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The Impact of AFTA on Trade Openness, and Foreign Direct Investment: The Empirical Evidence from Lao PDR

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Abstract

This study looks at how the AFTA has affected trade openness, foreign direct investment, and economic growth in Lao PDR. The impact of AFTA on trade openness and foreign direct investment (FDI) entering Laos is examined using the gravity model method. To examine the long-term connection between variables, Panel Vector Error Correction and Pedroni Cointegration based on Fully Modified Ordinary Least Squares (FMOLS) were also used. The findings show that infrastructure development, disparities in factor endowments between the two nations, the GDP of Laos, and the country's shared border all have a beneficial impact on the entrance of foreign direct investment into the Lao PDR. Moreover, depreciation of domestic currency, sharing border with neighboring countries, and AFTA member countries are also significantly positive effect on trade openness in Lao PDR. However, the distance between the capital city is negatively affect on foreign direct investment and trade in Laos in the long run.



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1. Introduction

Since sustained growth is necessary for economic development, economies are seeking for strategies to speed up their economic growth (Barro & Sala-i-Martin, 2004). Numerous theoretical and empirical studies have been carried out to examine the variables that influence a nation's economic growth (Borensztein, De Gregorio, & Lee, 1998; Dewan & Hussein, 2001). These studies illustrate that capital stock and technological innovation drive worldwide growth differences. Due to the ongoing economic interdependence of countries, international commerce and FDI remain critical variables that support and/or influence technological growth. Increased trade openness and FDI inflows help a country and increase its popularity. Trade is advantageous to economic growth, poverty alleviation, job creation, health improvement, and inflation management, according to theoretical and empirical literature (Chang, Kaltani, & Loayza, 2009). However, these advantages can be further boosted with greater FDI inflows. One of the most frequently debated consequences of globalization is the recent enormous expansion of trade and foreign direct investment (FDI) flows. Outbound foreign direct investment (FDI) stocks grew globally from 1990 to 2009 at a rate that was about five times greater than exports, according to the World Investment Report (2010) and the United Nations' World Trade Data Base. Even yet, this rise outpaced that of intermediate goods' exports. Foreign direct investment (FDI) results from business strategy and investment choices made by multinational firms (De Mello and Fukasaku 2000). It is favored all over the world, but is particularly popular in developing countries due to the numerous advantages it offers, including access to capital, the establishment of production and distribution networks, innovative products, patents, and the diffusion of technology, knowledge spillover effects on domestic firms in terms of production process (Mijiyawa 2017). Even though considerable FDI flows have flooded a few emerging nations like China, India, and Growing capital has been challenging for governments in many emerging nations, including Mexico. This is especially true because it typically needs significant economic adjustments (Waldkirch, 2010). Foreign direct investment (FDI) in emerging nations has increased as a result of the importance of free trade agreements (FTAs) (Yeyati, Stein, and Daude 2003). The expectation of higher FDI inflow is one of the primary justifications a government enters into an FTA. (Blomstrom and Kokko 1997; Medvedev 2012). Long-term growth rates for members are anticipated to rise as a result of expanded markets, advantageous externalities, better resource allocation, and improved competitive potential (Blomstrom and Kokko 1997). How FDI is affected by FTAs depends on a number of variables, including FDI patterns, FTA investment provisions, host country locational benefits, intra- and extra-FTA source nations, and linkages between them. Increases or declines in FDI flows may also be observed among specific RTA members (Feils and Rahman 2011). It has been challenging to come to a firm conclusion about how FTAs affect FDI because some of the channels may move in various directions (Yeyati, Stein, and Daude 2003). The anticipated impact of FTAs on FDI is therefore still up for dispute (Medvedev 2012). This study closes a gap in the body of literature by investigating how the ASEAN Free Trade Agreement (AFTA) has affected trade openness and foreign direct investment in Laos. This study use panel data of top 15 trading partner countries from 1990 to 2019¹ to achieve objective of our study. All data are derived from the World Development Indicator (WDI), The Ministry of Industrial and Commerce of the Lao PDR. The reason of selecting this time period was mainly relied on the availability of the data, especially, data for gross domestic product, and foreign direct investment inflow.

¹ Data of inflow of foreign direct investment accounted more than 80% of total inflow of foreign direct investment in to Laos (Ministry of Planning and Investment of Laos)

2. Foreign Direct Investment and Trade in Laos

2.1 Foreign Direct Investment in Laos

Since the Lao People's Democratic Republic opened its economy to a market-oriented economic system, there has been a gradual increase in the amount of foreign direct investment, particularly towards the beginning of the 2000s. The amount of foreign direct investment that came into the country rose from 400 million US dollars in 2007 to a peak of 1,800 million US dollars in 2017, and it is expected to start falling in 2018. The Lao People's Democratic Republic experienced its greatest and second highest levels of foreign direct investment inflows in 2017 and 2018, respectively. However, FDI inflows declined from \$1.7 billion to \$1.3 billion in 2018. The amount of foreign direct investment (FDI) in manufacturing plummeted by 80%, to barely \$18 million. The majority of foreign direct investment (FDI) came from countries that are geographically close by, such as China, Vietnam, and Thailand. Compared to other sources of FDI, these countries offer a greater number of benefits. The decline in foreign direct investment (FDI) in the electrical industry, which is generally the sector that receives the most, was significantly higher than 70 percent. Following the failure of a dam in the state's southeastern region around the middle of 2018, the government decided to pause the approval process for new hydroelectric dams while it investigated best practices for dam construction. A decrease of twenty percent in investment from China was another contributor to the fall. Despite this, China has maintained its position as the country's single largest investor, accounting for 79 percent of the total foreign direct investment in the country. There were few bright spots within the situation. Both in the building industry and in the financial and insurance industries, investment levels rose by 152%. In 2018, over 54 percent of all FDI inflows were attracted to the construction industry, making it the most successful recipient industry. Strong construction investment was encouraged by persistent economic expansion as well as by increased industrial activity.







2.2 Trade Openess in Laos

The trade openness of the Lao PDR is shown in Figure 2. The openness index was changed during the end of the 1980s, and as a result, its value significantly increased, going from 26 percent in 1988 to 81 percent in 2016. It reached its maximum peak in 1998 and 2014, when it was around 84.4 percent and 92.4 percent, respectively. Since Laos' GDP fell as a result of the Asian financial crisis, more goods were exported and imported from its neighbors, notably Thailand, China, and Vietnam, which together accounted for more than 60% of all global trade. The entire export and import increased with adjacent nations, which greatly increased global commerce. However, even if Laos' openness index is getting better, the majority of its movement was fueled by imports rather than exports, indicating that the nation has had a

persistent imbalance since the 1970s. Thailand is Laos' most important trading partner, contributing 31 percent of the country's total export, following by China, and Vietnam. China , and Vietnam has a significant need for raw agricultural products from Laos, particularly those that require a large amount of land, such as corn, sugar, cane and watermelons. The topography of Laos has been an essential component in the connectivity between the Chinese mainland and the countries of Southeast Asia. Since 2013, 55.7%, the proportion of Laos exports that are sent to ASEAN nations. The export trend to these countries has been increasing rapidly, and it is anticipated that it will reach 65.7% in 2020. From \$1153 million in 2012, the total export climbed anticipated to reach \$409 million in 2020.



Figure 2 Trade openness in Lao PDR Source: Ministry of Industrial and Commerce of the Lao PDR.

3. Literature Reviews

In the past few decades, the research on the impact of regional economic integration and free trade agreements on FDI inflow and international trade expansion has grown. One of the earlier theories, specifically (Dunning, 1987), proposed the well-known theory "eclectic theory," stating that there are three primary cluster variables that determine FDI: firm-specific, internationalization, and geographical advantage. According to (Blomström, Globerman, & Kokko, 1999), the reactions of foreign direct investment (FDI) to a trade agreement depend on the environmental changes caused by the agreement as well as the geographic advantages of participating nations and industries. Since then, numerous studies have looked at the theoretical and practical effects of regional trade agreements on the growth of international trade in a variety of economic dimensions as well as the entrance of foreign direct investment. Recent empirical research in OECD nations has been carried out by (Dorothee J. Feils, 2008; Jang, 2011; Levy-Yeyati, Stein, & Daude, 2012). Utilizing the OECD International Direct Investment Statistics, which includes FDI from 20 OECD countries to 60 host countries from 1982 to 1998, is one of these methods (Levy-Yeyati et al., 2012). They arrive to the subsequent conclusions: When the home country enters an RTA to which the host country is not a party, the growth of the domestic market reduces FDI; entering an RTA or a common free trade agreement (FTA) between the home and host nations increases the stock of intra-RTA FDI. Several FDI forms are not described in the report, though. By classifying nation pairs into intraand extra-OECD groups using data on bilateral FDI stocks for 30 OECD and 32 non-OECD countries for the 1982–2005 period, Jang (2011) distinguishes between horizontal and vertical FDI. Because intra-OECD country couples are dominated by vertical FDI as opposed to horizontal FDI, he finds evidence to support the assumption that RTAs increase FDI in extra-OECD country pairings but decrease it in OECD country pairings. Because he used bilateral data, he can only take into account intra-RTA effects in the analysis. (Dorothee J. Feils, 2008) looked

at FDI flows into 24 OECD host economies from 59 different nations. They assert that members of the regional integrated area have seen an increase in FDI flows, with larger economies feeling the benefits more keenly. Case studies that specifically address the ASEAN Free Trade Agreement often present a positive outcome. These studies, which focus on bilateral trade, global trade, and regional integration, include (Cherif & Dreger, 2018; Duong, Holmes, & Strutt, 2021; Piyaareekul Uttama & Peridy, 2009; Thangavelu & Narjoko, 2014; Verico, 2012) and explore the factors that affect foreign direct investment (FDI) in the major ASEAN countries. The findings indicate that regional integration and third-country impacts have a considerable impact on FDI inflow to ASEAN nations. Particularly for sophisticated vertical FDI that is vertical. Verico (2012) examines the impact of intra-regional trade agreements on foreign direct investment inflows in ASEAN, including Indonesia, Malaysia, and Thailand. The findings indicate that factors such as population, consumption, trade openness, currency rate, and infrastructure soundness have an impact on FDI inflow in these countries. (Thangavelu & Narjoko, 2014) use a gravity model and bilateral FDI data from 2000 to 2009 to assess the effects of FDI flow in ASEAN. Human capital development and trade agreements for bilateral and regional integration have been included in the research. The findings demonstrate that free trade agreements have a positive effect on FDI inflow. The return on FDI, however, depends on the ability of each nation to absorb new investment and the global industrial value chain. (Cherif & Dreger, 2018) investigate the impacts of South-South trade agreements on foreign direct investment (FDI) by multinationals in three regions, including ASEAN, Non-Gulf Arab state, and Latin America. The findings indicate that FDI inflow was significantly influenced by factors such as trade openness, financial market development, industrial sector size, urbanization rate, and foreign debt. (Duong, Holmes, & Strutt, 2021) use panel data for 17 major foreign investors to examine the effect of free trade agreements on FDI inflow in Vietnam. The results demonstrate that regional free trade agreements can interact with factors such as the exchange rate, human capital, and factor endowments. Although, there were literature on regional free trade agreement has also been conducted previously in Lao PDR including (KEOCHAIYOM, 2015; KYOPHILAVONG, 2004; Vanhnalat, Kyophilavong, Phonvisay, & Sengsourivong, 2015). However, the results of previous studies still be controversial and inconclusive. (KYOPHILAVONG, 2004) point that joining AFTA increased Lao imports more than exports, indicating a greater trade deficit. However, AFTA participation lowers costs, boosts local demand, investment, and economic growth. (KEOCHAIYOM, 2015) used a Gravity model to analyze bilateral trade data for 29 trading partners from 2000 to 2012 to study the effects of AFTA on trade in Laos. AFTA was represented by the size of the economy that relied on it. According to the research, AFTA has a favorable impact on overall commerce and imports but a negative impact on exports. Vanhnalat et al. (2015) investigate the effect of AFTA on Lao export using the 32 trading partners from 1996 to 2011 and the Gravity model. The study discovered that the preferential and generalized import tariff systems in the AFTA region benefit Lao exports.

4. Data and Methodology

4.1 Specific Model

In this part, the gravity model method is employed to assess how much of an impact the AFTA has had on the volume of FDI entering Laos. The OLI framework and other models developed by Brainard (1997), Markusen and Venables (2000), and others, as well as Brenton, Di Mauro, and Lucke (1999), contend that other country characteristics and economic size are important factors that influence FDI. This encourages the use of gravity models in FDI research. According to the gravity model, FDI flows between two countries will have a positive correlation with their respective economies and a negative correlation with their distance from one another (Feils and Rahman 2011; Hejazi and Safarian 2005), which appears to be a perfect fit for FDI flows. Faeth (2009) asserts that to completely explain FDI, a variety of various theoretical

theories required to be combined. We build on Bevan and Estrin's (2004) work by extending the fundamental model in a way that takes institutional quality and comparative advantages into consideration in a transitional economy like Laos. In order to account for how AFTA affects FDI flows, in the model a dummy variable has also been included (Crotti, Cavoli, and Wilson 2010; Yeyati, Stein, and Daude 2003). The details of the extended gravity model utilized for FDI flows are as follows:

$$lnFDI_{it} = \alpha + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 Dist_{ij} + \beta_4 lnER_{jt} + \beta_5 lnDIFF_{ijt} + \beta_6 lnInfra_{it-1} + \beta_7 AFTA + \varepsilon_{it}$$
(1)

A gravity model technique is used in this section to determine how much of an influence AFTA on trade in Laos. Bilateral exports from country I to country j are explained by basic gravity. Exports from nation I to nation j are influenced by economic considerations (GDP), population size, and geographic elements like borders and distance. Dummy variables can be added to the fundamental model to evaluate how the AFTA will affect trade (Baier and Bergstrand, 2007; Head and Mayer, 2015).

$$lntrade_{it} = \alpha + \beta_1 lnGDP_{it} + \beta_2 lnExch_{ij} + \beta_3 lnDist_{ij} + \beta_4 lnLang_{ij} + \beta_5 lnBorder_{ij} + \beta_6 AFTA_{ijt} + \varepsilon_{it}$$
(2)

where I stands for Laos and j for its partner nation; Real FDI flows from country partner j to Laos are represented by $DIFF_{ijt}$; GDP_{it} and GDP_{jt} denote the actual GDP of Laos and nation j, respectively; The distance between Laos' and country j's capitals is indicated by the symbol " $Dist_{ij}$ "; The real exchange rate between the Laotian kip and the currency of country *j* is given as ER_{jt} . Feils and Rahman thereafter (2008) Factor endowments play a significant role in determining FDI flows (Bae and Jang 2013; Park and Park 2008; Yeyati, Stein, and Daude 2003). A proxy for the differences in factor endowments between the two nations is therefore defined as " $DIFF_{ijt}$," which is the ratio of Laos' GDP per capita to that of its partner country (Bae and Jang 2013). $Infra_{it}$ The length of roads in Laos serves as a proxy for infrastructure development $AFTA_{ijt}$ is the primary variable, and it will have the value 1 if Laos and country partner j have signed an AFTA; $Lang_{ij}$ is a dummy variable that, when exported, has the value 1.(i) and importing (j); $Border_{ij}$ is Dummy variable that takes the value of 1 if the exporting (i) and importing (j); α is intercept, and $\beta_1 - \beta_6$ is the slope coefficients.

4.2 Unit root test

The data must be checked for stationarity before examining the relationship between variables. Several panel unit root test methodologies are used in this work, including the LLC (Levin, Lin, & Chu, 2002), the ADF-Fisher Chi-square Maddala & Wu, 1999) and the IPS (Im, Pesaran, & Shin, 2003). (The alternative hypothesis for each of these tests is that there is no unit root, while the null hypothesis for each test is that there is a unit root.

$$\Delta y_{it} = \alpha_i + \beta_i y_{it-1} + \sum_{j=1}^{q_i} \delta_{ij} \Delta y_{it-j} + \varepsilon_{it}$$
(3)

The test statistic for the IPS test is based on the mean of the Augment Dicky-Fuller statistic across the groups, and it permits the auto-regressive coefficient I to vary among cross-sectional units. Although both tests are based on autoregressive models, the IPS test offers a stronger test statistic. Below is how the IPS statistic is written:

$$Z_{\bar{t}} = \sqrt{N}(\bar{t} - E(\bar{t}))/\sqrt{Var(\bar{t})}$$
 (4)
Denote, $\bar{t} = 1/N \sum_{i=1}^{Ni=1} t_{\rho i}$, $E(\bar{t})$ and $Var(\bar{t})$ are mean and variance of individual specific individual specific processes, respectively. The Fisher-PP and Fisher-ADF tests can be formulated as follows and presuppose that the individual cross-sectional unit root processes are units (Maddala & Wu, 1999; Choi, 2001).

(6)

 $\gamma = -2\sum_{i=1}^{n} \log_e \pi_i \sim x^2 2N \ d.f.$ (5) Where N and I stand for, respectively, the p-value for the test I and the number of samples.

Where N and I stand for, respectively, the p-value for the test I and the number of samples. Fisher-PP test recommendation (Choi, 2001) statistic:

$$Z = \frac{1}{\sqrt{N}} \sum_{i=1}^{n} \delta^{-1}(\pi_i) \sim N(0, 1)$$

Where δ^{-1} is the inverse of the standard normal cumulative distribution.

4.3 Panel cointegration estimation

The Pedroni Cointegration method (Pedroni, 2004) and Panel Vector Error Correction method (based on Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS), which are often used in panel time series data, will be employed in this work. Regardless of the association between the individual impact and the explanatory variable, the fixed effect technique ensures consistent estimate across the countries under consideration when grouping the countries. However, for variables that are not time series, the fix effect technique is insufficient. The random effect approach must be used when working with variables that are not time series. Additionally, this research will use the panel time series technique of the Pedroni Cointegration approach to mitigate the time variable impact (Pedroni, 2004). Due to the fact that this method allows for panel member heterogeneity, it provides a variety of benefits over other approaches. The following equation represents the Pedroni cointegration test:

$$y_{it} = \alpha_i + \delta_i + \sum_{j=1}^n \beta_{ij} x_{it} + \varepsilon_{it}$$
⁽⁷⁾

Where y_{it} and x_{it} are the panel data for each variables uses and = 1,...., N; t-1,....T. one of y_{it} and x_{it} indicators must be integrated at order 1 or I(1). Every variable has a unique fixed effect and predictable trend, which are here represented by parameter. According to the null hypothesis, cointegration doesn't exist. Three stages based on pooled data along the panel data dimension are significant among the statistics provided by Pedroni (2001), while two steps based on pooled data are also significant along the panel data dimension. Therefore, we can express the panel co-integration equation as follows using the following five statistics:

Panel variance ratio static:
$$Z_{\hat{\nu}NT} = L^2 (\sum_{i=1}^N \hat{e}_{it-1}^2)^{-1}$$

Panel rho static: $Z_{\hat{\rho}NT-1} = (\sum_{i=1}^N \sum_{t=1}^T \hat{e}_{it-1}^2)^{-1} \sum_{i=1}^N \sum_{t=1}^T (\hat{e}_{it-1} \Delta \hat{e}_{it-1} - \lambda_i)$
Panel statistic: $Z_t \sigma_{NT^{-1}}^2 = (\sigma_{NT^{-1}}^2 \sum_{i=1}^N \sum_{t=1}^T \hat{e}_{it-1}^2)^{-1/2} \sum_{i=1}^N \sum_{t=1}^T (\hat{e}_{it-1}^2 \Delta \hat{e}_{it-1}^2 - \lambda_i)$
Group rho static: $\check{Z}_{tNT} = (\sum_{i=1}^N \sum_{t=1}^T \hat{e}_{it-1}^2)^{-1/2} \sum_{t=1}^T (\hat{e}_{it-1}^2 \Delta \hat{e}_{it-1}^2 - \lambda_i)$
Group t static : $\check{Z}_{tNT} = \sum_{i=1}^N (\sum_{t=1}^T \sigma_i - 2\hat{e}_{it-1}^2)^{-1/2} \sum_{t=1}^T (\hat{e}_{it}^2 \Delta \hat{e}_{it-1} - \lambda_i)$
(8)

Pedroni cointegration analyzes dependent and independent variables. It doesn't explain how independent factors affect dependent variables. Long-term partnership must be estimated. The Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) are used in this work in the following ways: The coefficient of the FMOLS estimator is expressed as:

$$\hat{\beta} = \left[\sum_{i=1}^{N} \sum_{t=1}^{T} (X_{it} - \bar{X}_i) (X_{it} - \bar{X}_i)\right]^{-1} \left[\sum_{i=1}^{N} (\sum_{t=1}^{T} (X_{it} - \bar{X}_{it}) \hat{Y}_{it} - T\Delta_{\varepsilon\mu})\right]$$
(9)

Where the serial correlation correction term is denoted by the symbol and the endogeneity correlation term is denoted by Y it. This is how the DOLS equation can be expressed:

$$Y_{it} = \alpha_i + \beta_i X_{it-1} + \sum_{j=q_1}^{q_2} C_{ij} \Delta X_{it+j} + \mu_{it}$$
(10)

Where q_2 is the maximum lead length, q_1 is the maximum lag length, ΔX_{it+j} eliminates the effect of endogeneity of X_{it} , and μ_{it} is an error term

4. Results and Discussion

Tables 1 report the descriptive statistics for the variables used in the study for top 15 countries, which is highest inflow of direct investment in Lao for 1990-2019. Most of variables are in the

form of logarithms to avoid the problem of heteroscedasticity and to increase comparability with existing studies. Descriptive statics given in Table 1 shows that foreign direct investment, distance and infrastructure have a very high mean value of 6.6, 3.44 and 3.68, respectively. It is indicating a great extent of foreign direct investment caused by distance location and the country infrastructure.

Variable	Obs	Mean	Median	Min	Max
lnFDI _{it}	287	6.60206	6.60206	1	9.353242
lnGDP _{it}	287	2.954375	2.954375	2.738273	3.231705
lnGDP _{jt}	287	3.76535	3.4554375	2.98382	4.254543
lnDist _{it}	287	3.44369	3.44369	2.683767	4.136974
lnER _{jt}	287	3.034169	3.034169	-1.137272	4.02756
lnDIFF _{ijt}	287	0.031897	0.031897	0.013559	0.924023
Infra _{it}	287	3.684845	3.684845	3.421604	3.994757
Lang _{ij}	287	0.01245	0.04344	0	1
Border _{ij}	287	0.75355	0.67654	0	1
lnTrade _{it}	287	0.343	3.343	0.213	0.432
AFTA	287	0	0	0	1

Table 1 Descriptive Statistic

Source: Author's calculation

Testing for stationary data is important before analyzing the relationship between variables. IPS (Im, Pesaran, & Shin, 2003), which is frequently used in panel analysis, the ADF-fisher Chisquare (Maddala & Wu, 1999), and some panel unit root test methods we use in this work include the PP-fisher Chi-square (Choi, 2001). Based on the majority of the testing statistics, the panel unit root testing results will be drawn. All variables are non-stationary at level I(0), according to Table 2's multiple panel unit root tests, but they become stationary after they are translated into the first difference I (1).

4.1 Panel unit root test

According to the results of several panel unit root tests shown in Table 2, all variables are nonstationary at level I (0) but become stationary after they are translated into the first difference I. (1) To examine the cointegrating relationship between variables over the long term, the outcomes of the unit root test demonstrate the non-stationarity of the variables at the level and integrate of order one, or I(1). Pedroni Residual Cointegration was used in this work (Pedroni, 2004).

Unit root test	lnFDI _{it}	lnGDP _{jt}	Dist _{it}	lnER _{jt}	DIFF _{ijt}	Infra _{it}	AFTA
Level							
IPS test	0.66138	-1.23	-0.72	0.537	3.21	5.177	-0.72
ADF-Fisher	17.0084	27.88	20.88	36.98**	8.92	12.70	19.63
PP-Fisher	9.29899	42.40**	20.64	52.58	15.95	9.58	23.20
First							
difference				-			
IPS test	-5.22***	-0.84	-4.59***	7.66***	-2.96**	65.16***	-5.87***
ADF-Fisher	60.41***	23.17**	46.72***	79.77***	37.76***	48.57***	63.95***
PP-Fisher	70.73***	50.54**	73.99***	85.17***	77.64***	34.57***	95.8***

Table 2 Panel unit root test results

Note: ** and *** indicate significant level at 5% and 1% respectively

4.2 Pedroni cointegration testing

Table 3 displays the Pedroni Cointegration test results. The null hypothesis that there is no cointegration was soundly rejected by the majority of statistical tests, including the Panel PP-Statistic, Panel ADF-Statistic, Group PP-Statistic, and Group ADF-Statistic tests. This suggests that there is a long-term relationship between the variables and that they are cointegrated. As a result, the Pedroni Cointegration test results, which are shown in Table 4, were also shown to be cointegrated when trade is taken into account as the dependent variable. The majority of statistical tests, such as Group ADF-Statistic, Panel PP-Statistic, Group PP-Statistic, and Panel

ADF-Statistic reject the null hypothesis that cointegration does not exist. As a result, it can be concluded that the variables are cointegrated and have long-term relationships with one another.

Test	Statistic	Prob.	
Panel v-Statistic	-1.64343	0.9499	
Panel rho-Statistic	-0.58917	0.2779	
Panel PP-Statistic	-11.527***	0.000	
Panel ADF-Statistic	-2.51404***	0.006	
Group rho-Statistic	0.621488	0.7329	
Group PP-Statistic	-13.5388***	0.0000	
Group ADF-Statistic	-2.02186**	0.0216	

Table 3 Pedroni Cointegration test result (FDI as dependent variable)

Note: ** and *** indicate significant level at 5% and 1% respectively

Table 4 Pedroni Cointegration test result (T	[rade as dependent variable]
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Test	Statistic	Prob.
Panel v-Statistic	4.167886	1.00
Panel rho-Statistic	3.083123	1.00
Panel PP-Statistic	-7.00822***	0.00
Panel ADF-Statistic	-1.75057***	0.00
Group rho-Statistic	4.377396	1.00
Group PP-Statistic	-18.4262***	0.00
Group ADF-Statistic	-1.85426**	0.03

Note: ** and *** indicate significant level at 5% and 1% respectively

4.3 Long-run Elasticity

Table 5 provides the FMOLS and DOLS results. The GDP of Laos (lnGDP it) and the home countries (lnGDP jt), differences in factor endowments between the two countries (lnDIFF ijt), infrastructure, and infrastructure quality of the host country (INFRAit), and ASEAN Free Trade Agreement (AFTA) all have a significant positive impact on the long-term inflow of foreign direct investment into Lao PDR, according to FMOLS and DOLS. However, the long-term impact of foreign direct investment in Laos is severely impacted by the distance (Dist ij) between the capitals of Laos and nation j and the real exchange rate (ERjit) between the two currencies.

Table 5 Panel long-run elasticity based on FMOLS and DOLS test result (FDI as dependent variable)

Variable	FMOLS	DOLS	
lnGDP _{it}	1.179007***	0.195539**	
lnGDP _{jt}	0.02345***`	0.03653***	
<i>lnER</i> _{it}	-0.70244***	-0.13623	
lnDist _t	-0.73097***	0.804525	
lnInfra _{ijt}	0.097238***	0.268347**	
Diff _{it}	1.9493***	2.815267**	
AFTA	1.368284***	0.99966**	

Note: ** and *** indicate significant level at 5% and 1% respectively

The results of FMOLS and DOLS when trade openness (Trade) is treating as dependent variable is presence in Table 6. The results also found that that GDP of Laos $(lnGDP_{it})$, Exchange rate between Lao Kip and trading partner countries $(lnER_{jt})$, Sharing border with Laos (*Border_{it}*), and AFTA member countries are significantly positivel effect on trade openness in Lao PDR. Meanwhile, the distance between the capital of Laos and that of country j (*Dist_{ij}*) is negatively effect on trade openness in Laos in the long run. Overall, the AFTA will have a good long-term impact on both international commerce and foreign direct investment in the Lao PDR. These findings are consistent with a wealth of literature and provide more evidence that multinational corporations' business strategy and investment choices are what cause foreign direct investment (FDI) to occur (De Mello and Fukasaku 2000). Due to the many benefits it provides, including access to capital, technology diffusion, knowledge spillover effects on domestic firms in terms of production process, innovative products, patents, and the establishment of production and distribution networks, it is favored throughout the world, but especially in developing countries (Mijiyawa 2017).

Variable	FMOLS	DOLS
lnGDP _{it}	0.000023**	-0.000047**
Dist _{it}	-0.06146**	-0.0444**
$lnER_{jt}$	0.002759**	0.0013**
$lnLang_{ijt}$	0.0000263	0.000054
Border _{it}	0.0019***	0.00133**
AFTA	0.00874**	0.00876**

Table 6 Panel long-run elasticity based on FMOLS and DOLS test result (Trade as dependent variables)

Note: ** and *** indicate significant level at 5% and 1% respectively

5. Conclusion and Recommendation

In order to ascertain how much of an impact, the AFTA has had on the volume of commerce and foreign direct investment (FDI) flowing into Laos, this study uses the gravity model technique to assess the effects of FDI flows and trade on AFTA. The Panel Vector Error Correction approach based on Pedroni Cointegration approach (Pedroni, 2004), Fully Modified Ordinary Least Square (FMOLS), and Dynamic Ordinary Least Square were used in this study (DOLS). Because it allows for diversity among each panel member. In order to analyze the longrun cointegrating relationship between variables, the unit root test results showed that the variables are non-stationary at the level and they are integrate of order one, or I(1). The null hypothesis that there is no cointegration was rejected by the majority of statistical tests, including Panel PP-Statistic. As a result, it was discovered that trade and foreign direct investment (FDI) are truly cointegrated when FDI and trade are viewed as dependent variables. Additionally, according to FMOLS and DOLS, the GDP of Laos and the home countries, disparities in the factor endowments of the two nations, Laos' infrastructure and the quality of that infrastructure, and AFTA all have a beneficial impact on the influx of foreign direct investment into the Lao PDR. Depreciation of the local currency, border sharing with adjacent nations, and AFTA member nations are other factors that have a considerable favorable impact on trade openness in the Lao PDR. The distance between Laos' and country j's capitals, however, has a long-term negative impact on foreign direct investments and trade openness between the two countries. The findings indicate that over time, the ASEAN Free Trade Agreement (AFTA) has a positive impact on both foreign direct investment (FDI) and global trade in the Lao PDR. These results are in line with earlier research and show that FDI is produced by the business strategies and investment choices made by multinational businesses (De Mello and Fukasaku 2000), as well as (KEOCHAIYOM, 2015), which claims that AFTA has a favorable impact on overall trade.

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