

The Impact of Foreign Direct Investment on Tax Revenues in Six ASEAN Nations: A Dynamic Panel Data Model

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Abstract

The aim of this study was to assess the impact of foreign direct investment on taxation in the Association of Southeast Asian Nations, known as ASEAN. There were five indicators namely foreign direct investment, tax revenues, foreign exchange, consumer price index, and balance of trade of Cambodia, Indonesia, Malaysia, Philippines, Singapore, and Thailand were integrated in a dynamic panel data model which utilized an estimation method developed by Arellano-Bond. The research findings indicated that tax revenue was impacted by net flow of foreign direct investment. This conclusion was drawn based on the positive slope coefficient and high statistical significance observed. Additionally, the estimated parameters of the lag of the dependent variable, foreign exchange, consumer price index, and balance of trade had significant influence on taxation. The tax revenues were collectively explained by all independent variables in the dynamic panel data model, as evidenced by the empirical findings.

Keywords: Tax Revenues, Foreign Direct Investment, ASEAN, Dynamic Panel Data Model

INTRODUCTION

Foreign direct investment has been discovered to assist host countries in achieving rapid and steady economic growth. The development of these host countries is not only attributed to the inflow of financial resources and capital, but also to the transfer of technology, which enhances human capital. The promotion of human capital is evident across the entire economy, providing advantages to businesses of various scales, ranging from small enterprises to large corporations. This promotion notably enhances the productivity and profitability of host companies, consequently leading to an increase in government tax revenues. According to a recent study conducted by Huong et al. (2021), effective management of sustainable tax revenue can play a crucial role in promoting fiscal balance, mitigating public debt, and enhancing the overall social welfare of the population.

ASEAN member states rely heavily on tax revenues to drive their nations' progress. They have adopted diverse strategies to increase the flow of funds from foreign countries so that their economy can be strengthened and the income of the government can be improved through tax collection. The significant relationship between foreign direct investment and taxation has been observed not only in ASEAN but also in other nations and communities (Camara, 2022; Minh Ha et al., 2022; Gaspareniene et al., 2022; Firda & Suparna, 2023). A significant correlation between tax revenues and foreign direct investment has been established in previous research. Nevertheless, the majority of the research has employed static panel data models, including pooled ordinary least square (OLS), random effect (RE), and fixed effect (FE), and Panel Corrected Standard Error (PCSE) models. On the other hand, the present study seeks to expand the inquiry into the impact of FDI on taxation in ASEAN member countries through the utilization of a dynamic panel data model.

This research is structured into five distinct sections. The initial part provides an introduction, while the second section comprises the literature review. The third section of the paper delves into the research methodology, while sections four and five provide a detailed account of the empirical results and conclusion, respectively.

LITERATURE REVIEWS

The economic development of a country has often been assessed by considering its per capita income level. Fenochetto and Pessino (2013) found that there is a direct relationship between per capita income and tax revenues, indicating that nations with greater income tend to produce higher levels of resources. This aligns

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with the argument put forth by Brun et al. (2006) that a country's ability to generate resources increases with its level of development. Different in tax revenues may stem from various significant factors. Among these factors, the level of development stands out, often gauged by the gross domestic product (GDP) per capita. This has been highlighted by Gupta (2007) and Pessino and Finochietto (2010). The structure of the economy, also known as productive specialization, is another important factor that can be assessed by analyzing the sectoral composition of the GDP. Piancastelli (2001) and Karagöz (2013) have undertaken investigations in this field. Moreover, tax revenues are significantly influenced by external factors like the level of foreign direct investment (FDI) and trade. The impact of FDI and trade on tax revenues has been examined by Cassou (1997) and Bird et al. (2008).

A study was carried out in Ethiopia to examine the determinants of tax revenue in the country. The primary aim of the study was to pinpoint the precise factors that impact tax revenue. Employing a quantitative research approach, the study analyzed a range of data gathered from 1999 to 2016. Several secondary regression model variables were used, employing the OLS method. The data collected from relevant institutions were subjected to descriptive and econometric statistical tests. According to the study's results, it was revealed that tax revenue was positively and significantly influenced by the industrial sector, per capita income, and trade openness. Conversely, the agricultural sector, GDP, and annual inflation were found to have a significant and negative impact on tax revenue (Neway G. et. al., 2018). A Fully Modified Ordinary Least Squares and Dynamic GMM approach was employed to analyze the influence of different economic factors on tax revenue in East African countries between 1992 and 2015. The study findings revealed that economic expansion, increased trade, growth in agriculture and the service sector, foreign assistance, and development in the manufacturing industry all contributed significantly to the rise in tax revenue within the area. Conversely, the research indicated that the exchange rate, urbanization, and inflation had a notable adverse effect on tax revenue in East African nations collectively. Moreover, the study demonstrated that a delay of one period in taxation and urbanization negatively affected tax revenue, whereas a delay of two periods in taxation and urbanization positively impacted tax revenue in the East African region. These findings highlight the importance for policymakers in East African countries to prioritize policies that foster economic growth, trade openness, and industry growth, while also addressing the adverse effects of exchange rate, urbanization, and inflation on tax revenue (Terefe & Teera, 2018). Panel data analysis was employed to examine the correlation between tax revenue and various economic indicators in both developed and developing countries from 1996 to 2015. The results of the research indicated that tax revenue was positively impacted by factors including industrial expansion, broad money circulation, economic advancement, trade accessibility, and agricultural output (Piancastelli & Thirlwall, 2020; Tufail & Taieb, 2023).

In 2018, Andrejovska and Pulikova conducted a research study focusing on European Union countries. The researchers utilized fixed effects, pooled ordinary least squares (OLS), and random effects approaches to examine the data. The investigation unveiled that the expansion of tax revenue was positively influenced by employment, economic growth, and foreign direct investment. Nevertheless, the results also corroborated the claim put forth by Baunsgaard and Keen (2010) concerning the correlation between trade liberalization, reduction in tariffs, and the total tax income generated within the economy. The research showcased that the level of trade openness had a notable negative impact on tax revenue, as evidenced by the implementation of all four panel data analysis methods. These results were consistent with the empirical research conducted by Anuah (2019), which also identified a negative correlation between trade openness and taxation. The tax revenue is significantly and positively influenced by foreign direct investment (FDI), as demonstrated by the dynamic GMM and random effects models. Conversely, the fixed effects and pooled OLS models have shown that FDI has a positive impact on tax revenue, although it is not statistically significant. The findings align with the observations made by Amoh and Adom (2017), who have noted that FDI inflows contribute to the formalization of economic activities and enhance competitiveness, thereby increasing tax revenue collection in the economy. During the entire investigation, a consistent observation was made that the correlation between FDI and financial development yields a noteworthy and favorable influence on tax revenue across all four econometric techniques employed. This implies that foreign direct investment and financial development collaborate in the endeavor of generating and accumulating revenue. In the upper middle-income group of

countries, financial development plays a crucial role in facilitating the flow of foreign direct investment and boosting revenue generation. The findings of Masiya et al's (2015) research align with this notion, as they found that FDI entering countries with well-established formal financial systems tends to lead to higher government revenue collection. Additionally, the results align with the research conducted by Andrejovska and Pulikova (2018) as well as Ade et al (2018).

A research project was conducted to analyze the impact of economic, structural, institutional, and social factors on tax revenue in 34 countries belonging to the Organisation for Economic Co-operation and Development (OECD) from 2001 to 2011. The study utilized two types of panel models, specifically static and dynamic panel models. The results showed that GDP per capita, the industrial sector, and civil liberties positively influenced the dependent variable, whereas the agricultural sector and foreign direct investment had a negative impact. Moreover, the previous value of the dependent variable, which reflected tax revenue, had a beneficial effect on the equation, particularly in high-income countries (Castro & Camarillo, 2014; Al-Dmour et al., 2023). Rodríguez (2018) analyzed an unbalanced panel dataset with a significant sample size of developed and developing countries spanning a 40-year timeframe between 1976 and 2015. The primary aim was to pinpoint the enduring factors, covering economic, social, political, and cultural dimensions, that shape tax policies and contribute to variations in tax performance. The study outcomes suggest that taxation evolves in a path-dependent manner, hinging on past trends, while taking into account the overall tax burden and the proceeds from consumption and income taxes, in addition to a progressiveness indicator (Jam et al., 2018). The results indicate that taxes are markedly influenced by historical and structural factors, such as the economic environment and the dynamics of alternative public revenue streams, including inflation.

Different panel models were employed in this research to analyze the factors influencing tax revenue in Southeast Asia. The models used encompassed Pooled OLS, Fixed Effects, Random Effects, and Driscoll-Kraay standard error. Furthermore, a dynamic panel data model was utilized in the analysis. The research made use of a well-balanced dataset encompassing eight different countries. The findings of the research suggest that tax revenue is positively affected by trade openness, FDI, the ratio of foreign debt to GDP, and the share of value added in industry to GDP. Conversely, official development assistance has a detrimental effect. According to the findings, it is advisable for Southeast Asian nations to adopt more efficient strategies in global trade, attract greater amounts of foreign direct investment (FDI), accelerate the economic restructuring process, and enhance their capacity to mobilize, oversee, and utilize foreign debt and assistance. Implementing these measures will result in a boost in tax revenue collection across the region (Ha et al., 2022). From 1996 to 2017, a research study was carried out in 90 developing nations to explore the correlation between FDI and tax income. The study employed a GMM system to gauge the consequences. The results demonstrated that FDI inflow resulted in a rise in tax revenues obtained by the recipient countries. Furthermore, the study's empirical findings showed that FDI had a negligible effect on tax revenues in export-oriented economies (Camara, 2022). The impact of FDI on tax revenues was evaluated using empirical evidence across the 28 member states of the European Union over a period of 21 years, between 1999 and 2019. This evaluation utilized pooled ordinary least squares estimation panel data and considered robust heteroscedasticity-consistent standard errors. The results of the analysis revealed that FDI inflow had a negative effect on tax revenues. Notably, the lag of FDI outflow by two years was found to have a statistically significant influence on tax revenues in the European Union states (Gasparyniene et al., 2022; Bensaid, 2023).

A study was conducted to evaluate the effect of foreign direct investment on tax revenues in ASEAN member states. The study utilized various static panel data models, including pooled OLS, FE, RE models, and a Panel Corrected Standard Error (PCSE) model. The research spanned from 2012 to 2019, and the findings revealed a significant positive impact of foreign direct investment on tax revenues in ASEAN (Firda & Suparna, 2023; Rashid et al., 2023). However, it is important to note that the models used in this study did not account for the dynamic influence of the dependent variable. To address this research gap, the current study will employ a dynamic panel data model to assess the influence of foreign direct investment on tax revenues in ASEAN countries.

METHODOLOGY

The purpose of this research is to empirically assess the impact of foreign direct investment on tax revenues within the Association of Southeast Nations. This research objective is achieved by utilizing a dynamic panel data model with a specific form as below.

$$TAX_{it} = \delta_0 + \delta_1 TAX_{it-1} + \delta_2 FDI_{it} + \delta_3 FX_{it} + \delta_4 CPI_{it} + \delta_5 TRADE_{it} + \vartheta_{it}$$

TAX denotes the aggregate tax revenues, FDI signifies the net influx of foreign direct investment, FX denotes foreign exchange, CPI represents the consumer price index, and TRADE indicates the trade balance. All the variables are expressed in millions of US dollars, with the exception of FX, which is denominated in local currency per US dollar, and CPI, which is gauged using a weighted average price index. The focus of this study is on FDI, which serves as the independent variable of interest. Additionally, the model takes into account three control variables: CPI, FX, and TRADE. The data for CPI, FX, and TRADE are obtained from the Asian Development Bank (ADB). Tax data is sourced from the World Development Indicator (WDI) of the World Bank (WB), while information on the net flow of foreign direct investment is obtained from the Balance of Payment (BoP) of the International Monetary Fund (IMF). The parameters to be estimated in this research are δ_j , where $j = 0,1,2,3,4,5$. ϑ_{it} be the error term of a panel data regression model, with $1 \leq i \leq n$, and $1 \leq t \leq T$. It is worth mentioning that $\vartheta_{it} = \mu_i + \epsilon_{it}$ and $\epsilon_{it} \sim \mathcal{N}(0, \sigma_\epsilon^2)$. Throughout the duration of the study, a total of six countries within the ASEAN region, specifically Cambodia, Indonesia, Malaysia, Philippines, Singapore, and Thailand, have contributed comprehensive datasets. These countries represent the complete data from the ten member states. The sample size consists of 72 observations (N) and spans a period of 12 years (t) from 2010 to 2021. The estimation technique employed is the two-step generalized method of moments, specifically the Arellano-Bond dynamic panel data approach.

EMPIRICAL RESULTS

The research empirically examines data from six ASEAN member states - Cambodia, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Over a 12-year study period, a total of 72 observations were made. Table 1 provides a summary of statistics for tax revenues, foreign direct investment, consumer price index, and balance of trade.

Table 1 Summary Statistics

Variables	Observation	Mean	Standard Deviation	Minimum	Maximum
TAX	72	49400	29983	1125	109134
FDI	72	-8435	16047	-87742	23544
FX	72	2733	4619	1.25	14582
CPI	72	114	26	79	188
TRADE	72	26963	53793	-43533	253678

The correlation matrix in Table 2 shows the relationships between the independent variables being studied. The results displayed in the table reveal that there is no significant multicollinearity present, as all correlation coefficients fall below -0.9 or above +0.9. Specifically, the correlations between FDI and FX, FDI and CPI, as well as FDI and TRADE are -0.1178, 0.1118, and -0.1407, respectively. Furthermore, the correlation between FX and CPI is 0.3852, while the correlation between FX and TRADE is -0.2357. Lastly, the correlation between CPI and TRADE is -0.0903.

Table 2 Correlation Matrix

	FDI	FX	CPI	TRADE
FDI	1			
FX	-0.1178	1		

CPI	0.1118	0.3852	1	
TRADE	-0.1407	-0.2357	-0.0903	1

The dynamic panel data model's empirical findings are displayed in Table 3. Initially, it is important to carry out and analyze the Sargan test of over-identifying restrictions. The outcome of this test suggests that the null hypothesis, stating that the instruments used are valid, is supported as the probability of the Wald $\chi^2(9) = 11.597$ is 0.237, which is less than the 5% significance level. Additionally, it is important to highlight that there are 14 instruments utilized, exceeding the number of groups, which is 12. With respect to the Arellano-Bond test for the first-order autocorrelation, AR(1), the calculated z-value is -0.4465 with a corresponding probability of 0.6552, exceeding the 5% significance level. This implies that there is no first-order autocorrelation present. Conversely, in relation to the Arellano-Bond test for the second-order autocorrelation, AR(2), the null hypothesis is strongly rejected at a 1% significance level, indicating the presence of second-order autocorrelation.

Table 3 Dynamic Panel Date Model, Empirical Results

Independent Variables	Coefficient	Standard Error	z	P>z	[95% Confident Interval]	
TAX(-1)	-0.1970	0.0190	-10.36	0.000	-0.2342	-0.1597
FDI	0.2067	0.0219	9.44	0.000	0.1637	0.2496
FX	2.2545	0.1506	14.97	0.000	1.9594	2.5496
CPI	525.46	47.530	11.06	0.000	432.30	618.62
TRADE	-0.0623	0.0055	-11.38	0.000	-0.0730	-0.0516
Joint test						
Wald $\chi^2(5)$	55791					
Prob > χ^2	0.000					
Sargan test						
Wald $\chi^2(9)$	11.597					
Prob > χ^2	0.237					
AR(1)						
z	-0.4465					
Prob > z	0.6552					
AR(2)						
z	-2.8056					
Prob > z	0.0050					

The findings of this study have provided additional evidence that the calculated slope coefficient of the lag dependent variable is -0.1970, and it is statistically significant at the 1% level. What's even more intriguing is that the estimated parameters for FDI amount to 0.2067, indicating a positive relationship. Moreover, the corresponding probability is 0.000, which is below the 1% level of significance. This suggests that as the net flow of foreign direct investment increases, the tax revenues collected by the six ASEAN member states under investigation (Cambodia, Indonesia, Malaysia, Philippines, Singapore, and Thailand) also increase. Moreover, the depreciation of the exchange rate and the rise in the overall price level would contribute to the enhancement of tax revenue collection in ASEAN. This is supported by the estimated coefficients of 2.2545 for FX and 525.46 for CPI. Notably, both individual slope coefficients for FX and CPI are highly statistically significant at the 1% level. Conversely, although the balance of trade also has a significant impact on tax revenues at the 1% level, it is negative due to an estimated slope of -0.0623. As the trade deficit increases, tax revenues decrease. Furthermore, all slope coefficients in this study collectively explain tax revenues, as evidenced by the calculated Wald $\chi^2(5)$ test of 55791 and its corresponding probability of 0.000, which is less than the 1% level of significance.

CONCLUSION

In order to examine the impact of the net flow of foreign direct investment on total tax revenues in the six ASEAN member states - Cambodia, Indonesia, Malaysia, Philippines, Singapore, and Thailand, this study utilized a dynamic panel data model. The model incorporated three control variables: foreign exchange, consumer price index, and balance of trade. There were a total of 72 observations, obtained from six cross-sectional and twelve time series data over a period of twelve years. The findings of this study indicate that the net flow of foreign direct investment had a significant positive effect on tax revenues. Notably, in addition to foreign direct investment, all other independent variables such as foreign exchange, consumer price index, and balance of trade, along with the lag of the dependent variable, were statistically significant in explaining tax revenues at a 1% level.

Foreign direct investment not only brings financial resources into host countries, but also introduces technologies that boost production levels. This, in turn, provides governments with the opportunity to collect more tax revenues and improve their budget balance. These additional funds can be utilized to enhance economic development and elevate the standard of living for the people in their respective home countries, including ASEAN member states. Given the significance of foreign direct investment highlighted previously, it is imperative for the government to formulate efficient tactics to entice foreign direct investment into the nation. Some strategies that merit consideration include establishing a favorable business climate, providing incentives, nurturing a proficient workforce, allocating resources to infrastructure, and fostering robust international partnerships.

The dynamic panel data model was the sole model used in this research to examine the impact of net flow of foreign direct investment on tax revenues in ASEAN member states. In order to enhance the scope of this study, it is strongly advised that future researchers not only utilize the dynamic model, as done in the current study, but also incorporate static panel data models like pooled ordinary least square (Pooled OLS), random effect, and fixed effect models.

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