

**Two For One Ringgit: How Foreign Direct Investment Affects Trade in  
Southeast Asia**

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### **Abstract**

This paper investigates how foreign direct investment (FDI) affects international trade flows in Southeast Asia, using data for the ten member countries of the Association of Southeast Asian Nations (ASEAN) from 2010 to 2023. Using fixed effects models, the study examines the relationship between inward FDI and both export and import values, controlling for GDP, unemployment rate, and population. Initial baseline models reveal no significant effect of FDI on trade, suggesting heterogeneous outcomes across countries. To account for this, the study introduces GDP as an interaction term with FDI, revealing that inward FDI is more trade-enhancing in lower GDP countries. This finding supports theories of less developed economies benefiting more from FDI, often through mechanisms such as technology transfer and productivity gains. These results contribute to the literature by highlighting the conditional nature of the relationship between FDI and trade, especially in heterogeneous regions such as ASEAN.

## Introduction

Southeast Asia is home to some of the fastest growing economies in the world, consisting of ten countries - Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand and Vietnam - that make up the Association of Southeast Asian Nations (ASEAN). Over the past 50 years, the region has experienced rapid economic growth, driven initially by Singapore, Thailand, and Indonesia, and more recently by Vietnam, Myanmar, and Laos (Intal, Chen, et al., 2017). Furthermore, ASEAN is a top destination for foreign direct investment (FDI), maintaining the lead for three consecutive years as of 2024 (The ASEAN Secretariat & United Nations Trade and Development, 2024). One of the key driving forces of the region's economy is trade, with several of its member economies being global exporters of commodities, manufactures, and services (Intal et al., 2017). With these two standout regional qualities, this paper aims to examine the effects of FDI on trade for ASEAN member countries. By doing this research, this study aims to inform policymakers of any interesting dynamics between FDI and trade, allowing for better foreign financial policymaking, especially in trade relationship with more powerful states.

## Literature Review

FDI is found by existing literature to be mutually beneficial to both the businesses and the hosting country, in terms of economic well-being. For the investing foreign businesses, Dunning (2001) describes three motivations for a business to utilize FDI using his OLI paradigm: ownership advantages (O) - knowledge and privileges that the firm possesses that are not available to domestic competitors, location advantages (L) - such as better infrastructure or cheap production inputs, and internalization advantages (I) - assets that the firm can better use itself, rather than selling or leasing to other firms. From Dunning's theory, Wadhwa and Reddy (2011) identified four types of FDI based on their purpose: market-seeking FDI that helps businesses penetrate the local and regional markets; resource-asset seeking FDI that enables access to raw natural resources, cheap

labor pools, physical infrastructure and technology level; efficiency-seeking FDI that seeks to minimize costs of production; and strategic asset-seeking FDI that integrates the firm's regional and global strategy into strategic foreign networks of assets like technology, organizational abilities and markets (Faeth, 2009). For the host economy, FDI can be an engine that drives development and growth, enabling technology transfer, increasing employment, and allowing access to high-quality managerial and employee training (Borensztein, De Gregorio, and Lee (1998), Zhang (2001), and Alfaro (2016)). However, FDI can also weaken domestic firms, society and government control (Zhang, 2001), or the host country may lack sufficient human capital to enable the increased productivity that FDI provides (Borensztein et al., 1998).

Besides looking at the overall economy, academic literature also looks at the effects of FDI on international trade specifically. Through this lens, there are two FDI patterns: firms replicating their existing production in foreign markets (horizontal FDI), and firms investing in different places on the supply chain (vertical FDI). Thus, horizontal FDI tends to substitute trade (as goods can now be created locally instead of imported), while vertical FDI tends to stimulate trade (usually to the home country of the foreign firm) (Aizenman & Noy, 2006). However, the direction of causality between FDI level and trade activity is debated, with some claiming that higher FDI leads to an increase in trade activity (Barry and Bradley (1997), Africano, Magalhães, et al. (2005)), some others claiming vice versa (Ghosh (2007), and a few claiming a bidirectional relationship between the two ((Liu, Wang, & Wei, 2001), (Aizenman & Noy, 2006)). This is understandable, as there are a lot of real-life interdependency between macroeconomic indicators like FDI and trade activity, among others like GDP and inflation.

Another area of interest for this paper in academic literature is the study of FDI and trade that is specific to the ASEAN region. This region is an interesting one for research because it is one of the fastest growing regions in the world, with a mix of middle- and high-income economies (Intal et al., 2017). With many developing economies in the region

such as Indonesia, the Philippines and Vietnam, Southeast Asia is an attractive destination for FDI by developed economies (Magasházi, 2015). Furthermore, ASEAN, as an integrated market, has established free trade agreements with many of its surrounding economies, including China, South Korea, Japan, Australia, and New Zealand (Okabe et al., 2015), and Southeast Asia itself is a free trade area. On this topic, Magasházi (2015) found that trade from ASEAN to other countries, as well as its inward FDI flows, increased after the establishment of the aforementioned free trade agreements (FTAs). And while Magasházi focused on ASEAN in the global context, Li, Scollay, and Maani (2016) and Li and Maani (2018) focused on the relationship between the region and China, and found that the ASEAN - China Free Trade Area (ACFTA) attracted both horizontal and vertical FDI.

This study fills the gap in existing literature in several ways. First, current papers mostly only focus on the relationship between trade and FDI in the manufacturing sector. Second, there are limited research into the relationship between FDI and trade activity in Southeast Asia, rather than between FDI and FTA establishments. Third, research concerning the region focuses on only a subset of Southeast Asian countries, most commonly ASEAN-5 or ASEAN-6 members - Indonesia, Malaysia, Philippines, Singapore, Thailand (ASEAN-5) and Vietnam (ASEAN-6). This study examines the effect of FDI across all sectors on trade value of all ten ASEAN member economies, using a fixed effects model.

### Data

The data for this study contains annual statistics for the ten ASEAN member countries, from 2010 to 2023. The statistics include net FDI inflow value, import and export values, gross domestic product (GDP) value, unemployment rate, and population. These variables are chosen because they directly relate to the research question of how FDI affects trade in Southeast Asia, and the time frame is selected based on the availability of data. **Table 1** summarizes the variables used in this study.

In terms of data source, the FDI inflow, import and export values were collected

**Table 1**  
*Variables Summary*

Variable	Source	Unit	Description
Inward FDI	ASEANstats	USD millions	Annual FDI inflows by each ASEAN country
Exports	ASEANstats	USD millions	Total value of goods and services exported by each country
Imports	ASEANstats	USD millions	Total value of goods and services imported by each country
GDP	World Bank	USD millions	Gross Domestic Product by each country
Unemployment Rate	World Bank	Percentage	Proportion of the labor force that is unemployed but actively seeking work
Population	World Bank	Number of persons	Total population of each country

from ASEANstats, ASEAN's official data portal, while the remaining statistics were collected from the World Bank. Since these data sources are data reported by the nations themselves (ASEANstats), or collected by a credible international financial institution (World Bank), the reliability, consistency, and accuracy of the dataset is ensured.

In terms of licensing, ASEANstats' Terms and Conditions of Use allows the statistical information by ASEANstats to be used, downloaded and copied, provided that ASEANstats is duly credited and acknowledged as the data source. As such, citing them is sufficient for me to use the data available on the website for analysis. Data from the World Bank, whose author is the World Bank Group, is licensed under CC BY-4.0, allowing the use of data when given proper credit, similar to ASEANstats' Terms and Conditions of use.

The multiple data sources were aggregated into a single dataset. Each query to either data source yielded one variable, with the exception of export and import value, which were simultaneously collected in one query. The data was then pivoted in Excel such that each observation is for one country, for one year, and then the variables are put into a single file. Finally, the FDI inflow, import, export, and GDP variables were converted from

USD to millions USD using R. The data files and code used are available in the Appendix.

### Methods

Given the panel structure of the data, coupled with the heterogeneity nature of ASEAN nations (Intal et al., 2017), this study uses fixed effects models to examine the relationship between trade value and FDI. The model performs regression analysis on the variables specified above, while controlling for country and year fixed effects. Two batches of models are created: one baseline model, and one model where GDP is introduced as an interaction term with FDI. As such, the formula for the baseline model is as follow:

$$\begin{aligned} \text{Trade}_{it} = & \beta_C + \beta_Y + \beta_1 \cdot \text{FDI}_{it} + \beta_2 \cdot \text{GDP}_{it} + \beta_3 \cdot \text{UnempRate}_{it} \\ & + \beta_4 \cdot \text{Population}_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

And the formula for our model with the interaction term is as follow:

$$\begin{aligned} \text{Trade}_{it} = & \beta_C + \beta_Y + \beta_1 \cdot \text{FDI}_{it} + \beta_2 \cdot \text{GDP}_{it} + \beta_3 \cdot (\text{FDI}_{it} \times \text{GDP}_{it}) \\ & + \beta_4 \cdot \text{UnempRate}_{it} + \beta_5 \cdot \text{Population}_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

Where:

- $\text{Trade}_{it}$  is either exports or imports for country  $i$  at time  $t$
- $\text{FDI}_{it}$  is the FDI inflow
- $\text{GDP}_{it}$  is the GDP value
- $\text{UnempRate}_{it}$  is the unemployment rate
- $\text{Population}_{it}$  is the population
- $\beta_C$  is the country fixed effects

- $\beta_Y$  is the year fixed effects
- $\varepsilon_{it}$  is the error term

The model design is justified for several reasons. First, the diversity of ASEAN member economies mean that there are time-invariant characteristics of each country that can affect both FDI attractiveness and trade activity. For example, Singapore's geographic location and consistent pro-foreign investment, export-oriented government policies since 1965 leads to its high FDI inflows and trade value (Pangarkar and Lim (2003), Feridun and Sissoko (2011)). As such, the country fixed effect is introduced to control for these characteristics, allowing the model to capture variability within each ASEAN country. Second, considering that the time frame of our data contains economic shocks like the 2008 financial crisis and the COVID-19 pandemic - which could simultaneously affect all countries, the year fixed effect is also introduced. Third, the introduction of GDP as an interaction term is reasonable, as FDI amount can be conditional on GDP level. For example, using Wadhwa and Reddy's FDI classification, resource-seeking FDI may prefer country with low GDP for cheap labor, or high GDP for better infrastructure. Fourth, fixed effects models has been used in empirical analysis of panel data. For example, among the mentioned literature in this paper, Aizenman and Noy (2006) and Li et al. (2016) incorporated fixed effect models on their research into FDI and trade. To sum up, the data structure, ASEAN countries' heterogeneity, and historical usage of the fixed effects methodology justify the design of this model, whose result is shown in the following section.

## Results

The first batch of models estimate the impact of FDI inflows, unemployment rate, and population, on import and export values, respectively. For each trade statistic, two fixed effects specifications are used: country fixed effects only, and both country and year fixed effects. This creates four total models, whose results for FDI coefficients and overall model statistics are shown in **Table 2**. The full regression results of all variables are



reported in **Appendix Table A1**.

**Table 2**

*Baseline Model Group*

Variable	Export Model 1	Export Model 2	Import Model 1	Import Model 2
FDI Inflows	0.0039 (0.3095)	-0.1295 (0.2587)	0.2927 (0.3505)	0.1701 (0.2856)
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	No	Yes	No	Yes
R <sup>2</sup>	0.96356	0.96906	0.95074	0.95969
Within R <sup>2</sup>	0.56144	0.36996	0.46605	0.22743
Observations	140	140	140	140

Standard errors in parentheses. Full regression results are reported in Appendix Table A1.

Significance codes: . p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

For this first group of models, the effect of FDI inflows is positive for both import value models, and for the export model that only account for the country fixed effects. However, FDI inflows is negatively correlated to export value when considering both country and year fixed effects. What is more noteworthy is that no FDI inflows coefficients across all four models are statistically significant. As for the controlling variables, both GDP and unemployment rate has a positive and statistically significant effect on both import and export. While population has a negative effect on both trade values, but it is only statistically significant for the export models. Across all four models, the R-squared values are all at around 96%, and the Within R-squared values range between 22% and 56%. The models that include both country and year fixed effects consistently have higher Within R-squared values than their counterparts with only country fixed effects.

The second batch of models is similar to the first batch, but introduce GDP as an interaction term to FDI inflows. The results for FDI inflows and the interaction term are shown in **Table 3**. The full regression results of all variables are reported in **Appendix Table A2**.

The results for the second batch of models are more consistent than that of the first batch. The coefficients for inward FDI are all positive, while the coefficients for the interaction term are all negative. These coefficients are also all statistically significant, except for those in the export model with only country fixed effects. However, the p-value

**Table 3***Model Group With Interaction Terms*

Variable	Export Model 1	Export Model 2	Import Model 1	Import Model 2
FDI Inflows	2.854. (1.612)	3.267* (1.547)	3.571* (1.703)	3.893* (1.594)
FDI Inflows $\times$ GDP	$-5.29e^{-6}$ . ( $2.76e^{-6}$ )	$-6.15e^{-6}$ * ( $2.65e^{-6}$ )	$-6.08e^{-6}$ * ( $2.91e^{-6}$ )	$-6.74e^{-6}$ * ( $2.72e^{-6}$ )
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	No	Yes	No	Yes
Observations	140	140	140	140
R <sup>2</sup>	0.96612	0.97199	0.95492	0.96404
Within R <sup>2</sup>	0.59218	0.42947	0.51143	0.31079

Standard errors in parentheses. Full regression results are reported in Appendix Table A2.

Significance codes: .  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ 

for FDI inflows and the interaction term are 0.079 and 0.057 respectively, only slightly above the significance cutoff of 0.05. Controlling variables tell a similar story to that of the first batch of models, with GDP and unemployment rate having positive coefficients and population having negative coefficients. However, the significance levels for the latter two variables are different. R-squared values remain similar to the first batch of models at 96%, while Within R-squared values see improvements across all four models.

## Discussion

### Result Interpretations

The control variables - GDP, unemployment rate, and population - while not within the scope of this study, are worth mentioning. First, GDP consistently has a positive and significant effect on trade, which is in line with existing economic theory. What is surprising is that unemployment rate has a statistically and economically significant positive effect on trade value. This means that the more unemployed the population is, the higher the trade activity, which is somewhat counterintuitive. Third, population has a negative correlation to trade value, which is also somewhat counterintuitive. These results deserve further investigation.

The statistical insignificance of the FDI coefficients across all four models in the first batch means that there is no strong evidence of FDI inflows affecting trade value. Furthermore, with one coefficient being negative, even if the results for this first batch of

model were statistically significant, the economic implications would be ambiguous. The results from these baseline models suggest that there is little evidence that FDI uniformly affects ASEAN economies. This result makes sense because Southeast Asia contains very heterogeneous economies, with a mix of middle- and high-income countries (Intal et al., 2017). As such, it is reasonable to assume that FDI affects countries differently based on their development level, which GDP is a suitable proxy.

This assumption is supported by the results of the second batch of models, which introduces GDP as an interaction term with FDI inflows. The coefficients for the FDI inflows alone in these models are irrelevant by themselves, as they represent the change of trade value at \$0 GDP. What is interesting is the negative coefficients of the interaction terms across all four models. They represent the fact that when considering the marginal effect of FDI inflows on trade, lower GDP countries see a greater increase in trade value, both import and export, as FDI inflows increase. This can be attributed to the effects of technology transfer, new processes, and higher-quality employee training mentioned by Borensztein et al. (1998) and Alfaro (2016), all of which being more impactful for lower GDP countries. Since they have worse starting conditions than higher GDP countries (who already has good infrastructure, high-quality labor, etc.), the marginal effects of FDI is larger. This batch of models also have good explanatory powers, with very high R-squared values and relatively high Within R-squared values. The fact that Within R-squared values are higher when controlling only for country fixed effects is understandable: when additionally capturing year fixed effects, the year variable is omitted, so the models lose some explanatory power.

## Limitations

Despite its contributions, this study has some limitations. First, the usage of the fixed effects model prevents the study from capturing any reverse causality or interdependence between trade and FDI, which was found by existing research such as Liu et al. (2001) or Ghosh (2007). Second, the model is susceptible to omitted variable bias.

Due to data availability, only GDP, unemployment rate and population are introduced as control variables. Adding more controlling factors may increase the robustness and accuracy of future analysis. Third, the time frame for this analysis is relatively short - 14 years, due to data availability. Future research can incorporate longer time periods, as more data become available in the future.

### **Conclusion**

This paper set out to investigate the relationship between foreign direct investment (FDI) and trade in Southeast Asia — an area marked by sustained economic growth, growing trade volumes, and rising investor interest. This study employed fixed effects regression models to estimate both the direct and conditional effects of FDI on trade value. While the baseline models found no significant direct effect of FDI on trade across the region, the inclusion of an interaction term between FDI and GDP revealed that lower GDP economies benefit more from FDI. This has important consequences for policymakers: the study highlights the need to tailor investment policies not only to attract FDI, but also to ensure that host economies have the infrastructure, labor force, and institutions necessary to translate FDI inflows into meaningful trade gains. As ASEAN continues to grow and integrate more with the global economy, understanding the differentiated effects of FDI across member states is crucial.

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## Appendix A

### Supplementary Tables

**Table A1***Baseline Model Group (Full)*

Variable	Export Model 1	Export Model 2	Import Model 1	Import Model 2
inward_fdi	0.0039 (0.3095)	-0.1295 (0.2587)	0.2927 (0.3505)	0.1701 (0.2856)
gdp	0.5915*** (0.1057)	0.5038*** (0.0997)	0.4274*** (0.1110)	0.3075** (0.1032)
unemployment_rate	9,562.4** (3,100.5)	9,432.5** (3,277.3)	5,995.9* (2,686.4)	6,529.4* (3,226.5)
population	-0.0039*** (0.0011)	-0.0037*** (0.0010)	-0.0020 (0.0012)	-0.0014 (0.0012)
Country Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	No	Yes	No	Yes
R <sup>2</sup>	0.96356	0.96906	0.95074	0.95969
Within R <sup>2</sup>	0.56144	0.36996	0.46605	0.22743
Observations	140	140	140	140

Significance codes: . p &lt; 0.1, \* p &lt; 0.05, \*\* p &lt; 0.01, \*\*\* p &lt; 0.001



**Table A2***Model Group With Interaction Terms (Full)*

Variable	Export Model 1	Export Model 2	Import Model 1	Import Model 2
inward_fdi	2.854. (1.612)	3.267* (1.547)	3.571* (1.703)	3.893* (1.594)
gdp	0.7384*** (0.1366)	0.6760*** (0.1321)	0.5964*** (0.1355)	0.4962*** (0.1309)
unemployment_rate	8,496.3** (2,630.4)	9,533.6** (2,924.9)	4,769.8* (2,155.5)	6,640.3* (2,801.6)
population	-0.0048*** (0.0011)	-0.0041*** (0.0011)	-0.0029* (0.0012)	-0.0019 (0.0011)
inward_fdi $\times$ gdp	$-5.29e^{-6}$ . ( $2.76e^{-6}$ )	$-6.15e^{-6}$ * ( $2.65e^{-6}$ )	$-6.08e^{-6}$ * ( $2.91e^{-6}$ )	$-6.74e^{-6}$ * ( $2.72e^{-6}$ )
Country Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	No	Yes	No	Yes
R <sup>2</sup>	0.96612	0.97199	0.95492	0.96404
Within R <sup>2</sup>	0.59218	0.42947	0.51143	0.31079
Observations	140	140	140	140

Significance codes: . p &lt; 0.1, \* p &lt; 0.05, \*\* p &lt; 0.01, \*\*\* p &lt; 0.001

## **Appendix B**

### **GitHub Repository**

The data, code, and documentation for this study can be found here:

<https://github.com/mb-linh/da-401>