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Determinants of Economic Growth in Laos

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Author's contribution

This work was carried out whole research work by the author HP, who designed, wrote first draft, read, and approved the final manuscript.

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ABSTRACT

This paper identifies the key determinants of economic growth in Laos, using annual time-series data from 1980 to 2010. To avoid the problems of non-stationary associated with time series analysis, the Dickey-Fuller unit roots statistic is checked in order to ascertain whether the variables are stationary. This prevents problems of spurious results in the regressions by transforming the dependent and independent variables in the first different operator form. This paper contributes on the on-going research issue whether foreign aid and trade liberalization help developing countries to foster their growth. The findings show that trade openness and foreign aid contribute to economic growth in Laos. Furthermore, foreign direct investment, domestic investment, government expenditure, labour force and being a member of ASEAN also found to have positive effects on the performance of the economy, whereas the population growth has a negative impact. This is in line with the argument that a large population is related to the capacity of government expenditure to provide the people with social services efficiently, thereby negatively impact development. To sustain a high rate of growth, this paper suggests improving the trade policy orientation, based on value-added products for exporting, together with investment policy adoption and tourism promotion based on the potential resources of the country. The foreign aid allocation should be focused on specific areas, such as (1) promoting economic growth and (2) direct intervention for the poor, and ensured the positive effectiveness with accountability and transparency methods for aid allocation.

Keywords: Economic growth; trade openness; foreign aid; investment; government expenditure.

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1. INTRODUCTION

Laos pursued significant economic reform under the new economic mechanisms (NEMs) in 1986, aiming to improve the economic development system based on a market-oriented economy, with the intention of transforming the nation from a closed and centrally planned economy to a market-oriented one. Laos made great efforts to reform state-owned enterprise and promote private enterprise and foreign investment, in parallel with strengthening the banking system and implementing trade liberalization. From the early 1990s, this country has paid attention to improving its business environment to make the country more investor-friendly, together with trade promotion and international cooperation.

Following the open-door policies, Laos accepted several offers of support from governments and international organizations from around the world. These factors are assumed to have had a positive impact on its economic development. Sustained economic growth is considered to be a key factor for current and future development, particularly to achieve the development goal for 2020, which is to emerge from the list of least developed countries (LDCs); in addition, the country expects to achieve at least the middle-income country status. Economists have long been interested in the factors that cause different countries to grow at different rates. One of such factors is economic reform. Laos sustained a high rate of economic growth from 1990 to 2010, particularly after the introduction of the NEMs in 1986, which is basically an open economy to international transaction and integration, which is assumed to have a positive impact on growth. The economic development of Laos under the NEMs depends on the perspective of trade with other nations. Moreover, foreign aid is considered to be one factor that dominates the growth, since this country depends heavily on foreign aid for the promotion of higher economic growth and poverty reduction.

Foreign aid plays a crucial role in overcoming problems in poor countries including Laos, this country received a great deal of support from international organizations and agencies in terms of foreign aid, amounting to 16 percent of the GDP, on average, between 1989 and 2010. This aid was allocated to social economic development, particularly rural development and poverty alleviation. Regarding other factors, such as investment, both foreign and domestic investments have increased significantly, particularly after gaining full membership of the ASEAN in 1997. The Government of Laos is committed to achieving robust economic growth through various policies and strategies, which totaled around 6 - 8 percent on average per annum from the late 1990s to 2010, and emerging from LDC status by 2020.

This paper attempts to examine the impacts of the key determinants, such as aid, trade openness, and investment on economic growth in Laos, based on the context of a simple modified growth model and experience from previous studies. The expected outcomes will provide good suggestions for the future development of Laos. This paper consists of five sections, including the introduction. The next section reviews the theoretical issues and the literature. Section 3 specifies the methodology and provides the model specification, while the empirical result is detailed in Section 4. Finally, section 5 concludes the paper.

2. THEORY AND LITERATURE REVIEW

Economic growth means an increase in the average rate of output produced per person, usually measured on a per annum basis. This section reviews the theoretical and empirical studies related to economic growth, particularly the relationship between economic growth and its explanatory variables, such as trade openness, foreign aid, investment and other variables.

2.1 Theories of Economic Growth

Growth theory has mainly developed from the neoclassical model, by authors such as Solow [1], Cass [2], and Koopmans [3]. One characteristic of the model, explored in the empirical hypothesis of recent studies, is the convergence property. The studies state that a country that begins with a lower level of GDP per capita is expected to achieve a higher growth rate in the long term. This could imply the assumption that if all economies were basically the same, except for their initial capital intensities, poor economies would probably grow faster than rich ones. However, this theory has not been completely proved by the empirical analysis, since the economic systems of different countries differ in various features, including the government policy, access to work, international cooperation, willingness to work, and access to technology; thus, the convergence force employs only a conditional logic.

The widespread use of the neoclassical model focuses on the roles played in coordinating and integrating various factors in macroeconomics, public finance, and international economics. This model usually finds wide usage in aggregate economic analysis. Solow's model of economic growth allows the determinants of economic growth to be separated out into increases in inputs (labour and capital) and technical progress. The theory of Solow essentially argues that when production takes place under usually neoclassical conditions and constant returns to scale, there will be no opposition between natural and unwarranted rates of growth. The system is self-adjusting to any given rate of growth in the labour force and eventually approaches a state of steady proportional expansion. The main innovation introduced by Solow is the ability to allow for factor sustainability so that stable equilibrium growth could be attained.

Due to the dependence of growth on exogenous technical progress in the neoclassical growth model and the evident inconsistency of the "unconditional convergence", the hypothesis led to a renewed search for alternative models that can generate economic growth endogenously. According to the endogenous growth theory, economic growth is primarily the result of endogenous and not external forces. This theory maintains that investment in human capital, innovation, and knowledge is a significant contributor to economic growth; therefore, the endogenous theory emphasizes education, on-the-job training, and the development of new technologies for the world market, accounting for their increasing relevance. These proponents are confirmed by the studies of Lucas [4], and Uzama [5].

Several studies have followed the endogenous theory, such as the study by Romer [6], who identifies four basic preconditions for growth: (1) capital-measured in units of consumption goods; (2) labour skills available from a healthy human body; (3) human capital-activities such as formal education and on-the-job training, which is person-specific; and (4) an index of the level of technology. However, this model specification is less clear about the technical progress and the factors influencing growth are hard to measure. In an open economy, the economic growth theory usually suggests more additive determinants, such as degree of trade openness, foreign aid and other factors, which are assumed to dominate growth. Those factors may have a positive impact on economic growth, the production growth function usually simplifies as follow:

$$Y_t = A_t f(K_t, L_t, X_t) \tag{1}$$

where: $f(\dots)$ is the production function

Y denotes the output

A is the technical change

K is the capital stock

L is the labour force

X is a vector of other variables (all other relevant production input) such as trade openness, foreign aid, FDI, government expenditure, domestic investment, and dummy variable.

t denotes the time

2.2 Literature Review of Empirical Evidence

Economists generally agree that openness to international trade facilitates development. Several studies confirm that the openness achieved through trade cooperation and reduced trade obstruction is related to greater growth. This is confirmed by the study of Harrison [7], who examined the relationship between openness and the rate of GDP growth, using the results from cross-sectional and panel data estimates while controlling for country effects. This study shows that the openness measures seem to have a positive correlation with GDP growth, meaning that the more open the economy, the higher the growth rate, while the more protected the local economy, the slower the growth in income.

Hassan Mobeen [8] states that trade openness is believed to improve allocation of all types of resources, economies of time scale, improvements in production techniques by widening knowledge and the technical base, multilateral international arrangements for the transfer of technology, accumulation and formation of capital, and raising the level of employment by job creation and thus economic growth and development. He points out that the concept of trade openness is derived from the classical school of economics and from the theory of Adam Smith and David Ricardo, which specifies that the theory of international trade relates trade and international development. It is believed that economic gains of specialization, discernible in enhanced exports, entail higher levels of GDP, thus exports contribute directly to growth in the national income.

The impact of trade on growth is confirmed by a number of empirical studies. For example, the study by Dolla and Kraay [9], using cross-country data on 100 countries, confirms that changes in the growth rate are associated with changes in trade volumes. Particularly, the change in trade policy is one of the key factors that causes an increase in trade volume and leads to rapid growth. Fosu [10] and Sachs and Warner [11] conducted studies on several African countries, and agreed that more trade restrictions have a negative impact on growth. However, those studies based on cross-country data may suffer from biased estimation, since the different characteristics of each individual country lead to differences in data measurement and collection.

Several recent studies using time analysis to examine the impacts of trade on economic growth confirm that there is a strong correlation between export performance and economic growth, such as the study by Medina-Smith [12]. The relationship between trade and growth is envisaged through an export-led growth strategy, which follows the theory that sustained trade is the main engine of economic growth. This idea is confirmed by Obadan et al. [13], who examined the impacts of trade on economic growth and development in Nigeria using time-series data. The study was developed from the studies of Edwards [14] and Obandan [15], though with some modifications to the model. The GDP growth is the function of the degree of openness, exchange rate, foreign direct investment, domestic investment, and

political stability. The study confirms that trade openness produced a positive impact on Nigeria's economic growth. Moreover, it states that political instability has a strong negative impact on growth and development.

A positive correlation between trade openness and economic growth has been carried out and proved by several recent studies [16,17]; however, the growth may be influenced by the other factors of economic development, which depend on the characteristics of the individual countries, particularly developing countries. Therefore, other studies have explored the impact of foreign aid on economic development, since foreign aid is assumed to play a crucial role in overcoming economic problems in many developing countries. For example, Indonesia in the 1970s, and Bolivia in the late 1980s, moved from a slow path of economic growth to rapid development; in fact, foreign aid plays a significant role in stimulating growth by transferring money, ideas, and technology from donor countries to developing countries [18]. Moreover, the positive impacts of aid on promoting economic growth are confirmed by the studies by Mosley et al. [19], Arvin and Barillas [20], Hudson [21], and McGillivray et al [22].

Recently, the relationship between foreign aid and economic growth has attracted great attention and there is now a large amount of literature on the correlation between foreign aid and growth. The study by McGillivray [23] identifies the impact of foreign aid on growth in African countries, using time series from 1968 to 1999; the result of this study demonstrates that aid not only has a positive impact on growth, but also reduces poverty in Africa. The study by Gomanee et al. [24] addresses the mechanisms through which aid impacts on growth. Using data on 25 sub-Saharan African countries over the period 1970 to 1997, this study indicates that there is a positive correlation between aid and growth; it proves that foreign aid has a significant positive effect on economic growth. Moreover, this study identifies investment as the most significant transmission mechanism for growth.

Karras [25] investigates the relationship between foreign aid and growth per capita using annual data on 71 aid-receiving developing countries, from the period of 1960 to 1997, the result of this study shows that the impact of foreign aid on economic growth is positive, permanent, and statistically significant. A permanent increase in foreign aid by US\$20 per person results in a permanent increase in the growth rate of real GDP per capita by 0.16 per cent; however, this result is obtained without considering the effects of policies.

Chansomphou and Ichihashi [26] examine the impact of foreign aid and foreign direct investment on the long-run income per capita and short-run income growth of Laos. Using time-series data from the period 1970-2008 and deriving a modification of Solow's growth model in regression analysis, this study indicates that foreign aid has a strong positive impact and it is considered to be a main contributor to income growth in Laos, while FDI has a negative impact on income per capita. They conclude that the negative impact of FDI might be due to its surge in and contribution to a few economic sectors and its extreme rises and falls in some periods.

From the above review of the empirical literatures, based on the study of Obadan et al [27], this study hypothesizes that trade openness has a positive impact on economic growth; an increase in the openness level is associated with an increase in the level of income per capita through economic performance, meaning that the trade openness is a driving force of economic growth. Next, this study considers the impact of foreign aid on growth, particularly in developing countries which is confirmed by some studies [28, 29, 30]. The main role of

foreign aid in stimulating economic growth is to supplement domestic sources of finance, such as savings, thus increasing the amount of investment and capital stock.

3. METHODOLOGY

This section discusses the data sources and variables, and then it presents the model specification to examine the relationships between trade openness and economic growth, as well as the relationship between foreign aid and GDP per capital growth.

3.1 Variable Description and Data Sources

In order to examine the relationship between trade openness and growth, as well as the impact of foreign aid on growth, the annual time-series data of Laos were collected, for the period 1980–2010. The data applied for this study are taken from different sources, both international and national. Mostly, the data are from the World Development Indicators, Penn World Table 07, Asian Development Bank, UNDP, Laos Economic and Consumption Survey (LECS), and relevant ministries in Laos. Additionally, data were collected from surveys and case studies carried out by local and international organizations including economic annual reports of Laos, economic monitoring reports by the World Bank, economic development strategy, etc.

The growth rate of the initial GDP per capita is used to represent economic growth from the World Development Indicators. The trade openness level is based on the proportion of exports and imports per GDP or (export + import)/GDP from Penn World Table 07 (PWT07). The data on foreign aid and FDI are from the World Development Indicators, while the data on domestic investment are from PWT07, which is converted to constant 2000 prices.

The descriptive statistics is divided into two periods for the analysis: one before 1997 when it did not hold a full membership, and the second one after 1997 beyond which it holds a full membership of ASEAN. This organization was preceded by an organisation called the Association of Southeast Asia comprising of ten member countries in Southeast Asia consisting of Singapore, Thailand, Malaysia, Indonesia, Philippine, Brunei, Laos, Vietnam, Cambodia, and Myanmar.

As shown in the Table 1 below, the mean values of the economic indicators indicate improvement after 1997 where Laos became a full membership of ASEAN. It seems that the membership positively affect the performance of Laos economy.

Time series variables are often non-stationary at levels and an econometrics analysis with these variables results in spurious correlations, that is, a seemingly significant effect though the variables are actually unrelated in a statistical sense. To avoid spurious relations among economic variables, time series analysis should not use the original series but recommended to be transformed. It can be possible to eliminate non stationarity by using difference¹. A variable is said to be integrated of order d, (I (d)), if it can be transformed to a stationary stochastic process by differencing d times.

¹ The first difference of variables is generated according to the following equation;

$$dY_t = Y_t - Y_{t-1}$$

Where y is each variables employed in the analysis, t is time, and d refers to the first order difference.

Table 1. Descriptive statistics of variables

Variable	Obs	Before being a member of ASEAN				After Being a member of ASEAN			
		Mean	Std.Dev	Min	Max	Mean	Std.Dev	Min	Max
lnGDPP	31	5.66	0.35	5.05	6.27	6.13	0.48	5.53	6.84
LnOPEN	31	0.31	0.19	0.07	0.60	0.73	0.06	0.64	0.83
lnAID	31	18.34	0.88	17.20	19.62	19.58	0.21	19.32	20.02
lnFDI	23	16.76	1.55	14.51	18.89	18.03	1.19	16.64	19.67
lnpop	31	1.26	0.13	0.88	1.47	1.09	0.15	0.86	1.34
LnLBF	31	14.43	0.14	0.88	14.65	14.82	0.10	14.67	14.97

Source: Author calculation

In order to test whether variables are stationary and establish order of integration we employed Augmented Dickey Fuller (ADF) tests. The null hypothesis of unit roots test is non-stationarity, and if the value of the test statistic is smaller than the critical value of significant, we reject the null hypothesis. As shown below in Table 2, the results of the ADF tests suggest that variables are not stationary at their first level, but at their first differences. Thus, our proceeding analysis uses the first differences of variables. A variable process is said to be stationary if its mean and variance are constant over time.

Table 2. The results of augmented dickey-fuller (ADF) units test

At level	Lag	ADF test	
		t-statistics	Critical Value
Ln GDPP	1	-2.89	-3.20
LnAID	2	-1.445	-3.325
LnFDI	3	-3.059	-3.240
LnDI	0	-2.709	-2.230
LnGoEx	1	2.214	-3.240
LnOPEN	1	-2.123	-3.233
LnPOP	0	-3.077	-3.228
LnLBF	0	-2.453	-3.233
At first difference	Lag	t-statistics	Critical Value
dLnGDPP	1	-2.462*	-2.426
dlnAID	5	-2.690**	-2.630
dLnFDI	4	-2.921**	-2.630
dLnDI	3	-2.797*	-2.338
dLnGoEx	1	-4.243**	-3.588
dLnOPEN	4	-3.953***	-3.750
dLnPOP	5	-1.662*	-1.600
dLnLBF	3	-3.363*	-3.238

Source: Author calculation

Note: Asterisks (***), (**), and (*) indicate the significant level at 1%, 5%, and 10 %

3.2 Specification of the Model

Firstly, this study attempts to examine the impact of trade openness on economic growth and development in Laos. The model derives from the study by Obadan and Elizabeth [31], though with some modifications. In regression analysis both the dependent variable and independent variable(s) are log-transformed variables, based on the basic interpretation of

coefficients in a regression analysis is that a one unit change (or one percent change) in the independent variable results in the respective regression coefficient change in the expected value of the dependent variable (GDPP) while all other predictors are held constant. The basic growth model of Laos can be specified as below:

$$d\text{LnGDPP}_t = \alpha_0 + \alpha_1 d\text{LnOPEN}_t + \alpha_2 d\text{LnAID}_t + \alpha_3 d\text{LnFDI}_t + \alpha_4 d\text{LnGoEx}_t + \alpha_5 d\text{LnDI}_t + \alpha_6 \text{LnLBF}_t + \alpha_7 D_{1997} + E_t \quad (2)$$

where: GDPP denotes the GDP per capita at time (t=1980, 1981, 1982...)

OPEN is the degree of trade openness

AID is the foreign aid inflow

FDI is foreign direct investment

GoEx is government expenditure

AID is the foreign aid inflow

DI is domestic investment

LBF is the number of labour force

D is the dummy variable

E represents the error term

In model 2, "d" in front of each variable stands for the first difference of the variables; it suggests that a change in number of economic determinants (both dependent and independent variables) in current year is correlated with a change in last year. For example the GDPP this year is correlated with GDPP last year, the OPEN level of this year is likely correlated with OPEN last year, and the OPEN last year is correlated with the GDPP last year.

The growth rate of the initial GDP per capita (GDPP_t) is the dependent variable, while other variables, such as OPEN, FDI, DI, and government expenditure, are the independent variables, and becoming a full member of the ASEAN in 1997 serves as a dummy variable: $D_{1997} = 0$ before becoming a member of the ASEAN, while $D_{1997} = 1$ after joining the ASEAN in 1997. The dummy variable is used to examine the impact of membership of the ASEAN on the economic growth of Laos. The discussion above has exhaustively shown that trade plays an important role in growth. The critical variables in the model are justified below.

The openness variable is measured as exports plus imports divided by GDP or $(\text{export} + \text{import})/\text{GDP} = \text{OPEN}$; this variable is used to proxy for the level of trade between the country's economy and the rest of the world. It is expected to have a positive impact on economic growth as drawn from various studies reviewed earlier [10,11,19,20,21,22].

Foreign aid is considered to distribute on the capital stock of growth function, since it is hypothesized that foreign aid plays a critical role in boosting economic growth and development of Laos [26]. Therefore this variable is also included in our analysis.

Foreign direct investment and domestic investment are expected to have a direct or positive impact on economic growth in Laos. Foreign direct investment (FDI) has been known as foreign direct investment, which represents any contribution of foreign capital liable to monetary evaluation. It constitutes foreign investors' own capital under their own risk, which originates from abroad and is aimed to be an investment in the host country.

Domestic direct investment (DI) refers to any contribution of national capital liable to monetary evaluation that constitutes national investors' own capital under their risk aimed to be an investment in their own country.

Government expenditure (GoEx) is used as government spending on public sectors, such as education, health, sanitation and water supply, and infrastructure.

In addition, the growth rate of population is a proxy for the growth rate of the labour force. In addition, we may consider the growth rate of the labour force instead of the growth rate of population.

4. RESULTS AND DISCUSSION

This section presents the results of the empirical analysis. The results concern the relationship between trade openness and economic growth, followed by an analysis of the impact of foreign aid on economic growth and development, based on the hypothesis and model specification of this study. In addition, the analysis considers some other determinants, such as foreign direct investment (FDI), domestic investment (DI), government expenditure (GoEx), and the dummy variable, since these variables are expected to have impacts on the economic growth and development of Laos.

Multicollinearity check is necessary for regression, because if the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get wildly inflated. In this case, the *vif* command (in stata programme) is used after the regression to check for multicollinearity. VIF stands for variance inflation factor. Under this regulation, a variable whose VIF values are greater than 10 may merit further investigation. A tolerance value lower than 0.1 is comparable to a VIF of 10, this means that the variable could be considered as a linear combination of other independent variables. The results of this study are detailed in Table 3.

The positive impact of trade openness on economic growth has been confirmed by several empirical studies, as already mentioned in the literature review section. Regression 1 is used to show the correlation between trade openness and growth in Laos. The result shows a statistically significant and positive correlation between trade openness and growth. This indicates that one percent increase of the trade volume is associated with an increase (2 percent) in the national income, based on the gross domestic product per capita, while all other variables are held constant. This confirms the first hypothesis that there is a positive correlation between trade and economic growth. The coefficient value of dummy is also positive and statistically significant implying that becoming a full membership of ASEAN has a positive impact on economic growth of Laos.

Trade openness is considered to be one of the factors encouraging the economic growth of Laos; in particular, since the introduction of the open-door policy in 1986, particularly after joining ASEAN in 1997, the Government of Laos has been committed through various policies and strategies to achieving a robust growth rate of around 7-8 per cent per annum on average and aims to emerge from the LDCs status by 2020. The trade policy promotion has been improved, especially the extension of exports, which is considered to have played a critical role in economic growth during these two decades (1990-2010). Numerous export products have become more diversified and embodied more value added since 1990; the majority of those products are wood products, garments, coffee, electricity, timber, and mining products (gold and copper).

Table 3. Empirical results

Explanatory variable	dLnGDPP _t			
	(1)	(2)	(3)	(4)
Intercept(c)	5.46***	16.28***	-7.53	5.33***
(Std. Err)	(0.14)	(1.397)	(4.44)	(0.51)
dlnOPEN	2.003*		0.014	0.61**
	(1.001)		(0.22)	(0.21)
dLnAID		2.61*	2.415*	0.554
		(1.25)	(1.21)	(1.53)
dLnFDI		0.13**	0.038	0.222***
		(0.05)	(0.066)	(0.045)
dLnDI				0.350***
				(0.048)
dLnGoEx			0.733***	
			(0.201)	
dlnPOP			-0.781*	-3.69***
			(0.344)	(0.86)
dlnLBF		13.53***		
		(2.30)		
Dummy (1997)	0.102*	0.058	0.0415	0.130*
	(0.025)	(0.071)	(0.099)	(0.009)
R-square	0.3045	0.928	0.962	0.951
Adj R-square	0.2530	0.912	0.947	0.932
Mean VIF	3.40	4.01	8.78	4.41

Note: All the regressions are estimated using the OLS method, with *, **, and *** denoting statistical significance at the 10%, 5%, and 1% level, respectively. The values in the parentheses (...) are the standard errors of the estimates.

Although, regression 1 shows a positive relation between trade and economic growth, considering that the value of R-square, which is only 30.45 percent of the systematic variations in GDPP (the proxy for economic growth) is explained by the explanatory variable. In addition, this study considers the correlation between foreign aid and economic growth, it hypothesizes that there is a positive correlation between foreign aid and growth. In regression 2, the result confirms a positive correlation and it is statistically significant between these two variables, one percent increase of foreign aid results in an increase in GDPP (2.61 percent), keeping other variables constant. Moreover, the coefficient values of other variables, FDI, and LBF are positive and statistically significant, which confirms a positive correlation of these determinants on economic growth of Laos. Even if the coefficient value of dummy is not statistically significant, the positive side of the coefficient value would assume a positive impact for holding a full membership of ASEAN on economic growth in Laos.

In brief, this study also examines the impacts of foreign aid on economic growth. Recently, the positive impact of foreign aid in economic performance of developing countries has been a topic of intense debate; therefore, it is questionable whether this factor influences the economic development of Laos, particularly the economic growth. This analysis is used to examine the hypothesis that foreign aid can promote growth in Laos through infrastructure improvement and rural development, in additional, it leads the enhancement of domestic sources of finance and capital stock. The result of regressions 2 and 4 shows a positive and statistically significant correlation between aid and economic growth (although regression 3

is positive but not statistically significant). This result confirms that foreign aid has been influential in economic growth, and it is a major form of foreign capital expected to play important roles in boosting the economic growth and development of Laos.

After the economic reforms, particularly from the early 1990s, the Government of Laos has paid more attention to improving its business environment to make the country more investor-friendly. An investment law policy and regulations have been adopted and developed. The first investment law policy was introduced in 1988. The first revision of this law was made in 1994, followed by the second revision in 2004 and another in 2009. The increase in the FDI inflow has been widely considered to be a potential contributor to growth and economic development, such as the study of Shahbaz et al. [32], who find that foreign direct investment is a good promoter of economic growth. The results of regression 2 and regression 4 confirm that FDI has a positive impact on economic growth, while in regression 3 it is also positive but it is not statistically significant. One observation is that the FDI inflow in Laos is mainly related to the availability of natural resources, such as minerals, hydropower, and agricultural endowments.

The coefficients for population growth (regression 3 and regression 4) are negative and statistically significant. This would assume that the negative correlation between the growth and the high rate of population growth, may be related to the capacity of the Government to provide social services to the people efficiently, therefore negatively affecting economic growth and development. On the other hand, the coefficient values of OPEN, in regressions 3 and 4, remain with a positive correlation with economic growth, these results still confirm that trade openness is good for economic growth of Laos.

In regression 3 and regression 4, we examine the impacts of GoEx and DI on economic growth, since there is a high degree of multicollinearity (over 10 of VIF) between these determinants; therefore, we separate in two regressions. The government expenditure is one of the most important variables related to the national income. It is important to examine the impact of GoEx on economic development, thus the coefficient of this variable is expected to be positive and the result is consistent. This implies that the government expenditure is very influential in economic growth indirectly through social services and public infrastructure improvement. This expenditure includes spending on the national infrastructure (roads, bridges, electricity, information networks, etc.) and social services (education, health, water supply, etc.). These indicators are considered to be important components that dominate economic growth. For example, the improvement of education and health services is related to a high quality of human resources or labour, which is assumed to increase productivity and growth, while infrastructure improvement is considered a necessary condition for economic performance and productivity distribution, and better infrastructure is related to better economic performance.

To sustain a high rate of growth in Laos, domestic investment is also considered to support economic growth. In regression 4, the coefficient of DI is expected to be positive and the result is consistent. The positive and statistically significance of DI coefficient, it confirms that there is a positive correlation between domestic investment and economic growth. The domestic investment involves both public (excluding aid) and private investment, which progressed greatly after economic reform, particularly following the introduction of the new investment policy and joining the ASEAN.

The positive side (regressions 1, 2, 3 and 4) of the dummy variable and economic growth proves that becoming a member of the ASEAN (in 1997) was good for the economic growth

and development of Laos. This is one of the most important events that play a critical role in economic growth. It is a good opportunity to promote the position of this country in the international community; in this case, Laos would have a long-term effect on the direction of its economic development and it was necessary for Laos in respect of its economic progress, both regional and global [33].

Considering at labour force in regression 2, we found that there is a positive correlation and statistically significant between the economic growth and the labour force level, the increase in the number of labour force is assumed to increase the amount of employment in the market and the productivity of a country. Furthermore, the open door policy, increase in investment and international cooperation after holding a full membership of ASEAN, this would increase the employment opportunities that those labourers can find in Laos. In addition, it is also directly related to the government policy to push economic activities, which can generate more employment opportunity, especially tourism promotion, manufacturing investment, and organic agricultural promotion, based on the absolute advantage of potential resources of the country.

5. CONCLUSION

This study analyses the key determinants that have dominated the sustained growth of Laos. Firstly, we analysed the effects of trade openness on economic growth and development, followed by the impacts of foreign aid and other factors (FDI, DI, GoEx, POP, LBF, and dummy variables); these factors are assumed to have impacts on economic growth and development of this country. One of the contributions of this paper is its input to the existing empirical literature on the effects of trade openness and foreign aid on economic growth.

The first result confirms the hypothesis that there is a positive relation between trade openness and economic growth. It implies that the open-door policy is good for the economic development of Laos. An increase in the trade openness level is associated with an increase in economic growth. This may boost the international cooperation and national economic productivity, which lead to the trade growth of the country. Moreover, this study shows that becoming a full member of the ASEAN (in 1997) played a critical role in economic growth. This study also shows a negative impact between population growth and economic growth. The high rate of population growth may affect the capacity of the Government to achieve efficient expenditure on social and public services.

Secondly, this paper also proves that foreign aid has a positive impact on the economic growth of Laos. Following the economic reform, Laos faced difficulties with the trade deficit; therefore, foreign aid is considered to have been an essential factor for the implementation of the Government's investment programme. Furthermore, this study confirms that other factors, such as foreign direct investment and domestic investment, have a positive correlation with economic growth. These two factors are expected to play an important role in the economic development of Laos; particularly, they are assumed to generate job opportunities for Laos's population and increase the national productivity, leading to economic growth.

The government expenditure is one of the other factors that dominate the economic growth. This refers to the government spending on infrastructure (roads, bridges, electricity) and public services (health services and education), which are the basic needs for the economic development of a country. The last result shows the positive correlation between the change in the labour force level and the economic growth; however, it may depend on the

government policy to extend the employment opportunities through domestic investment as well as foreign direct investment in three major sectors: agriculture, industry, and services.

6. RECOMMENDATIONS

This study highlights the positive impact of trade openness and foreign aid on economic growth in Laos. However, to ensure the effectiveness of sustained economic growth to distribute to the total population for the current and future generations, the following recommendations are made.

Although the trade openness shows a very strong correlation with economic growth, the Government of Laos should exaggerate the efforts to diversify the country's export base, which relies less on the exporting of natural resources and raw products, such as wood logging, timber, minerals, etc. The Government should consider its potential resources that can be allocated to national productivity and exports. Even foreign aid has a very strong positive impact on economic growth; this depends on how it is distributed to economic activities, and it also depends on the monitoring and evaluation system used to evaluate the impact of aid spending with accountability and transparency concepts. Thereby, the Government and donor should develop a clear methodology and policy for aid allocation, which involves a good monitoring and evaluation system; this is important to avoid issues of uselessness and corruption.

Foreign direct investment is one of the key factors for current and future development. This factor has a positive impact on aggregate economic growth that will not be distributed throughout the total population. In this respect, it suggests that the Government of Laos should encourage the diversity of FDI, particular in agriculture, manufacturing, and services, instead of prioritizing only some key factors, such as the electricity and mineral sectors. Moreover, domestic investment is important for economic growth; it is necessary to have a good policy to promote private domestic investment, which is a harmless natural resource.

Government expenditure is considered to be one key factor for economic development, which is the basic need for economic growth. The Government has to balance its expenditure on infrastructure and public services, by increasing the budgets for education system improvement as well as health service promotion, which is the development concept of long-term development. Education is related to good human resources, while good health is related to good employers or labourers who can contribute to the social economic development of Laos.

Another suggestion for policy makers and relevant institutions is that they should consider how to take the lead in constituting well-defined schemes and well-timed policies, for which it is important to monitor indicators such as technology, employment market, business practice, education opportunity, and other factors. This creation would ensure a balance between economic efficiency and economic growth, which is a concept of sustainable development.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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