotion policy and economic growth in the host country makes the impact of foreign direct investment on tax revenue positive.

On the empirical front, several researchers attempted to explore the influence of foreign direct investment on tax revenue. These include Gaspareniene et al (2019), Binha (2021), Nasibu (2022), Camara (2022), Gaspareniene et al (2022), Gnangnon (2021), Nalyanga et al (2020), Olaniyan et al (2020), Protomo (2020), Ola (2021), Makwe and Oladele (2020) and Alalawneh (2020), among others.

Using time series data (2008-2017) analysis, Gaspareniene et al (2019) explored the influence of foreign direct investment on tax revenue in Lithuania. The study found out that tax revenue in Lithuania was significantly enhanced by the inflow of foreign direct investment. Binha (2021) examined the nexus between tax revenue and foreign direct investment in Zimbabwe using ordinary least squares (OLS) with time series data ranging from 1980 to 2015. Foreign direct investment enhanced tax revenue collection in Zimbabwe. Nasibu (2022) examined the relevance of the tax revenue-led foreign direct investment hypothesis using Kenya as a unit of analysis. The study made use of the time series (annual) data spanning from 1989 to 2018. Inflow of foreign direct investment was found to have had no influence on tax revenue in the short run whilst an inverse relationship between the two variables was observed in the long run in Kenya. The study observed that both moderating variables (trade openness and economic growth) had an insignificant positive effect on foreign direct investment's influence on tax revenue generation in Kenya.

Camara (2022) examined the influence of foreign direct investment on tax revenue in developing countries using the system generalized methods of moments with panel data ranging from 1996 to 2017. Tax revenue was found to have been positively and significantly affected by the inflow of foreign direct investment in developing countries. The same study observed that tax revenue was not influenced by foreign direct investment inflow in the case of resource exporting developing countries. Gaspareniene et al (2022) used the European Union as a unit of analysis to investigate the tax revenue influence of foreign direct investment inflows. The study employed panel data analysis approaches with panel data from 1999 to 2019. Inflow of foreign direct investment had a dampening influence on tax revenue whilst tax revenue was significantly enhanced by foreign direct investment outflows.

Employing two step system generalized methods of moments (GMM) with panel data (1981-2016), Gnangnon (2021) explored how income tax volatility and foreign direct investment are related in 129 countries. As countries depends more on their resources, the volatility of foreign direct investment had a greater positive impact on the volatility of corporate income tax. The study noted that the positive effect of foreign direct investment volatility on corporate income tax volatility was more pronounced in less advanced nations in comparison to in advanced group of countries.

Nalyanga et al (2020) examined the interrelationship between tax revenue and foreign direct investment in the context of Kenya using annual time series data (2009-2018) analysis. A significant positive influence of foreign direct investment and economic growth on tax revenue was observed in the case of Kenya. Using Nigeria as a focal point, Olaniyan et al (2020) investigated the nexus between tax revenue and foreign direct investment. Ordinary least square regression approach with time series annual data spanning from 1990 to 2020 were used in their study. They observed that tax revenue was positively affected by the inflow of foreign direct investment in the context of Nigeria.

Using the autoregressive distributive lag (ARDL) methodology with annual time series data (1991-2018), Alalawneh (2020) studied the influence of foreign direct investment and foreign aid on tax burden reduction in the context of Jordan. In the long run, the study noted that the tax burden in Jordan was increased by the inflow of foreign direct investment. Similar results were observed in the case of the relationship between tax burden and the inflow of foreign aid. A study by Protomo (2020) examined the influence of foreign direct investment on tax revenue in the case of developing countries. Two stage least squares (panel data analysis) was used in this investigation. Total value

added tax, individual tax revenue, corporate tax revenue and total tax revenue were found to have been positively and significantly affected by the inflow of foreign direct investment. Although positively influenced, property tax revenue was affected by foreign direct investment inflow in a non-significant manner.

Ola (2021) in the context of Nigeria examined the linkage between tax revenue and foreign direct investment using time series annual data (1987-2019) analysis. The study employed the vector error correction model and produced results which show that tax revenue was positively and significantly enhanced by the inflow of foreign direct investment inflow in the long run. Makwe and Oladele (2020) investigated the relationship between foreign direct investment inflows and tax revenue using the ARDL approach using the time series annual data (1970-2018) in Nigeria. Foreign direct investment inflow into the mining sector had a significant enhancing effect on tax revenue whilst tax revenue was negatively affected by the inflow of foreign direct investment into the agricultural sector in Nigeria.

3. Control Variables on the Tax Revenue Function

Economic growth, savings, trade openness, agricultural sector growth, domestic investment and infrastructural development are the control variables of the tax revenue function used in this study. Consistent with Taha et al (2011), high levels of economic growth increase not only the number of new companies being formed but the growth and expansion of the existing companies thereby leading to an increase in tax revenue base. An increase in domestic savings spurs (1) economic growth and (2) investment in financial assets and physical projects, both of which are sources of tax revenue generation in the economy, consistent with Ribaj and Mexhuani (2021).

A study done by Asghar and Mehmood (2017) observed that trade openness had a negative impact on tax revenue in the case of Pakistan. Consistent with their study, trade openness makes it easy for capital outflows to happen thereby stifling domestic investment, which is a major source of tax revenue generation. On the other hand, Bird et al (2004) produced results which show that trade openness enhanced tax revenue collection. The explanation is that high levels of trade openness allows the growth and expansion of domestic firms through enabling them to easily participate in international markets, bring in foreign currency and easily market their products. The study therefore anticipates trade openness to either positively or negatively affect tax revenue. Rodrik (1998) argued that as the economy opens more to international trade, the government is more likely to implement protectionist policies (raising import duties, quotas, and export taxes) to ward off the threat of external influences.

Consistent with Nguyen et al (2022), it is extremely cumbersome and difficult to collect tax revenue in the agricultural sector as most of its activities happens in the informal markets and they are of a small scale in nature. To promote the agricultural sector which is a cornerstone for economic success, majority of the governments offer incentives to the farmers such as removal of taxes on the farm produce traded or slashing the taxes to a very minimum level, argued Castro and Camarillo (2014). The anticipation is that tax revenue is negatively affected by agricultural sector growth.

Consistent with Bakari et al (2019, p. 1), domestic investment triggers economic growth and the tax revenue base. As noted earlier on, Taha et al (2011) and Ribaj and Mexhuani (2021) also supported the same assertion. Yoshino and Abidhadjaev (2017) argued that infrastructural development enhances economic growth and tax revenue generation through the following channels. Railways promotes interconnectedness and connectivity between commodity markets, locally, regionally and continentally thereby enhancing trade growth, company success, gross domestic product of economies involved and tax revenue generation capabilities. Developed transport infrastructure decreases carriage costs thereby facilitating international trade, which is a very reliable source of foreign currency and tax revenue (Ando & Kimura, 2013). The same study noted that telecommunication infrastructure helps

investors to effectively and decisively address the problem of information asymmetry hence it is one of the primary consideration by foreign direct investors. Infrastructure development is expected to have a positive effect on the generation of tax revenue in the host country.

4. Foreign Direct Investment and Tax Revenue Trends in Selected Asian Group of Countries
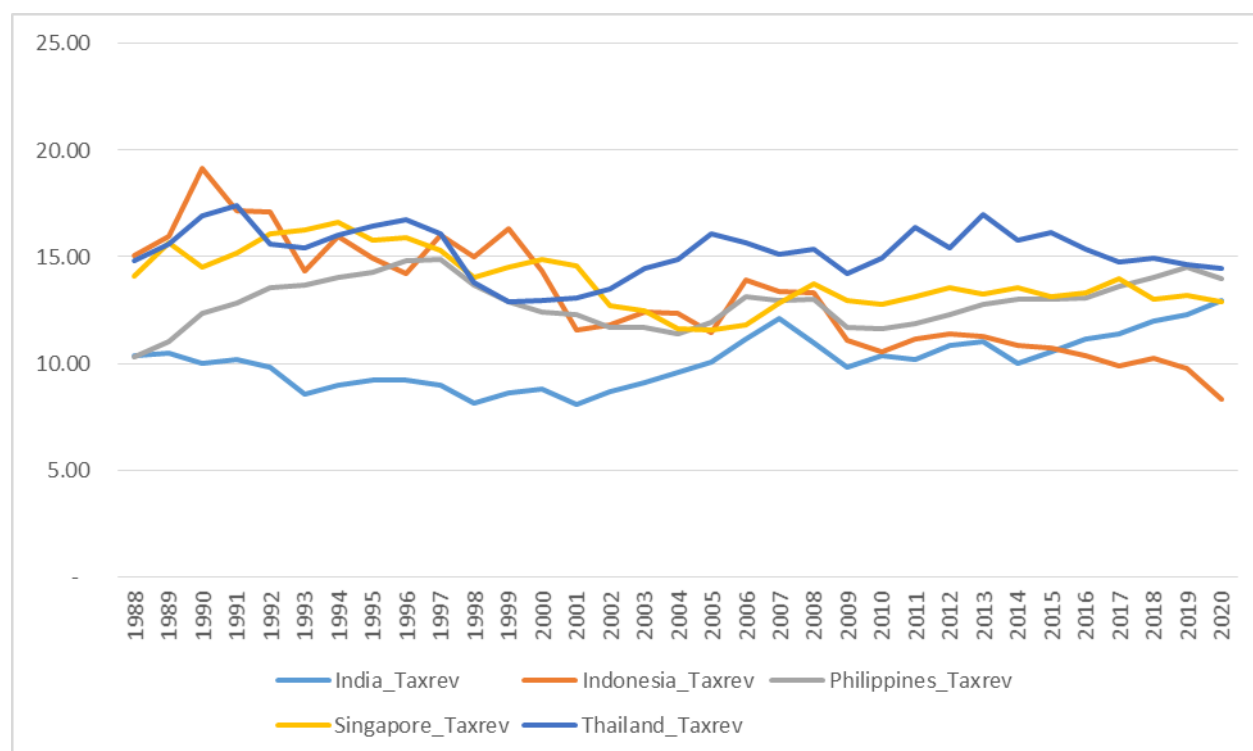
Figure 1. Tax revenue (% of GDP) trends for Asian countries (1988-2020)

According to Figure 1, India's tax revenue went down from 10.36% of GDP in 1988 to 8.98% of GDP in 1994, marginally decreased by 0.17 percentage points during the period from 1994 to 2000 before going up by 2.32 percentage points during the subsequent six-year period (2000-2006). The period ranging from 2006 and 2012 saw India's tax revenue plummeting by 0.29 percentage points (from 11.13% of GDP in 2006 to 10.84% of GDP in 2012. The tax revenue for India increased from 10.84% of GDP in 2012 to 12.02% of GDP in 2018 before further surging by 0.91 percentage points during the two-year period from 2018 to 2020.

Indonesia's tax revenue increased from 15.08% of GDP in 1988 to 15.95% of GDP in 1994 before declining by (1) 1.63 percentage points during the period between 1994 and 2000, (2) 0.39 percentage points between 2000 and 2006 and (3) 2.55 percentage points during the period spanning from 2006 to 2012. The period between 2012 and 2018 saw Indonesia's tax revenue declining by 1.15 percentage points before further going down from 10.23% of GDP in 2018 to 8.31% of GDP in 2020.

Tax revenue for Philippines went up from 10.33% of GDP in 1988 to 14.04% of GDP in 1994, declined by 1.60 percentage points during the period between 1994 and 2000 and then increased from 12.44% of GDP in 2000 to 13.13% of GDP in 2006. The period between 2006 and 2012 saw Philippines's tax revenue plummeting by 0.82 percentage points. The tax revenue for Philippines went up from 12.31% of GDP in 2012 to 14.05% of GDP in 2018 whilst the two-year period between 2018

and 2020 saw Philippines's tax revenue marginally going down by 0.10 percentage points (from 14.05% of GDP in 2018 to 13.95% of GDP in 2020.

The tax revenue for Singapore increased from 14.07% of GDP in 1988 to 16.61% of GDP in 1994, declined by 1.76 percentage points during the period between 1994 and 2000 before further going down during the subsequent six-year period, from 14.86% of GDP in 2000 to 11.83% of GDP in 2006. Singapore's tax revenue went up by 1.75 percentage points during the period from 2006 to 2012, declined during the subsequent six-year period, from 13.58% of GDP in 2012 to 13.01% of GDP in 2018 before further going down by 0.12 percentage points during the two-year period spanning from 2018 to 2020.

Regarding Thailand, its tax revenue went up from 14.81% of GDP in 1988 to 16.04% of GDP in 1994, decreased by 3.06 percentage points during the subsequent six-year period (1994-2000) before increasing from 12.98% of GDP in 2000 to 15.64% of GDP in 2006. Singapore's tax revenue went down by (1) 0.20 percentage points during the period between 2006 and 2012, (2) 0.53 percentage points during the six-year period ranging from 2012 to 2018 and (3) 0.43 percentage points during the two-year period from 2018 to 2020.
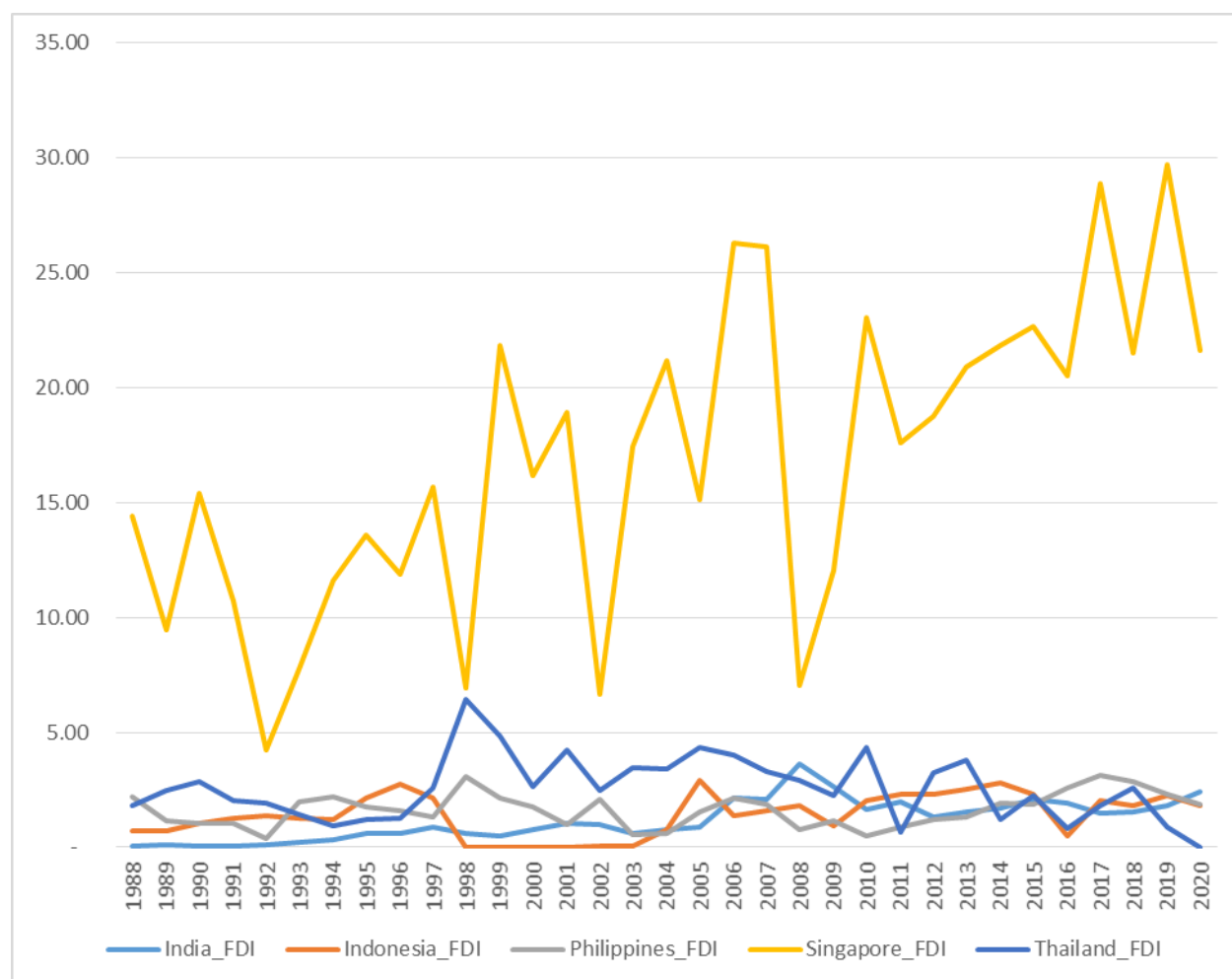
Figure 2. Net foreign direct investment (% of GDP) trends for Asian countries (1988-2020)

Figure 2 indicates that India's foreign direct investment net inflow increased from 0.03% of GDP in 1988 to 0.30% of GDP in 1994, went up by 0.47 percentage points during the period between 1994 and 2000 before further going up by 1.36 percentage points during the subsequent six-year period,

from 0.77% of GDP in 2000 to 2.13% of GDP in 2006. The period between 2006 and 2012 saw India's net inflow of foreign direct investment plummeting from 2.13% of GDP to 1.31% of GDP. Net foreign direct inflow for India went up from 1.31% of GDP in 2012 to 1.56% of GDP in 2018 before further increasing by 0.85 percentage points during the two-year period between 2018 and 2020.

Indonesia's net foreign direct investment inflow went up from 0.68% of GDP in 1988 to 1.19% of GDP in 1994, declined by 1.18 percentage points during the period from 1994 to 2000 and then went up from 0.01% of GDP in 2000 to 1.35% of GDP in 2006. The time period between 2006 and 2012 saw Indonesia's net inflow of foreign direct investment going up from 1.35% of GDP to 2.31% of GDP. Net inflow of Indonesia's foreign direct investment went down from 2.31% of GDP in 2012 to 1.81% of GDP in 2018 and then remained unchanged during the two-year period ranging from 2018 to 2020.

Philippines's net foreign direct investment inflow marginally went up by 0.01 percentage points during the six-year period from 1988 to 1994, plummeted by 0.40 percentage points during the subsequent six-year period, from 2.17% of GDP in 1994 to 1.78% of GDP in 2000. The period between 2000 and 2006 saw Philippines's net foreign direct investment inflow going up by 0.34 percentage points before going down by 0.89 percentage points during the subsequent six-year period (from 2006 to 2012). The net inflow of foreign direct investment for Philippines increased from 1.23% of GDP in 2012 to 2.87% of GDP in 2018 and went down by 0.98 percentage points during the period spanning from 2018 to 2020.

The net inflow of foreign direct investment for Singapore went down from 14.41% of GDP in 1988 to 11.60% of GDP in 1994, increased by 4.55 percentage points during the period ranging from 1994 to 2000 before massively going up by 10.18 percentage points during the subsequent six-year period (from 16.15% of GDP in 2000 to 26.33% of GDP in 2006). Singapore's net foreign direct investment went down by 7.58 percentage points during the period between 2006 and 2012 whilst the subsequent six-year period spanning from 2012 to 2018 saw the net foreign direct investment for Singapore going up by 2.79 percentage points. Singapore's net foreign direct investment marginally went up by 0.11 percentage points during the following two-year period, from 21.53% of GDP in 2018 to 21.65% of GDP in 2020.

Regarding Thailand, its net foreign direct investment inflow declined from 1.79% of GDP in 1988 to 0.93% of GDP in 1994, increased by 1.73 percentage points during the six-year period spanning from 1994 to 2000 before further going up by 1.36 percentage points during the subsequent six-year period (from 2.66% of GDP in 2000 to 4.02% of GDP in 2006). Net inflow of Thailand's foreign direct investment went down by (1) 0.78 percentage points during the period running from 2006 to 2012, (2) 0.64 percentage points during the period spanning from 2012 to 2018 and (3) 2.59 percentage points during the two-year time frame ranging from 2018 to 2020.

5. Research Methodology

Using Asian countries (India, Indonesia, Philippines, Singapore, Thailand) as a unit of analysis, this study explored the influence of foreign direct investment on tax revenue. The study used panel data (1988-2020) analysis methods with secondary data obtained from World Development Indicators, International Monetary Fund, International Financial Statistics. The secondary data extracted from these international databases is publicly viewable, reliable and easily verifiable.

This study used the following general model specification, presented in the form of equation 1.

TREV = f (FDI, GROWTH, OPEN SAV, AGRIC, DINVEST, INFR)   [1]

Table 1 below describes the variables and their proxies.

Table 1. Variables and their proxies

Variable	Measure used
Tax revenue (TREV)	Tax revenue (% of GDP)
Foreign direct investment (FDI)	Net foreign direct investment (% of GDP)
Economic growth (GROWTH)	Gross domestic product (GDP) per capita
Trade openness (OPEN)	Total trade (% of GDP)
Savings (SAV)	Domestic savings (% of GDP)
Agriculture sector growth (AGRIC)	Agriculture, foresting and fishing, value added (% of GDP)
Domestic investment (DINVEST)	Gross capital formation (% of GDP)
Infrastructural development (INFR)	Fixed telephone subscriptions (per 100 people)

Source: Author's compilation

Empirical studies whose research informed the choice of variables to be included in the general model specification include but are not limited to Gaspareniene et al (2019), Binha (2021), Nasibu (2022), Gaspareniene et al (2022), Makwe and Oladele (2020), Gnangnon (2021) and Nalyanga et al (2020). Moreover, the choice of the proxies of variables used in this study is consistent with earlier similar research done by Olaniyan et al (2020), Ola (2021), Protomo (2020), Alalawneh (2020) and Camara (2022).

Equations 2 and 3 represents the econometric format of the general model specification.

$$\text{TREV}_{it} = \beta_0 + \beta_1\text{FDI}_{it} + \beta_2\text{GROWTH}_{it} + \beta_3 (\text{FDI}_{it} . \text{GROWTH}_{it}) + \beta_4 \text{OPEN}_{it} + \beta_5\text{SAV}_{it} + \beta_6\text{AGRIC}_{it} + \beta_7\text{DINVEST}_{it} + \beta_8\text{INFR}_{it} + \mu + \varepsilon \qquad [2]$$

$$\text{TREV}_{it} = \beta_0 + \beta_1\text{FDI}_{it} + \beta_2\text{OPEN}_{it} + \beta_3 (\text{FDI}_{it} . \text{OPEN}_{it}) + \beta_4 \text{GROWTH}_{it} + \beta_5\text{SAV}_{it} + \beta_6\text{AGRIC}_{it} + \beta_7\text{DINVEST}_{it} + \beta_8\text{INFR}_{it} + \mu + \varepsilon \qquad [3]$$

Whilst equation 2 introduces the interaction term ($\text{FDI}_{it} . \text{GROWTH}_{it}$), equation 3 includes the impact of a complementarity between foreign direct investment and trade openness ($\text{FDI}_{it} . \text{OPEN}_{it}$) on tax revenue.

Introducing the influence of a complementarity variable on tax revenue resonates with an earlier study done by Nasibu (2022) whose study noted that trade openness and economic growth have got a moderating influence on foreign direct investment's effect on tax revenue.

The study expects that the complementarity between foreign direct investment and economic growth spurs tax revenue generation. The study also anticipates that the combination between foreign direct investment and trade openness has a negative impact on tax revenue collection in the host country. Pooled ordinary least squares (OLS), fixed effects and fully modified ordinary least squares (FMOLS) were used to econometrically estimate both equation 2 and 3.

6. Final Data Analysis

In line with Aye and Edoja (2017), the data used for main analysis was transformed into natural logarithms to deal away with statistical problems such as multi-collinearity problem and extreme values.

Table 2. Panel stationarity tests - Individual intercept

Level				
	IPS (Im, Perasan and Shin. 2003)	LLC (Levin, Lin and Chu. 2002)	PP (Phillip Peron Fisher Chi-square)	ADF (Augmented Dick Fuller Fisher Chi-square)
LTREV	-0.74	-2.51***	24.76*	22.98
LFDI	-1.05	-0.72	33.10***	14.70
LGROWTH	1.65	-0.54	5.15	3.68
LOPEN	0.20	-1.11	11.02	7.16
LSAV	-0.36	-0.34	13.61	10.56
LAGRIC	-2.26**	-4.20***	29.18***	24.06***
LDINVEST	-0.72	-0.24	11.69	12.11
LINFR	-1.70**	-2.37***	16.84*	17.58*
First difference				
LTREV	-6.26***	-4.76***	100.83***	56.45***
LFDI	-7.40***	-5.02***	87.45***	69.09***
LGROWTH	-4.35***	-3.22***	65.72***	37.78***
LOPEN	-6.82***	-4.54***	114.12***	63.27***
LSAV	-4.91***	-1.28*	70.41***	45.27***
LAGRIC	-4.43***	-1.70**	84.67***	41.08***
LDINVEST	-6.15***	-4.31***	98.38***	55.16***
LINFR	-1.44*	-5.16***	43.32***	17.00*

Source: E-Views

***, ** and * stands for 1%, 5% and 10% significance levels, respectively.

Table 2 shows that the data sets for all variables employed in this study was stationary at first difference. Odhiambo (2010) referred to this scenario of the data as integrated of the first order.

Table 3. Panel Co-integration test - Johansen Fisher methodology

Hypothesised No. of CE(s)	Fisher Statistic (from trace test)	Probability	Fisher Statistic (from max-eigen test)	Probability
None	293.3	0.0000	98.37	0.0000
At most 1	172.9	0.0000	64.36	0.0000
At most 2	124.0	0.0000	47.11	0.0000
At most 3	84.72	0.0000	30.15	0.0008
At most 4	61.54	0.0000	24.70	0.0060
At most 5	45.42	0.0000	20.70	0.0233
At most 6	35.86	0.0001	21.47	0.0180
At most 7	35.24	0.0001	35.24	0.0001

Source: E-Views

At most seven co-integrating relationships between and among the variables were observed (see Table 3). These results are supported from trace and max-eigen tests angles. The evidence of the existence of a long run relationship shown in Table 3 allowed main data analysis (see Table 4,5,6) to proceed.

Table 4, 5 and 6 present results from fixed effects, fully modified ordinary least squares and pooled ordinary least squares respectively. In all the three Tables of results, model 2 and 3 includes the complementarity results whilst model 1 show results of the influence of foreign direct investment on tax revenue, excluding the complementarity variable.

Table 4. Foreign direct investment and tax revenue in Asia –Fixed Effects

	Tax revenue		
	(1)	(2)	(3)
FDI	0.0016	0.0308	0.022
GROWTH	0.0390**	0.0407**	0.0380**
OPEN	0.2925***	0.2972***	0.2867***
SAV	-0.4744***	-0.4712***	-0.4784***
AGRIC	-0.0376	-0.0495*	-0.0353
DINVEST	0.3190***	0.3247***	0.3121***
INFR	-0.1140***	-0.1122***	-0.1149***
FDI*GROWTH		0.0045	
FDI*OPEN			0.0049
Number of countries	5	5	5
Adjusted R-squared	0.79	0.79	0.79
F-statistic	58.27	53.38	53.17
Prob(F-statistic)	0.00	0.00	0.00

Source: E-Views

***/**/* indicate 1%, 5% and 10% significance levels respectively

Fixed effects and FMOLS approaches produced results which show that tax revenue was enhanced by foreign direct investment in a non-significant manner, in all the three models. However, pooled OLS methodology noted that foreign direct investment had a significant enhancing effect on tax revenue under all the three models. These results mean that foreign direct investment spur tax revenue, in line with Nguyen et al (2022) whose study noted that the inflow of foreign direct investment creates employment and economic growth thereby contributing to more income tax and company tax raised in the host country.

Under the pooled OLS, FMOLS and fixed effects, the positive influence of economic growth on tax revenue was found to be significant across all the three models (1, 2, 3). The results resonate with an argument by Taha et al (2011) whose study observed that high levels of economic growth increase not only the number of new companies being formed but the growth and expansion of the existing companies thereby leading to an increase in tax revenue base.

Table 5. Foreign direct investment and tax revenue in Asia–FMOLS

	Tax revenue		
	(1)	(2)	(3)
FDI	0.0021	0.0327	0.0229
GROWTH	0.0563**	0.0591**	0.0583**
OPEN	0.3319***	0.3348***	0.3212***
SAV	-0.5516***	-0.5467***	-0.5598***
AGRIC	-0.0525	-0.0655*	-0.0523
DINVEST	0.3630***	0.3655***	0.3511***
INFR	-0.1230***	-0.1211***	-0.1252***
FDI*GROWTH		0.0047	
FDI*OPEN			0.0052
Number of countries	5	5	5
Adjusted R-squared	0.79	0.79	0.79
Prob(F-statistic)	0.00	0.00	0.00

Source: E-Views

***/**/* indicate 1%, 5% and 10% significance levels respectively

The results also overwhelmingly indicate that a positive impact of trade openness on tax revenue is significant in all the three models under FMOLS, fixed effects and pooled OLS, in sharp contrast to findings by Asghar and Mehmood (2017), whose study noted that trade openness and tax revenue were inversely related in the context of Pakistan. However, the results support Rodrik (1998)'s argument that as the economy opens more to international trade, the government is more likely to implement protectionist policies (raising import duties, quotas, export taxes) to ward off the threat of external influences.

Table 6. Foreign direct investment and tax revenue in Asia – Pooled OLS

	Tax revenue		
	(1)	(2)	(3)
FDI	0.0170**	0.0900**	0.0624*
GROWTH	0.0884***	0.0843***	0.0891***
OPEN	0.4308***	0.4372***	0.4317***
SAV	-0.2957***	-0.3156***	-0.3072***
AGRIC	-0.0865***	-0.1054***	-0.0976***
DINVEST	0.3154***	0.3168***	0.3129***
INFR	-0.1192***	-0.1116***	-0.1151***
FDI*GROWTH		0.0106*	
FDI*OPEN			0.0113
Number of countries	5	5	5
Adjusted R-squared	0.69	0.69	0.69
Prob(F-statistic)	0.00	0.00	0.00

Source: E-Views

***/**/* indicate 1%, 5% and 10% significance levels respectively

FMOLS (figure 4) and fixed effects (figure 5) noted that economic growth enhanced foreign direct investment inflow's impact on tax revenue in a non-significant way whilst pooled OLS (figure 6) indicates that economic growth improved foreign direct investment's influence on tax revenue in a significant manner. These results generally mean that economic growth is a channel through tax revenue generation is positively affected by foreign direct investment inflows into the Asian countries studied, consistent with Nguyen et al (2022) whose study implied that certain factors such as economic growth must prevail in the host country to enable foreign direct investment to have a positive effect on tax revenue generation.

Across all the three econometric estimation techniques employed in this study, tax revenue was found to have been enhanced in a non-significant manner by the complementarity between foreign direct investment and trade openness. Although the influence is not significant, the results resonate with Nguyen et al (2022)'s implications on foreign direct investment-trade openness-tax revenue nexus. The results are also consistent with Nasibu (2022), whose study observed that economic growth and trade openness were Kenya's macroeconomic variables which enabled foreign direct investment to influence tax revenue in a positive but significant manner.

7. Conclusion

This study examined the influence of foreign direct investment on tax revenue in five selected Asian countries. Three panel data (1988-2020) analysis approaches were employed in this study, namely the fully modified ordinary least squares (FMOLS), fixed effects (FE) and the pooled ordinary least squares (POLS). Whether economic growth and trade openness are channels through which tax revenue generation is enhanced by foreign direct investment is another objective of this study. The existing literature on the relationship between foreign direct investment, tax revenue and absorption capacities in the host country produced results which are inconclusive, mixed, divergent and far from authoritatively showing consensus. Pooled OLS (all three models) showed that tax revenue generation

was enhanced significantly by foreign direct investment whilst FMOLS and fixed effects indicate a non-significant positive relationship running from foreign direct investment towards tax revenue. The complementarity between foreign direct investment and economic growth was found to have a significant enhancing effect on tax revenue under the pooled OLS. On the other hand, a non-significant positive relationship between the complementarity variable (foreign direct investment x economic growth) and tax revenue running from the former to the latter. Across all the three econometric estimation methodologies, the combination between foreign direct investment and trade openness was observed to have had an insignificant enhancing influence on tax revenue generation. The study urges the selected Asian nations to design and implement economic growth strengthening policies to enhance the positive impact of foreign direct investment on tax revenue. Investigating foreign direct investment threshold levels that enhances significant tax revenue generation should be part of further research related to this study.

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