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after the 1986 Economic Reform in Lao PDR*

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Economic Reform in Lao PDR*

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## Abstract

Lao PDR has experienced a high rate of economic growth over decades after undergoing economic reform toward a market-oriented economy in 1986. Meanwhile, inequality has been varying in a similar trend as the growth resulting in some development concerns to be addressed. This study is an attempt to review the pattern of and to identify the determinants of inequality in Lao PDR by estimating a longitudinal cross-sectional econometric model based on 17 x 3 samples in Lao provinces over three periods. There are two models selected with different dependent variables, respectively, which are Gini Index and Decile dispersion ratio. A set of independent variables represents economic development and internationalization. As a result, the study found that development was positively associated with rising inequality in the first model. Also, the second model found that internationalization represented by the FDI inflow has a positive relationship with the Decile dispersion ratio. The Kuznets's inverted U-curve relationship between inequality and economic growth could not be found due to the short panel dataset.

*Keywords: determinants of inequality, income distribution, GINI Index, economic reform, economic development, globalization, pooled OLS, panel data*

## **1. Introduction**

Since the 1986 economic reform, inequality in Lao PDR has been increasing over time despite rapid rate of economic growth and notable poverty reduction. Inequality has become a new challenge for Laotian social and economic development, in particular, the areas of inclusive growth and shared prosperity. According to some points of view, inequality is considered as an obstructor to development mainly through hindering the efficiency of resource allocations (Deyshappriya, 2017). In case of Lao PDR, Warr et al. (2015) noted that rising inequality had played a role in delaying poverty reduction. In particular, if the inequality had not increased, the poverty incident would have been reduced faster than it was. Accordingly, it is important to deal with the issue of inequality.

Recently, there are just a few academic works conducted in the context of Lao PDR. Epprecht et al. (2008) examine the determinants of poverty and inequality in Lao PDR by utilizing a “small area estimation” to estimate various measures of poverty and inequality for the provinces, districts, and villages in Laos. As a result, it is found that better economic opportunities were not associated with higher inequality. Moreover, NOLINTHA (2015) examined the relationship between inequality between FDI and consumption inequality by using Lao district data. He found that FDI inflows positively influenced inequality. Similarly, unequal distribution of FDI and government investment also affected provincial disparity.

Due to the lack of empirical literature on inequality in Lao PDR, this study aims to fill the gap of literature on the determinants of inequality by identifying the determinant of inequality, in particular, to answer the question of “what are core factors driving inequality in Lao PDR over decades.” This study employed pooled OLS regression technic with cross-provincial data over three periods (2002/03, 2007/08, and 2012/13) to identify the determinants. Essentially, the potential determinants, drawn from existing literature, consist of social and economic development indicators. Such as economic growth, FDI inflow, education enrollment, and so forth. Revealing these determinants will implicate a useful direction for policy makers particularly to deal with the inequality issue.

## 2. A Short Introduction to Trend of Inequality and Economic Development in Lao PDR

Inequality in Lao PDR has been Over two decades, a remarkable progress of Laotian social and economic development could be seen in the continuous increase of GDP per capita and decline of the poverty rate. As it is illustrated in table 1, GDP per capita increased from 250 in 1992 to 1588 \$US in 2013. Likewise, the absolute poverty rate decreased from 46 percent to 23.2 percent in the same period. In contrast, the growth seems to be unevenly distributed among nationals. As it is noticed, Gini coefficient increased from 0.31 in 1992 to 0.38 in 2012. Also, as it shows in table 2, inequality in Laos is quite low compared to the situation in the neighbors except for Cambodia, but the inequality in Laos has momentarily increased from 2002 to 2012 while the inequality in the neighbor has progressively declined except Vietnam. In overall, it is evident that inequality in Laos has risen over time.

*Table 1: Gini Coefficient and Poverty in Lao PDR*

	1992/93	1997/98	2002/03	2007/08	2012/13
Gini Coefficient	0.31	0.38	0.35	0.36	0.38
Poverty Headcount Ratio	46	39.1	33.5	27.6	23.2
GDP per capita (Current \$US)	250	345	362	709	1588

Source: World Development Indicators, <https://data.worldbank.org/data-catalog/world-development-indicators>, (accessed 10 December 2017)

Note: Poverty Headcount ratio was based on national poverty lines

*Table 2: Gini coefficient Laos and countries in the region*

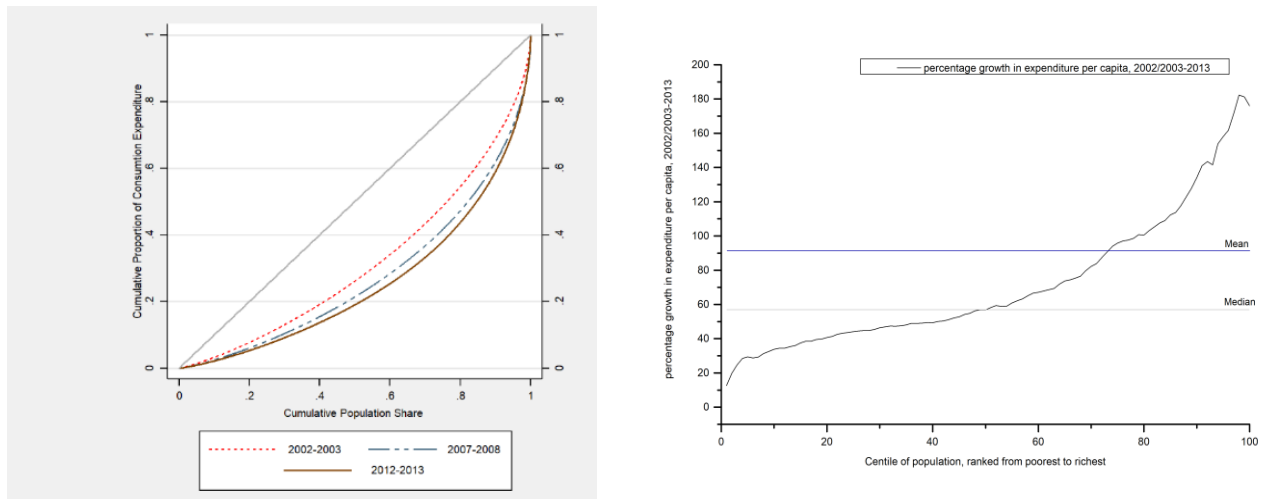
Country	Gini Index	Year	Gini Index	Year	Change	Percentage Change
Cambodia	35.46	2004	30.76	2012	-4.7	-13.25
China	45.06	2002	42.16	2012	-2.9	-6.43
<b>Laos</b>	<b>32.66</b>	<b>2002</b>	<b>37.89</b>	<b>2012</b>	<b>5.23</b>	<b>16.01</b>
Thailand	41.94	2002	39.26	2012	-2.68	-6.39
Vietnam	37.32	2002	38.7	2012	1.38	3.69

Source: World Development Indicators, <https://data.worldbank.org/data-catalog/world-development-indicators>, (accessed 10 December 2017)

Furthermore, to have a more precise look on changing of inequality in Laos, The Lorenz curves over 2002/03, 2007/08, and 2012/13 (Figure 1) on consumption expenditure indicates that inequality has slightly increased and the higher cumulative population has taken more the cumulative share in total consumption expenditure over time. Besides, the expenditure growth rates of each percentile from

2002/03 to 2012/13 is also unequal. As it is illustrated in Figure (2), the growth of the lowest percentile was just 20 percent while of the richest was almost 190 percent. In sum, the higher class enjoyed a higher rate of consumption expenditure growth.

Figure 1 & 2: Lorentz Curve and Growth Incident Curve of Lao Households' s Expenditure on Consumption in 2002/03, 2007/08, and 2012/13.



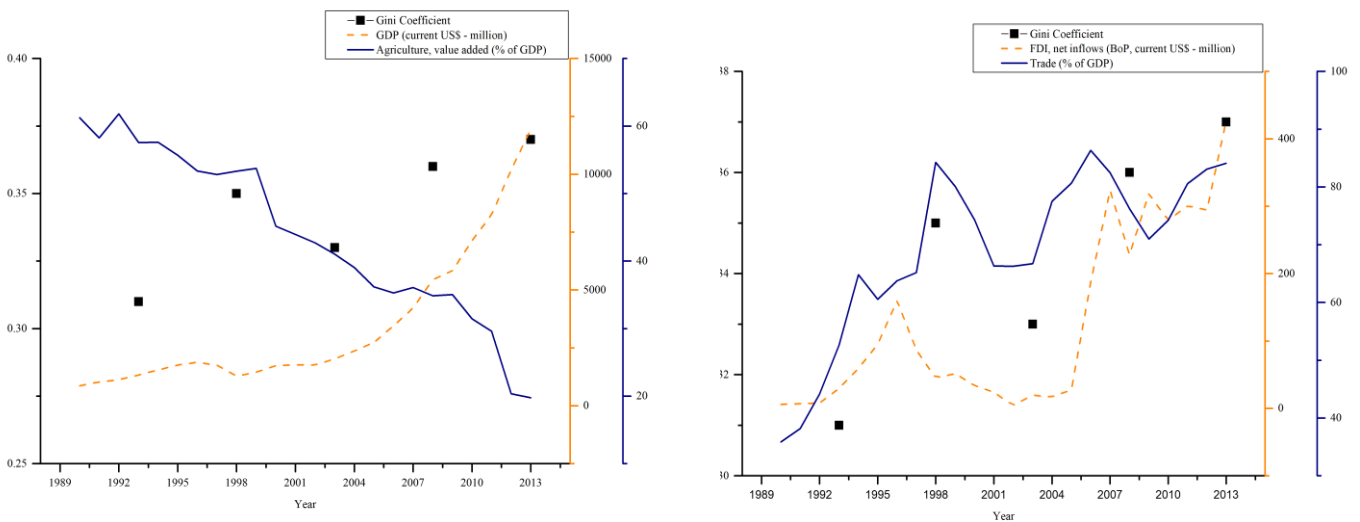
Source: Computed by the Author Using data (60% of an original number of observations) from the Lao Consumption and Expenditure Surveys for the years 2002/03 (LECS 3), 2007/08 (LECS 4), and 2012/13 (LECS 5).

Regarding economic development, Lao PDR has been through two significant economic reforms in the past 40 years. Socialist economic system was initially introduced after the victory of Lao communist party in 1975, which the state controlled almost every production system (what to produce, how to produce and for whom to produce). Consequently, the development in this period resulted in many ineffective outcomes, such as agricultural dependency with inadequate food security, undeveloped and industrial trap, slow economic growth and other economic indicators (J. G. Anderson, 1996). Moreover, because of these disappointing results, the state has started to transform its economic system toward a market-oriented economy. This reform underwent with various system adjustments such as liberalizing market and price control, privatizing state-owned enterprise, encouraging private ownership, removing exchange rate control, embracing international trade and investment, and so forth (Phimphanthavong, 2012).

Since the 1986 reform, Laos has achieved an impressive rate of economic growth and been fueled by foreign direct investment and international trade. In the pre-era, manufacturing used to play a vital role on FDI, later the natural resource-based sector and hydropower sector has taken the position. In terms of export, primary commodity remains the main export of Lao PDR. Additionally, economic

structure has shifted toward non-agriculture sectors while about 80 percent of nationals keep relying on agriculture as the primary income source, and most of the agriculture activities are subsistence-based (Menon et al., 2013). As it is shown in *Figure 3 & 4*, the overall trend of GDP, FDI inflow, and trade openness has rapidly increased over two decades except for agriculture sector. However, FDI and trade openness stagnated in the period after the Asian Financial Crisis 1997. Also, it is interesting that inequality is positively associated with FDI inflow and trade openness because inequality also decreased during the stagnation period. In overall, inequality and economic development are on the same trend.

Figure 3 & 4: Trade openness, FDI, GDP, Agriculture sector, and Gini coefficient in Lao PDR



Source: World Development Indicators, <https://data.worldbank.org/data-catalog/world-development-indicators>, (accessed 10 December 2017)

### 3. Determinants of Inequality

To date, there is immense literature on determinants of income inequality. Most of the studies applied regression technic on cross-countries and within country panel data by regressing inequality indices against various social and economic variables. The starting point of the study regarding the relationship between inequality and economic development could be traced back to the contribution of Simon Kuznets in 1955, who purposed a hypothesis that has later been well-known as a “Kuznets Hypothesis” or “Kuznets Curve” (ElGindi, 2014). The hypothesis shows the invested-U relationship between inequality and economic growth in these developed countries: the United State, England, and Germany. In typical word, inequality would increase in the early stage of economic growth, then falls in the subsequent time (Kuznets, 1955). The



primary explanations for this hypothesis are reliant on labor migration (the shifting of employment structure), urbanization, and demographic transition.

Due to the development of quality of data and technology, a cross-country analysis on the relationship between development and inequality has been increased since the 1980s (ElGindi, 2014). While, more factors have also been attached to this area of study. Notably, Influenced by Kuznets's explanation, Nielsen (1994) constructed an internal development model to investigate the relationship between growth and inequality by including three core variables, namely, sector dualism, demographic transition, and spread of education.

Besides this internal development model, globalization, infrastructure development, macroeconomic factors and others have been widely explored as significant determinants of inequality. For instance, Zhou et al. (2011) Jaumotte et al. (2013), ElGindi (2014) claimed globalization as drivers of inequality in particular through international trade, financial and investment liberation, and technology development. Also, Sarel (1997), Deyshappriya (2017) examined the relationship between inequality and macroeconomic factors, including inflation rate, exchange rate, government expenditure, and others. Lastly, Calderón et al. (2004) and Seneviratne et al. (2013) investigated the relationship between inequality and infrastructure development through various indicators, namely, energy, road, railway, telecommunication.

The following section would review some of the empirical studies and theoretical perspectives on the relationship between inequality and each of these selected factors: economic growth, demographic transition, sector dualism, education, foreign direct investment, government expenditure, and infrastructure development. The selection purpose is to make the review more precise and direct to the study. In dealing with the issue of inequality, problem-focus would be more feasible and realistic approach than discipline-focus, which all potential determinants are essential (ElGindi, 2014).

**Economic Growth and Sector Dualism:** Kuznets frameworks on the inverted U-curve relationship of inequality and development are driven through labor migrations due to the urbanization and industrialization, which the relative wage between rural-urban, and sectors are different (Bourguignon et al., 1998). Nielsen (1994) generalized the hypothesis by assuming that the different rate of wage between agriculture sector (low wage) and industrial sector (high wage) caused sector dualism. In the early stage of industrialization, shifting of labor from agricultural to industrial sectors widens the income gap. Subsequently, the gap gets narrower in the next stage of industrialization. Moreover, he adopted the measurement of sector dualism through the share

of the agricultural labor force in all employment, and the share of agriculture sector in GDP and the study confirmed the Kuznets hypothesis.

**The demographic transition:** Kruzenets (1965) has forecasted the relationship between growth and population growth as a curvilinear. The falling of death rate and high birth rate during the early stage of development lead to high rate of natural growth rate. Afterward, the birth rate would start to decline while economic growth still occurs (ElGindi, 2014). Regarding the relationship between inequality and population growth, Willismond (1991) provided two explanations to support that the population growth has a positive impact on inequality through increasing labor supply. Firstly, if there are more young workforces, which usually are at the bottom of income distribution; Relatively, there would be more low-income people. Secondly, the supply of such labor could also push the relative wage of unskilled workers down (Nielsen, 1994). The relationship between these two variables is entirely conclusive among scholars, Nielsen (1994) Raychaudhuri et al. (2010), and ElGindi (2014) found that higher rate of population growth leads to more inequality.

**Education:** John Stuart Mill (1848) has suggested the concept of education spread which predicted that more people access to school would result in lowering income inequality (cited in Elgidi, 2014). The explanation was based on the linkage among inequality, human capital accumulation, and earning. In basic economic explanation, based on supply-demand mechanism, the increase in the supply of skilled labor force, due to the spread of education, would lead to competition in the high-income market. As a result, the skill premium would be diminished, and the income gap between skill and the unskilled market would be minimized (Nielsen, 1994). However, there is also a composition effect, which the education spread could also potentially lead to new wage polarization between skill and unskilled labors in the early stage of the development. This concept claims that the relationship is similar to Kuznets's inverted-U curve (Gregorio et al., 2002). Plenty of literature supports the inverted-U relationship. Gregorio et al. (2002), Park (2017) similarly examined the relationship between inequality and inequality that more education attainment and equality in access to education lead to an equal distribution of income. However, it is accepted that investment in human capital and offering equal access to education are core factors in reducing inequality in East Asia countries (ElGindi, 2014). Then, whether an invested-U curve or linear relationship, education may always be an answer for inclusive growth target.

**Foreign Direct Investment:** the relationship between FDI and Inequality are inconclusive. Both of negative and positive effect of FDI on inequality have been purposed. Regarding theoretical perspectives, Kentor (2001) provides three channels whereby FDI would cause inequality. First of

all, FDI creates or restores sector employing specific group with a specific skill. This employee group relatively earns more salary than another group in the economy, particularly in public sector and other former sectors. Secondly, the profit from this kind of investment is sent back to the host economy rather than reinvested in the recipient countries. Third, in the era of racing to the bottom, to attract FDI, the government established a market environment to enhance the business climate for the investment by reducing wage, ignoring safeguard measure, providing tax exemption, and other privileges. These policies affect the income of labor and hamper inequality. Likewise, Jensen et al. (2007) suggested two mechanisms to explain the influence of FDI on inequality. On the one hand, FDI improves income distribution in recipient countries through reducing the gap between capital rent and wage rent because the inflow of FDI with capital possibly diminishing of capital return in the domestic market, and higher demand for labor would push labor wage up. On the others hand, FDI leads to more inequality because it trends to pay a premium wage for a skilled worker, which endanger the gap between unskilled and skilled workers. Moreover, Cornia (2013) explained that FDI in labor-intensive and capital-intensive sectors have a different effect on inequality. Firstly, Labor intensive FDI increases the demand for an unskilled worker in the recipient market, and it also push the overall wage of this class. Consequently, FDI in this manufacturing sector improves income distribution. In essence, it is assumed that FDI in the manufacturing sector is ordinarily labor-intensive, seeking for cheaper labor to condense production cost. Then, its effect on distribution would be negative. Secondly, in contrast to labor intensive, capital intensive sectors seem to increase inequality due to the return to capital and skilled workers (Suanes, 2016).

**Government Expenditure:** although an inverted-U curve relationship between inequality and economic growth has been broadly tested, there are also existing doubts over the efficiency of growth in reducing inequality. It is settled among scholars that Without government's redistributive measures, such as tax, social spending, social safeguard, and other measures, economic development could fail to achieve any poverty reduction and equal distribution of income. In contrast to classical economics augment over intervention and efficiency, the redistributive policy could foster growth (Martinez-Vazquez et al., 2012). However, the relationship between public spending and inequality remain vague. E. Anderson et al. (2016) conducted a meta-analysis of 84 separate studies containing over 900 estimates in the theme of government spending – inequality relationship. Most studies suggested that government spending (all sectors) is moderately positively associated with inequality. In contrast, spending in social sectors results in negative impact to inequality. Interestingly, the studies used Decile ratio found

a more negative relationship than Gini coefficient. Ferreira (2016) reviews some mechanisms purposed by a various meta-analysis on the topic that public spending positively affects inequality. Firstly, in developing countries, middle-income class enjoys most of the government transfer spending. Secondly, subsidies also took a lots share of government spending. Thirdly, public expenditure on education and health benefited middle class in an urban area than other groups. Lastly, financial source of spending is from taxes and monetary expansion, causing inflations which the low-income group gets directly affected.

**Infrastructure Development:** most of the literature on this topic has been supporting the argument of infrastructure development leading to a reduction in inequality. In conventional explanation, the infrastructure development enables people in the impoverished region to have an equal opportunity to engage in various productive activities by linking them to the broader economic network (Bajar et al., 2016). For instance, Fan et al. (2002) examined the relationship between various types of government expenditure, poverty, and inequality by evaluating provincial data from 1970 to 1997. It is found that the infrastructure development leads to rising of growth rates and reducing of poverty and regional inequality in China because the expansion of infrastructure created new opportunities for non-agricultural employment in rural regions. In Opposing to the trend, there is also a positive relationship found by scholars. An increase in access to necessary infrastructures, such as road, electricity, and may lead to an unequal distribution. Bajar et al. (2016) examined infrastructure and income distribution relationship by using a panel dataset of major Indian states. The study found that more access to road and electricity are positively associated with consumption based inequality. According to his explanation, the people in society enjoy the infrastructure services at the different degree of benefit. For instance, the poor trend to less use such access to promote their productive activities than the rich.

#### **4. Data, Variables, and Model Speculation**

The study was based on the cross-sectional time-series dataset, consisting of 17 provinces in Lao PDR over three periods (2002/03, 2007/08, 2012/03). This scope was selected according to the availability of overall data. Moreover, the core variables of this study are chosen based on the availability and consistency of the existing literature on inequality determinants. As it is illustrated in table 2, the inequality was represented by two inequality indices (GINI index and Decile Ratio). Besides, except for household expenditure, most of the variables are commonly used in previous work. Commonly, development was regularly represented by GDP per capita. However, because provincial (disaggregate)

data on GDP is not available, the study utilizes household consumption expenditure as a proxy for development.

Moreover, in terms of data sources, the study collected data from various sources. Mainly, the data were from Lao government's published and unpublished official statistical reports. Data on foreign direct investment and government expenditure were from Ministry of Planning and Investment and Ministry of Finance of Lao PDR, respectively. Besides, other data were from publications of Lao Statistic Bureau (LSB), including Lao Statistical Yearbook and Household Consumption and Expenditure Survey Report. Furthermore, in case of Decile ratio, the study calculated from the household expenditure survey dataset (raw data) because the data is not available in any publication. The dataset is also provided by LSB.

$$\begin{aligned} \text{Gini Index}_{it} = & \beta_0 + \beta_1 \text{GDP}_{it} + \beta_2 \text{Population}_{it} + \beta_3 \text{Government Expenditure}_{it} + \beta_4 \text{FDI}_{it} + \beta_5 \text{Household Consumption}_{it} + \beta_6 \text{Decile Ratio}_{it} + \beta_7 \text{Urbanization}_{it} + \beta_8 \text{Literacy}_{it} + \epsilon_{it} \quad (1) \end{aligned}$$

$$\begin{aligned} \text{Decile Ratio}_{it} = & \beta_0 + \beta_1 \text{GDP}_{it} + \beta_2 \text{Population}_{it} + \beta_3 \text{Government Expenditure}_{it} + \beta_4 \text{FDI}_{it} + \beta_5 \text{Household Consumption}_{it} + \beta_6 \text{Urbanization}_{it} + \beta_7 \text{Literacy}_{it} + \epsilon_{it} \quad (2) \end{aligned}$$

As the objective of this study is to find determinants of inequality in Lao PDR, the author has constructed two empirical models. In the first model, the dependent variable is Gini Index, and the independent variables include a set of social and economic factors. In the second model, all independent variables are the same as the first model. However, Decile ratio is set as dependent variable instead of Gini Index. The purpose of the second model is to specifically look at the inequality between top expenditure group and lowest income group, where the middle class is ignored. Moreover, the definition of variables in both models (Eq1 & 2) is presented in table 1. Besides,  $\beta_0$  denotes intercept and  $\epsilon$  denotes error term. In addition, the subscript  $i$  and  $t$  denotes the province and the time point of observation, respectively.

In essence, the empirical model expressed in equation (1) and (2) are in the form of Pooled OLS regression technic of Panel data. Panel data could be estimated through various empirical techniques. However, there are two reasons why the author opted to use Pooled OLS technique. The first reason is that the data set of this study is quite restricted in terms of a number of observation. Secondly, since the primary objective of the study is to find the cause of inequality, the analysis could ignore time specific and individual specific effect. Additionally, the expected sign of the results is presented in Table 3. These signs are drawn from existing literature in area of inequality determinants

**Table 3: Description of Variables and Data Sources**

Variable Name	Variable Used	Unit & Var in Model	Data Sources
Inequality	GINI Index and Decile Ratio (Top10/low10)	Percent for GINI Index, Ratio, (Tlratio)	GINI index: LCES 3/4/5 Summary, LSB. Decile Ratio is computed by the author using LECS Raw Dataset
Economic Growth	Mean Household Consumption Expenditure	Kip (deflated to 2002 prices), (HHCON)	LCES3/4/5 Summary, LSB
Sector Dualism	Percent of Labor Force in Agriculture Sector to Non-Agriculture Sectors	Percent, (SDual)	LCES3/4/5 Summary, LSB
Population Growth	Natural Growth Rate of Population	Percent, (POPG)	Statistic Yearbook, LSB
Secondary School Attainment	Net Enrolment Rate of Secondary School of Population Aged 9-15	Percent, (EDU)	LCES3/4/5 Summary
Foreign Direct Investment	Committed Value FDI	Million US dollar (deflated to 2002 prices), (FDI)	Unofficial Report of Ministry of Planning and Investment of Lao PDR
Government Expenditure	Government expenditure per capita	US Dollar (deflated to 2002 prices), (GOVEXP)	Official Gazette, Implementation of 2002-03, 2007/08, 2012/13 Fiscal Years
Infrastructure Development	Percent of Household Has Access to Road in dry season and Electricity	Percent, (ROAD and Electricity)	LCES3/4/5 Summary, LSB

*Note: LECS or Lao Expenditure and Consumption Survey is a national level survey, usually conducted in 5-years interval by Lao Statistic Bureau (LSB). The first survey was done in 1992/1993. To date, the latest was the fifth survey (2012-2013).*

**Table 4: Description of Expected Sign of the Two Equations**

Variable Name	Expected Sign	Recent Works
Economic Growth	+	(ElGindi, 2014; Kuznets, 1955; Nielsen, 1994)
Sector Dualism	-	(ElGindi, 2014; Kuznets, 1955; Nielsen, 1994)
Population Growth	+	(ElGindi, 2014; Kuznets, 1955; Nielsen, 1994)
Secondary School Attainment	-	(ElGindi, 2014; Kuznets, 1955; Nielsen, 1994)
Foreign Direct Investment	+	(Cornia et al., 2004; Kentor, 2001; NOLINTHA, 2015)
Government Expenditure	-	(E. Anderson et al., 2016; ElGindi, 2014)
Infrastructure Development (Both Road and Electricity)	-	(Fan et al., 2002)

## 5. Result and Discussion

Table 5 elaborates the estimation result of the two equations in this study. The first and the second models are presented in the first and second column, respectively. In general, F-statistics of both models provides satisfactory results indicating that both models are statistically significant at the 99 percent of the confidence interval. In the first model, it is seen that 50.92 percent of the variation of Gini Index can be explained by the change of all determinants. Also, it is 49.18 percent for Decile ratio in the second model. Also, there are three variables in the first model (MEABHHE, GOVEXP, and ROAD) and two variables (FDI and GOVEXP) in the second model are found to be statistically significant. Moreover, following sections would discuss about the result of each variable in detail.

**Household Consumption Expenditure:** According to table 5, mean household consumption expenditure is positively associated with Gini Index at 5% of probability of an error. One thousand kip increase in mean household consumption expenditure, ceteris paribus, would lead to an increase in Gini coefficient by 0.00521. This result is in the same line with many works listed in table 4, suggesting that inequality would increase in the early period of development, then, it would decrease later on. However, Kuznets curve could not be detected because the data used in this study is a short panel. Moreover, household expenditure also positively affects Decile ratio, but it is not statistically significant. In sum, this result suggested the positive relationship between economic development and inequality in Laos PDR.

**Sector Dualism:** percent of the workforce in agriculture sector is not found to be statistically significant with both Gini index and Decile ratio. However, it still shows a negative association with Gini Index and Decile ratio, which is also consistent with the previous literature that shifting of labor from agriculture to non-agriculture sector would increase inequality. In the case of Lao PDR, initially, agriculture sector used to play a critical role in Laotian economy, but, recently, service and industrial sectors become primary segments of the economy. Moreover, employment structure also shifted, but significant proportion of the population remains in the agriculture sector, and, mostly, the agriculture activities are subsistence-based. Thus, moving of labor from agriculture sector to non-agriculture during this period would perhaps lead to an increase in inequality because the shift increases the number of high-income peoples while there are still some low-paid workers in the agriculture sector.

**Demographic Transition:** base on table 5, the natural rate of population growth does not exhibit any significant results, nevertheless it still shows a positive association with both Gini Index and Decile ratio in the first and the second models, respectively. These results also coincide with recent literature purposed in table 4. As discussed in the literature review about the theoretical explanation, supply

of labor force caused by an increase in the natural rate of population growth would increase inequality. However, in case of Laos, as Hayes (2015) described that high fertility rate is concentrated among the poor while fertility rate of the rich is relatively much lower. Thus, it can be presumed that population growth rate is also concentrated among the poor, indicating that number of low-income population increases while the income base remains the same. Then, in general, the rising inequality could perhaps be caused by the increase in population in Lao provinces.

Table 5: Regression Result of the Two Models

	GINI INDEX (MODEL 1)	TLRATIO (MODEL 2)
1.MEANHHE	0.00521*	0.000809
T-VALUE	(2.59)	(0.97)
2.AGRIWORKFORCE	-0.00387	-0.00417
	(-0.08)	(-0.21)
3.POPGROWTH	1.331	0.229
	(1.29)	(0.53)
4.EDU	-0.0317	-0.0170
	(-1.02)	(-1.31)
5.FDI	0.00277	0.00631*
	(0.38)	(2.07)
6.GOVEXP	5.278*	2.641**
	(2.69)	(3.23)
7.ELECTRICITY	0.0115	0.00778
	(0.49)	(0.80)
8.ROAD	0.0681*	0.00954
	(2.41)	(0.81)
_CONS	15.84*	2.043
	(2.33)	(0.72)
N	51	51
ADJUST R-SQ (R-SQ)	0.5092 (58.78)	0.4918 (57.31)
F-VALUE	7.49***	7.05***

Note: t statistics in parentheses \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**Education Spread:** As it was hypothesized in the methodology, the relationship between net secondary school enrollment rate and inequality are found to be statistically insignificant in both models. However, the signs of the coefficients in two models are negative. It means that an increase in net secondary school enrollment rate would lead to declining in both Gini Index and Decile ratio. Even though statistically insignificant, it is essential to explain the negative relationship between the two. As it is reviewed in the literature, the more people access to high education, the more they



could engage in high-income work. Then, inequality would reduce. However, this study uses the net enrollment of the secondary school, which has already referred to the equality in access to school. Thus, previous net secondary school enrollment negatively affected inequality.

**Government Expenditure:** according to table 5, government expenditure is highly significant in explaining Gini Index and Decile ratio. It is surprising that government expenditure positively affects inequality in both models, which means that increase in government expenditure per capita leads to increase in inequality. This result seems not in line with many works that government expenditure would have a redistributive effect which would negatively affect inequality. However, the data of government expenditure used in this study was a total expenditure, including both recurrent expenditure and capital expenditure. Thus, the non-redistributive purpose of the spending could positively affect inequality. Moreover, as it is illustrated in table 6, capital expenditure and spending on wage and salary of civil servant captured a significant proportion of all expenditure. Regarding the impact of the salary of civil servant expenditure on income distribution, the middle class is likely to directly benefit most (salary) while the poor may only benefit indirectly from the public services. Thus distribution becomes unequal especially between the middle class and the lower. Moreover, it is also found that the gap between the top 10 rich and the low 10 poor is positively affected by the government expenditure. Based on the composition of expenditure, capital expenditure might play a role on this effect because government investment on infrastructure, such as road, building, water supply, electricity, and so forth, improves the business environment for business sectors. In short, recently, government expenditure had a positive effect on inequality in Lao PDR.

**Table 6: Composition of Lao Government Expenditure in Three Fiscal Years**

	2002/03		2007/08		2012/13	
	Allocation	Percent	allocation	Percent	Allocations	Percent
Total Expenditure	1835791	100.00%	2870429.85	100.00%	7497574	100.00%
Total Recurrent Expenditure	639701	34.85%	1882929.39	65.60%	6232160	83.12%
Wage, salaries and benefits	377285.08	20.55%	1032747.85	35.98%	4845527	64.63%
Operation and Maintenance	82703.26	4.51%	221164.01	7.70%	485927.7	6.48%
Subsidies and transfers	152026.81	8.28%	85284	2.97%	191308.5	2.55%
others	27685.85	1.51%	543733.53	18.94%	709397.5	9.46%
Total Capital Expenditure	1196090	65.15%	987500.46	34.40%	1265414	16.88%

*Source: Official Gazette, Ministry of Finance of Lao PDR*

**Foreign Direct Investment:** as it is shown in table 5, FDI inflow exhibits a significant and positive relationship with Decile ratio and a statistically insignificant and positive relationship with Gini Index. In general, the trend of the relationship between inequality and FDI in two models is consistent with previous works, that FDI positively affects inequality. As it is purposed by Kentor (2001), the foreign

firm pays wage premium to a particular group, leading to difference in earning. Moreover, in case of Lao provinces, it is quite supportive that capital-intensive sectors in natural resourced sector and hydropower sector seized a significant portion of FDI inflow to Laos in a previous time, while labor-intensive industries were not pronounced. Then, employment as a channel of distribution would only be concentrated among highly skilled workers, and the rest could not have a direct effect from FDI.

**Infrastructure Development:** percent of access to the road in the dry season of Lao Household in provinces exhibits a significant and positive relationship with Gini Index, while access to electricity does not show a significant relationship with Gini Index. In addition, access to road and electricity are not significantly associated with Decile ratio in the second model. Unexpectedly, the variables of infrastructure development in two models are positively associated with inequality, meaning that infrastructure development increases inequality. The results are not in line with the concept positing that more access to road or electricity would enhance the ability of the people in the disadvantaged region to engage in the income cycle, then, inequality becomes narrower. Furthermore, in terms of the effect of infrastructure on the poor in Lao PDR, Byoungki (2007) addressed that improvement of access to road and electricity negatively affected poverty headcount rate. This is because of that the increase in access to these infrastructure established market access, increase non-agriculture employment, labor mobility and farm and non-farm productivity for low-income group particularly for those who were in rural, then their livelihood improved. However, according to the result of this study in table 5, the impact of infrastructure development on inequality is opposite to its effects on poverty. In short, there were still other groups of people that seized more benefits than the bottom group of distribution.

## **6. Conclusion and Policy Implication**

The paper attempts to examine the determinants of consumption expenditure inequality in Lao PDR, by looking for the relationship between the potential social and economic variables and inequality indices. This study employed simple Pooled OLS regression to find the determinants of inequality. Fundamentally, this study found that three main variables namely, household consumption expenditure, government expenditure, and road access, are positively associated with Gini Index.

Firstly, the result supported the positive relationship between economic development (household expenditure) and inequality as it has been suggested in the mainstream literature. However, Kuznets inverted-U curve could not be found due to the short panel data. Secondly, it was found that government expenditure increased inequality. This case, however, seems not to be in line with the existing literature. Thirdly, road access also increased inequality, while many scholars broadly find that more road access would decrease poverty rate. On the other hand, the result also showed that

such determinants also affected the income gap between the top 10 percentiles and the lowest 10 percentiles in a similar trend, but it was just found that two variables, such as government expenditure and foreign direct investment are statistically significant. Government expenditure positively affected Decile ratio as it affected Gini Index. Meanwhile, FDI inflow was significantly found to widen the gap of the consumption between the rich and the poor.

Besides, other determinants, without statistical significance, also laid out interesting upshots. At first, the trend of access to education and inequality was found to be negatively related, which is consistent with mainstream literature claiming that access to education could lead to an equal distribution. Also, impact of demographic transition and sector dualism on inequality also followed the trend. Finally, it was found that infrastructure development (road and electricity) positively affected inequality. This trend seems to diverge from the previous studies. Moreover, the effect of these determinants on both Gini Index and Decile ratio were similar.

Based on the result of this study, there are some desirable ways to mitigate the inequality issue in Lao PDR. Firstly, to proscribe abandoning government expenditure, though found to be positively correlated with inequality, may not be a good choice. Instead, reconsidering about the redistributive function of the expenditure may be the recommended one, since it would encourage pro-poor growth.

Secondly, in term of shifting labor from agricultural sector to the non-agricultural sector, it is impossible and unbeneficial to keep people in the agricultural sectors. Nevertheless, reducing the time of shifting is possible by promoting agricultural productivity and establishing appropriate environment for the new sector, which would potentially absorb the labors from the agriculture sector and improves livelihood of those who remains in agriculture sector.

Thirdly, according to the result, education seems to be the most effective way to reduce inequality. Thus, to invest in education and promote equality in access to education would be a sensible way to reduce inequality. Fourthly, in case of FDI, resource sector and hydropower may have some limitations on distribution of the income because capital intensive nature mainly employs skilled labor. Then, to encourage the sectors that most of the people can take part without high skill such as labor-intensive is also preferable. Finally, infrastructure development and promotion of the commercial usage to all people are equivalently essential because access alone cannot always guaranty equal benefit for all.

Moreover, the result of this study is likely to raise a question rather than to provide a solution to the inequality issue. The dynamic of relationships between inequality determinants and inequality found in this study have not been yet explained. Further studies are, therefore, necessary to examine

individual factor and its mechanism. Especially, in the case of infrastructure development and inequality, the justification as to the relationship of the two would potentially be investigated through the microdata, such as household level data. Moreover, to conduct an in-depth analysis of the channel influencing the relationship between inequality and FDI is also essential.

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