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Influence of Foreign Direct Investment from Thailand and Export on Economic Growth of Laos

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Abstract: This study aims to examine the relationship between Laos's GDP, Thailand direct investment in Laos and Laos export into Thailand on the economic growth of Laos by using 44 quarterlies data from 2005Q1 to 2015Q4. All relationship proved by using vector error correction model. The results presented long run relation from Lao' GDP and Lao's export to Thailand to Thailand direct investment and from Thailand direct investment and Lao' GDP to Lao' export to Thailand. In short run, there was unidirectional from Lao' GDP to Lao's export to Thailand. This study indicates that only Laos' exporter got benefit from Thailand investment and economy growth in short run and long run while overall economy was nothing. Therefore, Lao' Government should distribute income from the group into the overall economy or spread the type of export goods into larger scale.

Keywords: FDI, Export, Economic Growth and VECM

JEL: F12, F13, F14, F15, F16, F17

INTRODUCTION

In the last centenary, foreign direct investment (FDI) was an important mechanism for driving global economy. In general, the capital flow effect on production in host countries by eliminate the investment gap in the countries especially in developing countries which have low investment level and send the benefit back to foreign investor in home countries from higher revenue or lower cost. Dunning (2001) presented 3 advantages which motivate the capital flow from home country into host country. One was the location advantage which investor would benefit from the specific of the host country as national resource, labor skill, lower rent or wage, host country economy etc. Ownership advantage made the benefit for foreign investor by the ownership of special equipment or proficiency for producing. It was more productivity

efficiency than another firm. The last advantage which prefer by Dunning was Internalization advantage. It made more benefit for investor by privilege which given by host country government or the other organization who aimed to magnetize the investment in the host country. However, Asiedu (2002) found the different between effect of return on a group of countries and give the situation that be the adverse regional effect.

Some studies confirm the effect of FDI on gross domestic product (GDP). Balasubramyam, Salisu and Sapsford (1996) found the positive effect of FDI in 46 country on GDP and more effect of FDI to GDP of the country which use export promoting strategy than the country which use import substituting strategy. Borensztein, Gregorio and Lee (1998) found the effect of FDI on growth was depend on the level of human capital available in the host economy. Tekin, R, B. (2012) studied the causality relations among real GDP, real exports and real net FDI inflows among least developed countries and found the Granger causality from FDI to GDP. Bernin and Togo and GDP to FDI in Burkin Faso, Gambia, Madagascar and Malawi. Moreover, there was obvious evidence of export Granger-causing GDP in Haiti, Rwanda and Sierra Leone and GDP Granger-causing export in Angola, Chad and Zambia. While studying the export and FDI relations was indicate that there was the causality from FDI to export in Bennin, Chad, Haiti, Mauritania, Niger, Togo, and Yemen and from exports to FDI in Haiti, Madagascar, Mauritania, Malawi, Rwanda, Senegal and Zambia. Carkovic and Levine (2002) argued the stability of the effect. This study estimated the effects of FDI inflows on economic growth in many condition, there was significantly effect of FDI on GDP by estimated with panel data but not significantly in cross section data. While, the impact of FDI on growth which depend on the other of factor as the stock of human capital, financial and trading was the same problem.

Freeman (2002) examined the foreign direct investment situation in Cambodia, Laos and Vietnam. It is shown that the majority investor of this region in the colony ages was France. The investment increased the economy activity in many sector as mining sector, agricultural sector, industrial activities, and investment and financial of the colonial country. After the colony era, Laos had important changing especially the regime. The early policy of new governor was denying the foreign investment. Laos was opening up again as the nearly country in this region, Cambodia, Vietnam. They had to learning how to attract, retain, sustain, manage, harness, and monitor the FDI inflows for developing their countries after pause in the last period. Gunanwardana and Sisombat (2008) studied the trends and patterns of foreign direct investment in Lao PDR since the promulgation of FDI law in 1988. The paper focus is on inflows of FDI to Laos during 1988 to 2004. At the beginning, the foreign investment was very small. Until the early 1990s, there was gradually increased and rapidly rose during 1998 to 2004. While, the largest source of investment was ASEAN investors in this period. The top four investors in all business sector in 2003 was China, South Korea, Malaysia and Thailand. However, the total investment since 1989 to 2015 in Laos that most investment was the electricity generation sector, the second was mining, and the third was agriculture (Laos's Ministry of Planning and Investment, 2016). The majority foreign investor was China, the second was Thailand and the third was Vietnam. The total domestic investment of Laos since 1989 to 2015 was about 25 percent while foreign investment was about 75 percent. (See appendix 1). It indicated that the Laos investment sector unavoidably depended on the foreign section.

Lao People's Democratic Republic is one of developing and landlocked country in Greater Mekong Sub-region (GMS). The economy has been affected by the low income and saving capital formation problem.

Thus, the economy acceleration needs massive capital formation both domestically and abroad in term of FDI. However, there are abundant of natural resources such as mineral, forest, and water. The effect of low income and fewer saving are obstacles for sustainable economic development while the wealth of natural resource attracts the investment. Nevertheless, only some of domestic investors have high potential to invest in mega projects. Thus, the foreign direct investment is necessary engine for Lao PDR economic development.

One of the most investment source in Laos was Thailand. There was many similarity between two country especially the language which other country in the region wasn't be, co-history, co-culture, religious, belief and the other. Moreover, the membership of Association of South East Asia Nations (ASEAN) of both country was support the capital flow and trading among the group. The total foreign investment from Thailand into Laos since 1989 to 2015 was about 748 projects or 4,491 million US\$ or about 18.35 percent (Ministry of Planning and Investment in 2016). Bank of Thailand (2016) presented the information of Thailand direct investment in Laos (FDI inflow) and Thailand import from Laos (Laos export to Thailand) since 2005 to 2015. There was significantly capital flow increased in term of direct investment from Thailand into Laos from 2005 to 2013, slightly decreased in 2014 and rose again in 2015. Meanwhile, there was increasing trend of Laos export into Thailand. Since 2005 to 2011, Laos export into Thailand was slight fluctuation before gradual rise from 2012 to 2015 (appendix 2). The situation can be observed the relationship in both variable. Moreover, they probably concerned the economy of Laos as previous study. Therefore, there probably be advantage for the government to decide supported foreign policy if the relationship can be proved.

Thus, this study aims to examine the relationship between Laos's GDP, Thailand direct investment in Laos and Laos export into Thailand by using vector error correction mechanism (VECM) and granger causality methods. The methodology was presented next section followed by the empirical results. Conclusion and discussion presented in the final section.

METHODOLOGY

This study proposes to prove the relationship among 3 variables, Laos's GDP, Thailand direct investment in Laos and Laos export to Thailand. The data was collected from 2 source, Laos's GDP was collected from UNCTAD statistic given as GDP, Thailand direct investment in Laos which (given as FDI) and Laos export to Thailand (given as Export) were collected from Bank of Thailand. The capital inflow and trading variable were collected as quarterly data from 2005Q1 to 2015Q4 while GDP was collected as annual data from 2005 to 2015 before interpolated by Chow-Lin method into quarterly data from 2005Q1 to 2015Q4. Therefore, there was 44 observation in this estimation. All variable measure in US dollars at current prices in millions and transform into logarithm form. This section explained four stages were applied to test unit root, co-integration, error correction mechanism and granger causality test.

1) Stationary Test

Almost macroeconomic time series variables are non-stationary. As a result, these variables have no tendency to return to long-run deterministic path and the variances are time dependent (Nelson and Plosser, 1982). Provided using the non-stationary variable in the regression by ordinary least square (OLS), there was spurious regression and unbelievable results. The normally method for investigating non-stationary property

was Augment Dickey Fuller (ADF-test) and Phillips Perron (PP-test). Both approach had the same model but different estimated process by using the t-test statistic. This process also examined the stationary property by using the following equations.

$$\Delta X_t = \alpha X_{t-1} + \sum_{i=1}^p \omega_i \Delta X_{t-i} + \varepsilon_t \quad \text{Eq (1)}$$

$$\Delta X_t = \delta + \alpha X_{t-1} + \sum_{i=1}^p \omega_i \Delta X_{t-i} + \varepsilon_t \quad \text{Eq (2)}$$

$$\Delta X_t = \delta + \gamma\theta + \alpha X_{t-1} + \sum_{i=1}^p \omega_i \Delta X_{t-i} + \varepsilon_t \quad \text{Eq (3)}$$

Where X was examined variable, t was any time, ε_t was error term, α was X coefficient, δ was intercept term, $\gamma\theta$ was trending term and $\sum_{i=1}^p \omega_i \Delta X_{t-i}$ autoregressive process term. Eq (1) was model which estimated without intercept and trending in process, while Eq (2) was estimated with intercept in process and Eq (3) was estimated with intercept and trending in process. However, all equation on above which approach by PP-test were none term of autoregressive process.

The stationary property considered by α . If α was equal 0, X was non-stationary while X was stationary if α less than 0. For tested the condition, Coefficient (α) would transform into ADF- t statistic by following.

$$ADF = \frac{\hat{\alpha}}{SE(\hat{\alpha})} \quad \text{Eq (4)}$$

ADF-t statistic would be compare with McKinnon critical value for conclude stationary potential. If ADF-t statistic is more than McKinnon critical value, the variable will non-stationary. In contrast, the variable will stationary if ADF-t statistic is less than McKinnon critical value.

Explained variables may be non-stationary at level or I (0). However, they may be stationary at higher order of integrated I (1) or I (2). Therefore, if empirical results at level was unit root, the variable should test again at higher order of integrated. This process was finished when found the stationary level of all variable was at the second differential.

2) Co-integration

The regression method by OLS is not appropriate in case of estimated variables are non-stationary. However, these estimated variables might have long-run relationships if there are co-integration (Engle and Granger, 1987). Johansen presented the new approach which could estimate many equation base on Vector autoregressive (VAR) process to test co-integration property as the system-based reduced rank regression approach called Johansen Co-integration test. Co-integration test in this study used the co-integration testing which present by Johansen (1988) for investigate the long run relationships between FDI, GDP and export by following:

$$\begin{bmatrix} \Delta FDI_t \\ \Delta GDP_t \\ \Delta Export_t \end{bmatrix} = \begin{bmatrix} \beta_0 & \beta_1 & \beta_2 \\ \vartheta_0 & \vartheta_1 & \vartheta_2 \\ \kappa_0 & \kappa_1 & \kappa_2 \end{bmatrix} \begin{bmatrix} FDI_{t-1} \\ GDP_{t-1} \\ Export_{t-1} \end{bmatrix} + \begin{bmatrix} u_t \\ v_t \\ w_t \end{bmatrix} \tag{Eq (5)}$$

When $\begin{bmatrix} \beta_0 & \beta_1 & \beta_2 \\ \vartheta_0 & \vartheta_1 & \vartheta_2 \\ \kappa_0 & \kappa_1 & \kappa_2 \end{bmatrix}$ vector was the parameter, $\begin{bmatrix} u_t \\ v_t \\ w_t \end{bmatrix}$ was the vector of error term. This approach is

based on the concept that if variables were co-integrated, then the rank of vector of parameter is not equal to zero. The statistical which used for proving the hypothesis was λ_{trace} and λ_{max} eigenvalue. Null hypothesis of λ_{trace} eigenvalue was the number of co-integration vector was rank < k while the alternative that rank = k and Null hypothesis of λ_{max} eigenvalue was rank < k while the alternative hypothesis was rank = k+1.

3) Vector Error Correction Mechanism (VECM)

Error correction mechanism could show the short-run and long-run relation and the speed of adjustment from explained variable return to the equilibrium after independent variables were changed. The classical Error correction mechanism was improved by numerous statistician. This process used the approach which can be explain many equation on the model base on VAR process as Vector Error Correction Mechanism. The model could be form as the following:

$$\begin{bmatrix} \Delta FDI_t \\ \Delta GDP_t \\ \Delta Export_t \end{bmatrix} = \begin{bmatrix} A_0 \\ B_0 \\ C_0 \end{bmatrix} + \begin{bmatrix} A_1 \\ B_1 \\ C_1 \end{bmatrix} EC_{t-1} + \begin{bmatrix} D_1 & D_2 & D_3 \\ E_1 & E_2 & E_3 \\ F_1 & F_2 & F_3 \end{bmatrix} \begin{bmatrix} \Delta FDI_{t-1} \\ \Delta GDP_{t-1} \\ \Delta Export_{t-1} \end{bmatrix} + \begin{bmatrix} p_t \\ q_t \\ r_t \end{bmatrix} \tag{Eq (5)}$$

Where $\begin{bmatrix} A_0 \\ B_0 \\ C_0 \end{bmatrix}$ was constant matrix, $\begin{bmatrix} A_1 \\ B_1 \\ C_1 \end{bmatrix}$ was coefficient matrix of error correction component and

presented the speed of adjustment of model, $\begin{bmatrix} p_t \\ q_t \\ r_t \end{bmatrix}$ was error term in each model and EC_{t-1} was a vector of

error term in the Johansen test. Long-run relation was accepted if the coefficient of vector error correction was negative significantly. This study would present the long-run relationship and speed of adjustment from this approach. The short run effect would present for testing Granger Causality in the next process.

4) Granger Causality test

This testing method is based on the idea that the explanatory variable is the Granger cause when the lag of explanatory variable can explain the dependent variable than only lag of themselves (Freeman, 1983). This

study used short run effect from the independent variable to dependent variable which shown the effect of the explanatory lag for proving the causality. If the independent variables can explain the dependent variable, all of lag coefficient wasn't significantly as zero. This hypothesis can be proved by Wald test.

RESULT AND DISCUSSION

This section presented the empirical result and discussion. The stationary check results were shown in the Table 1. Co-integration test results and Error Correction Mechanism results presented by Table 2 and Table 3. The table 4 shows the Granger Causality results.

The stationary property indicated that all variables were stationary at level by PP test but there were 2 variables which stationary at level by ADF-test. However, this difference was acceptable. This results indicated that all variable could estimate the long-run relationship on co-integration testing.

Table 1
Stationary test results

Variable	ADF-test			PP-test		
	None	Intercept	Intercept and trending	None	Intercept	Intercept and trending
FDI	1.6307	-4.7185***	-4.3225***	0.0233	-3.1514**	-5.0455***
GDP	0.8504	-2.1558	0.4703	6.2495	-4.0669***	-0.0036
Export	1.2527	-2.9369**	-4.3604***	1.4491	-3.0622**	-4.3572***

Note: selected by Schwarz information criterion (SC)

*** Significant at 0.01

** Significant at 0.05

From the co-integration test results in table 2, there were long run relation along the variables. Estimated λ_{trace} and λ_{max} were 0.5081 and significantly at 0.01 and indicated that there are 2 co-integration in the system.

Table 2 Co-integration test results

lag	eigenvalue		Number of co-integration	
	Trace	Maximum	Trace	Maximum
3	0.5081***	0.5081***	2	2

Note: selected by Schwarz information criterion (SC)

*** Significant at 0.01

Vector Error Correction result were presented in table 3. The long-run relationship from GDP and export into FDI was found from FDI and GDP into export by significantly return to the equilibrium which shown by EC1 coefficient. Even there was two co-integration but the EC2 was weaker. Thus, it can explain that shock pushed the dependent variables out of equilibrium as well as FDI would adjusted to equilibrium faster than export.

Long run relationship from GDP and Export into FDI conform the eclectic paradigm of international production of Dunning (2001). In long run, Thailand investor attracted by location advantage which present by Laos's GDP and the increasing of potential export from Laos into Thailand. If Laos' Government want

to increased long run direct investment, they should be openness in trading section and engorge the domestic economy.

In the path of long run relationship from FDI and GDP into export. The important problem is inadequate enhancement of the production although there are rich of domestic natural resources. Massive capital inflow from Thailand accelerates FDI in Laos and increases the ability for natural resources utilization impact. Both section increase the productivity and output which mostly were input of other industry as wood and mineral in Thailand and other. In the other word, there was increase input supply for the other industry in Thailand and other. Thus, in long run Thailand direct investment and Lao' GDP effect on Lao's Export into Thailand.

Nevertheless, there are no FDI and export effects on GDP in the long run. It probably because the human capital development in Laos wasn't enough for effect on the relationship from FDI to GDP as Borensztein, Gregorio and Lee (1998) indicated the important of human capital on the long run relationship while Laos's Export into Thailand is exogenous which depend on Thailand demand.

Table 3
Vector Error Correction Mechanism

<i>Dependent Variable</i>	<i>EC1</i>		<i>EC2</i>	
	<i>Coefficient</i>	<i>t-statistic</i>	<i>Coefficient</i>	<i>t-statistic</i>
FDI	-0.5437	-4.3522***	1.7793	1.5981
GDP	0.0017	0.5734	-0.0440	-1.6537
Export	-0.1385	-2.1638**	1.6828	2.9503

Note: selected by Schwarz information criterion (SC)

*** Significant at 0.01

** Significant at 0.05

* Significant at 0.1

In table 5, there were 1 unidirectional causality. Export was robust affect by GDP in short run. The directional from GDP to Export as found in some results of Rýfat Barýb Tekin (2012).

The increasing of output in Laos probably created input supply for industry in Thailand and directional the demand for input from Laos to Thailand as long run explained.

Table 4
Granger Causality

<i>Dependent variable</i>	<i>Independent variable</i>		
	<i>FDI</i>	<i>GDP</i>	<i>Export</i>
FDI	-	2.3447	1.7148
GDP	6.3771*	-	5.2517
Export	6.3316*	17.3261***	-

Note: selected by Schwarz information criterion (SC)

*** Significant at 0.01

** Significant at 0.05

* Significant at 0.1

CONCLUSION

This study aim to examine the relationship between Laos's GDP, Thailand direct investment in Laos and Laos export into Thailand. The results show 2 long run relationship from Laos' GDP and Laos export to Thailand and Thailand direct investment and Laos' GDP into Laos's export to Thailand. The only one direction in short run was running form Laos's GDP to Laos' export to Thailand.

The results indicate that only Laos' exporter got benefit from Thailand investment and Economy growth in short run and long run while overall economy was nothing. Lao' Government should distribute income from the group into the overall economy or spread the type of export goods into larger scale.

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Appendix 1

Total Investment in Lao since 1989 to 2015

<i>No</i>	<i>Country</i>	<i>Unit</i>	<i>Value of Investment (US\$)</i>	<i>%total value</i>
1	Lao	2,561.00	6,252,316,159.00	25.54
2	China	834.00	5,484,429,971.00	22.41
3	Thailand	748.00	4,491,684,613.00	18.35
4	Vietnam	417.00	3,574,681,539.00	14.60
5	Korea, South	291.00	751,072,139.00	3.07
6	France	223.00	490,626,243.00	2.00
7	United States	114.00	149,800,113.00	0.61
8	Malaysia	103.00	812,558,773.00	3.32
9	Japan	102.00	438,267,441.00	1.79
10	Australia	87.00	127,652,812.00	0.52
11	Singapore	79.00	187,761,475.00	0.77
12	Taiwan	73.00	86,663,554.00	0.35
13	United Kingdom	54.00	201,863,480.00	0.82
14	Hong Kong	49.00	83,547,259.00	0.34
15	Canada	40.00	65,791,144.00	0.27
16	Germany	31.00	7,833,128.00	0.03
17	Russia	24.00	38,459,130.00	0.16
18	India	22.00	163,772,237.00	0.67
19	Netherlands	16.00	434,466,484.00	1.78
20	Sweden	15.00	19,019,558.00	0.08
21	Switzerland	15.00	44,492,192.00	0.18
22	Belgium	13.00	3,694,852.00	0.02
23	Cambodia	11.00	8,363,324.00	0.03
24	Italy	9.00	4,478,813.00	0.02
25	Denmark	8.00	611,384.00	0.00
26	Myanmar	7.00	1,710,000.00	0.01
27	Sri Lanka	7.00	1,035,000.00	0.00
28	Norway	6.00	346,435,550.00	1.42
29	New Zealand	6.00	1,592,000.00	0.01
30	Israel	5.00	2,692,600.00	0.01
31	Korea, North	4.00	1,732,800.00	0.01
32	Indonesia	4.00	106,719,551.00	0.44
33	Bangladesh	3.00	250,000.00	0.00
34	Philippines	3.00	218,000.00	0.00
35	Finland	3.00	1,249,065.00	0.01
36	Pakistan	3.00	489,784.00	0.00

contd. appendix 1

No	Country	Unit	Value of Investment (US\$)	%total value
37	Nepal	3.00	500,000.00	0.00
38	Hungary	3.00	380,000.00	0.00
39	Spain	2.00	202,800.00	0.00
40	Iceland	2.00	164,000.00	0.00
41	Austria	2.00	390,000.00	0.00
42	Bolivia	2.00	230,000.00	0.00
43	Tajikistan	1.00	1,000,000.00	0.00
44	Ukraine	1.00	200,000.00	0.00
45	Angola	1.00	37,500,000.00	0.15
46	Bukina Faso	1.00	1,530,000.00	0.01
47	Panama	1.00	1,750,000.00	0.01
48	Peru	1.00	3,000,000.00	0.01
49	Cuba	1.00	185,000.00	0.00
50	Luxembourg	1.00	200,000.00	0.00
51	International Finance Corpor	1.00	1,590,000.00	0.01
52	Mali	1.00	40,000,000.00	0.16
53	Turkey	1.00	100,000.00	0.00
	total	6,015.00	24,476,953,967.00	100.00

Source: Ministry of Planning and Investment. (2016)

Appendix 2
Thailand direct investment to Laos and Laos' export to Thailand since 2005 to 2015

Year	Thailand direct investment to Laos	Laos' export to Thailand
2005	13.7	224.36
2006	25.58	515.78
2007	83.54	470.06
2008	214.35	616.85
2009	461.33	462.73
2010	566.71	749.38
2011	725.18	1,130.37
2012	1082.52	1,238.29
2013	1414.9	1,360.05
2014	1350.01	1,410.56
2015	1597.34	1,471.43

Source: Bank of Thailand. (2016)

Note: Thailand direct investment to Laos was FDI outflow to Laos or Lao FDI inflow from Thailand and Lao' export to Thailand are Thailand import from Lao.