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Expenditure Growth in Laos Between 1997 and 2008: Is It Due to the Improvement of Social Factors or their Returns?

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Abstract

This paper quantitatively examines evidences on expenditure growth in Laos between 1997 and 2008 using the 1997 and 2008 Lao Expenditure and Consumption Survey data (LECS2 and LECS4). Results show that real per-capita expenditure of Lao PDR has increased by 802% during the period. Disaggregating into two groups we find that rural households have slightly higher real per-capita-expenditure growth rate than those of urban household with the rates being 832% and 777% respectively. Estimation of per-capita expenditure regressions for each of these two time points consistently show that education and village endowments have positive impact on per-capita expenditure. We then conduct decomposition a-la Neumark (1988) to find that vast majority of improvement is due to the growth in returns to social factors, not the growth in social factors themselves.

Keywords: Laos, Development, Expenditure, Neumark decomposition.

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1 Introduction

This paper quantitatively investigates the evidences of per-capita-expenditure growth in Laos between 1997 and 2008 using 1997 and 2008 Lao Expenditure and Consumption Survey or in short, LECS2 and LECS4 respectively.[1] During the period per-capita expenditure has increased rapidly. For over-all Laos it increased by 802%, and for urban and rural areas growth rates are 777% and 832% respectively. Vast majority of this improvement is due to the growth in returns to social factors, not the growth in social factors themselves. Indeed the contribution share is about 97% in rural area and 93.5% in urban area.

Laos is one of the poorest countries in the world, with 27% of its population living below national poverty line at 1.25 USD/day in 2008 (Engvall et al, 2010). The poverty rate is also different between urban and rural areas, and they are 17% and 31%, respectively. The reasons for such high rates of poverty and disparity in Laos are due to the existence of considerable difference in social factors such as access to road, electricity, healthcare services, as well as education and health care. (Bourdet, 1998). National Growth and Poverty Eradication Strategy (NGPE) 2004 (Ministry of Planning and Investment, 2004) stated that the lack of access to agricultural land, livestock, and infrastructures is also the one of main causes of poverty.

Back in 1996, the government of Lao PDR has set a long-term development goal to bring country from the Least Developed Countries (LDCs) by 2020 and meet the Millennium Development Goals (MDGs) by 2015 (Ministry of Planning and Investment, 1996). To achieve these, the government of Laos has made efforts in socio-economic development by mobilizing funds from local people, government budgets, Development Partners through Official Development Assistance (ODA) and attracting Foreign Direct Investment (FDI) for reducing poverty. According to the Ministry of Planning and Investment, the Lao government has spent 100 billion kip or USD 10 million to poverty reduction through the enhancement of income generating activities in 2002 (Ministry of Planning and Investment, 2004). Between 2001 and 2009, Laos received ODA about USD 3.4 billion and

[1]LECS are collected over 12 month periods to control for seasonal variation in a largely agricultural society. LECS2 was conducted from March 1997 to February 1998 and LECS4 was conducted from April 2007 to March 2008. We use the fiscal year periods in what follows.

attracted FDI about USD 12 billion (World Bank, 2014). Given that increased per-capita expenditure leads to the reduction in the poverty rate, understanding trends of per-capita expenditures as a measure of poverty, its determinants and the sources of expenditure growth is crucial to policy makers for designing an effective poverty alleviation policy.

Previous empirical studies analyzed Laos' household living standards using Lao Expenditure and Consumption Survey (LECS) data. LECS are nationally representative surveys of consumption expenditure and collected for every five years since 1992. Kakwani et al. (2002) use only LECS2 to examine the determinants of expenditure; Andersson et al. (2006) use only LECS3 however extended the analysis to the effect of geography and the role of ethnicity on expenditure; and Warr (2005) uses both LECS2 and LECS3 and found that road access has positive impact on per capita expenditure. This paper supplements these studies by using repeated panel data containing the latest data set, specifically LECS2 and LECS4 and analyzes impacts of a wide range of social factors including household characteristics and village endowments on the per-capita expenditure. In addition we conduct Neumark decomposition to attribute the rapid per-capita expenditure growth into the growth of these social factors and that of their returns.

We first provide descriptive statistics to measure expenditure growth by comparing the key indices obtained from LECS2 and LECS4. The results show that over-all Laos's per-capita expenditure has increased as much as 802% during this period. We then examine via OLS the determinants of per-capita expenditure for each of these two time points. The results show that education as well as village endowments such as access to roads, electricity, and water have positive impact on per-capita expenditure. Finally, we use these regression results as well as that of pooled data with both LECS2 and LECS4 combined to investigate the source of change in per-capita expenditure by using decomposition method proposed by Neumark (1988). We find that vast majority of change in per-capita expenditure is due to the growth in returns to social factors, not the growth in social factors themselves.

This paper proceeds as follows. In the next section we present our data set. In Section 3 we describe our empirical model. Section 4 discussed the obtained results and provides interpretation. Finally, Section 5 concludes.

2 Data and Variables

This study uses household-level data from 1997 and 2007, contained in LECS2 and LECS4 respectively.[2] LECS is a comprehensive socio-economic survey of the living standards of households in all provinces (18 provinces) of Laos. The survey was conducted by the National Statistical Center (NSC), Ministry of Planning and Investment with donor funding and technical support. LECS have been collected every five years since 1992. It asks detailed questions on aspects of living standard including household and individual socio-economic characteristics, consumption expenditures, income, and production. LECS2 provides information on 8,882 households covering 450 villages; and LECS4 provides information on 8,296 households in 518 villages. However, this paper drops all observations such that the head of household is a student, retired, homemaker, disabled, and unemployed, as well as those household with the head who has never attended school. This makes the sample size in this study to be 4,663 for LECS2, and 4,738 for LECS4. Of the 4,663 observations from LECS2, 1,945 were urban and the remaining 3,186 were rural, and of the 4,730 observations of LECS4, 1,382 were urban and remaining 3,348 were rural.

Before discussing about variables, it is useful to consider the issue of geographical heterogeneity of the model of per-capita expenditure, i.e., whether we expect the model to be different across regions. In Laos, the urban and rural areas are sufficiently different in terms of endowment of social factors as well as their returns. For instance, it could be argued that human capital has different returns, and hence has different implications for per-capita expenditure in urban and rural areas. Thus, we will estimate separate models for over-all Laos, urban and rural areas.

Per-capita expenditure (total household consumption and expenditure divided by the number of household members) is measured as the sum of food and non-food consumption which is deflated to 2002 price and used as dependent variable.[3] Expenditure in education is not taken into account in this regression, because it is considered to be pre-determined

[2]Questionaire as well as the definitions of contained variables are different in LECS 3 from LECS2 and 4, and thereby we use only the LECS2 and 4 in our analysis.

[3]Monetary amount are available in data in terms of Lao Kip. We follow the way how to measure the household consumption and expenditure in Engvall et al. (2010)

to the current consumption.

Regarding explanatory variables, we include a set of social factors which are divided into two broad groups namely household- and village-level variables. The household-level variables include a set of demographic variables such as education, occupation, age together with age squared of the household's head, land, and household size (total number of household members). The age and its squared term of household's head are to capture possible life cycle effects.

The total area of land (measured in hectare) owned by households in last 12 months is also included as a determinant of expenditures. Land, in LECS2, is classified into two categories: irrigated land; and dry land (non-irrigated land). In LECS4, however, Land is disaggregated into five categories such as arable land for temporary crops; fallow land; land for permanent crops; grazing land; and forest land. In this paper we classify land into two categories, arable and non-arable land. Arable land is referred to irrigated land, and non-arable land is referred to dry land in LECS2. In LECS4, we aggregate land for temporary crops and land for permanent crops as arable land; and fallow land, grazing land and forest land as non-arable land.

Regarding educational variables, we include several different levels of educational attainment by the household's head. A set of dummy variables is created to indicate that whether household's head has completed either Primary; Lower secondary; Upper secondary; Vocational training; and University/Institute level. Education may affect household expenditure in many different ways such as rise in income, and improved productivity in farming.

In the occupation category, we include variables relating to the head of the household's activities in the last 12 months. Three occupation variables are distinguished: a worker if the household's head spent all 12 months in the non-farming activities; a farmer if she spent all 12 months in farming activities; and a both worker and farmer if she spent her time in both non-farming and farming activities.

At the village level, we include a set of dummy variables indicating whether a village can be accessed by automobiles during raining season and/or dry season, and accessibility

to electricity, tap water, and healthcare services.[4] The evidence shows that infrastructures are positively correlated with expenditure (Ali and Pernia, 2003). It is expected that this would be the case for Laos as well.

Finally, we include a number of provincial dummies. There are 18 provinces in Laos. We include these provincial fixed effects to capture the potential omitted-variable bias such as the movement of people, FDI in each province, as well as geographical differences. The evidence from Southwest China also suggests that household with similar characteristics would have different expenditure growth rate depending on where they live (Jalan and Ravallion, 1998).

Rapid growth of per-capita expenditure Descriptive statistics shown in Table 1 indicate that the average per-capita expenditure across Laos increased dramatically between 1997 and 2008. In aggregate, Laos' per-capita expenditure increased from 34,655 kip in 1997 to 312,567 kip in 2008 or 802%. When disaggregating the data by regions, the increase of per-capita expenditure in urban and rural areas is from 43,299 Kip to 379,618 Kip or 777%, and 30,576 Kip to 284,889 Kip or 832%, respectively.

[4]We consider healthcare service is available in the village if household can access to healthcare centre within five hours.

Table 1.
Descriptive statistics of variables.

Variables	*Entire Laos*				*Urban Areas*				*Rural Areas*			
	1997		*2008*		*1997*		*2008*		*1997*		*2008*	
	Mean	*Std.*	*Mean*	*Std.*	*Mean*	*Std.*	*Mean*	*Std.*	*Mean*	*Std.*	*Mean*	*Std.*
Real per-capita expenditure	34655	39076	312567	269664	43299	57394	379618	296717	30576	25334	284889	252579
Household characteristics												
Age	40.81	10.15	43.98	10.49	42.19	9.72	46.79	10.14	40.16	10.28	42.82	10.42
Household size	6.49	2.33	5.61	2.08	6.33	2.24	5.29	1.92	6.57	2.37	5.74	2.13
Area of land (hectare)												
Arable land	0.28	1.22	0.22	0.96	0.28	1.77	0.18	0.81	0.28	0.84	0.23	1.01
Non-arable land	0.90	1.81	0.00	0.07	0.60	2.31	0.00	0.14	1.04	1.51	0.00	0.01
Educational level												
Primary	0.50	0.50	0.57	0.50	0.28	0.45	0.37	0.48	0.60	0.49	0.65	0.48
Lower secondary	0.27	0.45	0.23	0.42	0.34	0.47	0.23	0.42	0.24	0.43	0.22	0.42
Upper secondary	0.14	0.34	0.09	0.29	0.21	0.41	0.15	0.36	0.10	0.30	0.06	0.25
Vocational training	0.05	0.22	0.09	0.28	0.09	0.29	0.17	0.37	0.04	0.18	0.05	0.22
University/Institute	0.04	0.19	0.03	0.17	0.08	0.28	0.08	0.27	0.02	0.13	0.01	0.10
Occupation												
Farmer	0.38	0.49	0.31	0.46	0.18	0.39	0.11	0.31	0.48	0.50	0.40	0.49
Worker	0.33	0.47	0.21	0.41	0.66	0.47	0.51	0.50	0.17	0.38	0.08	0.28
Both Farmer and Worker	0.29	0.45	0.48	0.50	0.15	0.36	0.38	0.49	0.35	0.48	0.52	0.50
Village endowments												
Dry season road	0.85	0.35	0.89	0.31	1.00	0.00	1.00	0.00	0.78	0.41	0.85	0.36
Raining season road	0.65	0.48	0.77	0.42	0.97	0.16	0.97	0.18	0.49	0.50	0.69	0.46
Access to electricity	0.41	0.49	0.68	0.47	0.82	0.38	1.00	0.00	0.21	0.41	0.54	0.50
Access to tap water	0.56	0.50	0.64	0.48	0.78	0.41	0.86	0.35	0.46	0.50	0.55	0.50
Access to healthcare	0.94	0.24	0.97	0.16	0.99	0.11	1.00	0.00	0.92	0.27	0.96	0.19
No. of observations	4663		4730		1495		1382		3168		3348	

Sources: LECS 2 and LECS 4.

3 Model

3.1 Regression in Each Time Point

First, we run regression on expenditure for each of two different time points, say year $t \in T = \{1997, 2007\}$ as follows:

$$y_{it} = \beta_{0t} + \sum_{k=1}^{K} \beta_{kt} x_{ikt} + \sum_{j=1}^{J} \alpha_{jt} D_{ijt} + \varepsilon_{it} \quad (1)$$

where, y_{it} is the log of per capita expenditure of the i^{th} household, β_{kt} is the coefficient of the k^{th} social factor, x_{ikt} is the k^{th} social factor of the i^{th} household, D_{ijt} is a province dummy for the j^{th} province, and α_{jt} is the coefficient of the j^{th} province dummy. We then have

$$\overline{y}_t = \hat{\beta}_{0t} + \sum_{k=1}^{K} \hat{\beta}_{kt} \overline{x}_{kt} + \sum_{j=1}^{J} \hat{\alpha}_{jt} \bar{D}_{jt} \quad (2)$$

for each t, where hats (ˆ) imply parameter estimates and the bars (-) imply sample means.

3.2 Decomposition of the Change in Household Expenditure

First we run the same regression as above using the pooled data combining two different time points. That is,

$$y_{ip} = \beta_{0p} + \sum_{k=1}^{K} \beta_{kp} x_{ikp} + \sum_{j=1}^{J} \alpha_{jp} D_{ijp} + \varepsilon_{ip} \quad (3)$$

where subscript p denotes pooled data of the two time points, and others defined as above. From this regression we have

$$\overline{y}_p = \hat{\beta}_{0p} + \sum_{k=1}^{K} \hat{\beta}_{kp} \overline{x}_{kp} + \sum_{j=1}^{J} \hat{\alpha}_{jp} \bar{D}_{jp} \quad (4)$$

We now decompose the growth in average per-capita expenditure as in Neumark (1988):

$$\begin{aligned}
\overline{y}_t - \overline{y}_{t-1} &= \left(\hat{\beta}_{0t} - \hat{\beta}_{0p}\right) + \left(\hat{\beta}_{0p} - \hat{\beta}_{0t-1}\right) \\
&+ \left[\sum_{k=1}^{K} \left(\overline{x}_{kt} - \overline{x}_{kt-1}\right) \hat{\beta}_{kp} + \sum_{j=1}^{J} \left(\bar{D}_{jt} - \bar{D}_{jt-1}\right) \hat{\alpha}_{jp}\right] \\
&+ \left\{\left[\sum_{k=1}^{K} \left(\hat{\beta}_{kt} - \hat{\beta}_{kp}\right) \overline{x}_{kt} + \sum_{k=1}^{K} \left(\hat{\beta}_{kp} - \hat{\beta}_{kt-1}\right) \overline{x}_{kt-1}\right]\right. \\
&+ \left.\left[\sum_{j=1}^{J} \left(\hat{\alpha}_{jt} - \hat{\alpha}_{jp}\right) \overline{D}_{jt} + \sum_{j=1}^{J} \left(\hat{\alpha}_{jp} - \hat{\alpha}_{jt-1}\right) \overline{D}_{jt-1}\right]\right\} \qquad (5)
\end{aligned}$$

where t and $t-1$ in our settings are 2007 and 1997 respectively. In the equation above the second line is called the explained term; in our context it is the per-capita-expenditure growth explained by the improvement of social factors between two time points. The last terms in the braces is called the unexplained term which gives the per-capita-expenditure growth due to the growth of returns to the social factors.

4 Results and Interpretations

4.1 Regression Results

In this section we investigate the impact of social factors on real per-capita expenditure using OLS. Since the dependent variable is in log form, the estimated regression coefficients measure the percentage change in per-capita expenditure within a unit change in the independent variables.[5]

The regression results are presented in Table 2. Looking at the demographic variables, the results show a positive sign for age and a negative sign for its square with statistical significance over time for over-all Laos. This implies that per-capita expenditure increases as household's head has more experience and this is in effect until the age of 62 for year 1997 and 59 for year 2007. Household size has a negative effect on per-capita expenditure and statistically significant at 1% over time for across Laos. That is larger the household

[5]This holds for continuous variables only. In the case of dummy variables, caution needs to be taken into account when interpreting estimation results as pointed out by Halvorsem and Palmquist (1980).

size, lower is the average per-capita expenditure.[6]

Regarding educational levels, the results show, as expected that the household's head with higher educational level has higher per-capita expenditure. The coefficients are also statistically significant over time. For the occupation variables, only the worker dummy has a statistical significance over time. This implies that the household's head who works as a worker has higher per-capita expenditure than a farmer. Regarding land ownership variables, only arable land for over-all Laos and urban areas exhibits a positive effect on per-capita expenditure over time.

Let us now turn to village endowments.[7] Looking at the impact of road access, the results show that only dry-season access to road for over-all Laos is statistically significant over time. This is due to that households in the villages with dry-season access to road have more opportunity to access to market activities thus they have higher average per-capita expenditure than those without dry-season-road access. Access to electricity has a positive impact on per-capita expenditure and is statistically significant over time as it increases household's productivity thus their income.[8] Regarding access to tap water, it shows a positive impact on per-capita expenditure and is also statistically significant over time implying that households in villages with access to tap water have average per-capita expenditure higher than those without tap-water access. Access to healthcare services shows a mixed effect. It is statistically insignificant in 1997 but it shows a positive contribution to per-capita expenditure and is statistically significant at 99% confidence level in 2008. This reflects that the opportunity cost of the risk due to sickness has risen during the period.

[6]This is found in previous studies such as Lanjouw and Ravallion (1995), Deaton and Paxson (1998), and Eastwood and Lipton (1999).

[7]Since the urban areas have little variations in village endowments, here we focus on analyzing the results of over-all Laos and rural areas only.

[8]We use the accessibility, not the usage of electricity and other village endowments to avoid potential endogeneity.

Table 2.
Determinants of the real per-capita expenditures (1/2)

Variables	*Entire Laos*		*Urban Areas*		*Rural Areas*	
	1997	*2008*	*1997*	*2008*	*1997*	*2008*
Household characteristics						
Age	**0.01363****	**0.03054*****	0.01159	**0.02277***	**0.01254****	**0.03285*****
	(0.004)	(0.004)	(0.011)	(0.009)	(0.005)	(0.005)
Age, squared	**-0.00011***	**-0.00026*****	-0.00007	-0.00018	-0.00010	**-0.00029*****
	(-0.00005)	(-0.00005)	(-0.00012)	(-0.0001)	(5.42e-05)	(5.31e-05)
Household size	**-0.08129*****	**-0.10290*****	**-0.09658*****	**-0.09607*****	**-0.07839*****	**-0.10356*****
	(0.004)	(0.004)	(0.008)	(0.010)	(0.004)	(0.004)
Area of land						
Arable land	**0.01739***	**0.03727*****	**0.00720****	**0.03306***	0.04326	**0.03619*****
	(0.008)	(0.008)	(0.003)	(0.016)	(0.022)	(0.008)
Non-arable land	0.02282	**0.05871****	0.00150	0.03527	**0.05408*****	0.26302
	(0.014)	(0.022)	(0.009)	(0.031)	(0.009)	(0.460)
Educational level						
Lower secondary	**0.08134*****	**0.11944*****	**0.08563***	**0.08717***	**0.06359****	**0.12230*****
	(0.019)	(0.018)	(0.036)	(0.038)	(0.022)	(0.021)
Upper secondary	**0.16443*****	**0.15273*****	**0.21272*****	**0.19054*****	**0.11595*****	**0.10738****
	(0.027)	(0.028)	(0.047)	(0.049)	(0.032)	(0.034)
Vocational training	**0.31511*****	**0.25927*****	**0.42148*****	**0.27450*****	**0.20291*****	**0.22546*****
	(0.043)	(0.032)	(0.068)	(0.048)	(0.049)	(0.043)
University/Institute	**0.31112*****	**0.36809*****	**0.30349*****	**0.36948*****	**0.31283*****	**0.36400*****
	(0.047)	(0.052)	(0.062)	(0.065)	(0.075)	(0.088)
Occupation						
Worker	**0.15094*****	**0.23308*****	**0.13258****	**0.26006*****	**0.15324*****	**0.20963*****
	(0.026)	(0.027)	(0.042)	(0.051)	(0.032)	(0.040)
Both Farmer and Worker	0.04332	**0.09579*****	0.00308	0.08421	0.05006	**0.09214*****
	(0.023)	(0.019)	(0.050)	(0.052)	(0.026)	(0.020)
Village endowments						
Dry season road	**0.05716***	**0.06401***	-	-	0.05474	**0.08227****
	(0.028)	(0.029)	-	-	(0.029)	(0.030)
Raining season road	**0.05778***	0.01207	0.13162	**0.22813***	**0.05932***	0.01356
	(0.023)	(0.024)	(0.129)	(0.092)	(0.023)	(0.026)
Access to electricity	**0.05559***	**0.08185*****	0.04152	-	**0.05493***	**0.06926*****
	(0.022)	(0.018)	(0.048)	-	(0.028)	(0.019)
Access to tap water	**0.06341*****	**0.03895***	0.01151	0.00269	**0.08799*****	**0.05683****
	(0.018)	(0.017)	(0.041)	(0.048)	(0.020)	(0.018)
Access to health care	0.06983	**0.25281*****	0.20112	-	-0.01337	**0.23633*****
	(0.038)	(0.050)	(0.168)	-	(0.039)	(0.050)

Table 2.
Determinants of the real per-capita expenditures (2/2)

Variables	*Entire Laos*		*Urban Areas*		*Rural Areas*	
	1997	*2008*	*1997*	*2008*	*1997*	*2008*
Provinces						
Phongsaly	**-0.20208*****	0.06634	**-0.41521*****	0.08754	0.00524	0.01336
	(0.049)	(0.049)	(0.100)	(0.119)	(0.068)	(0.063)
Luangnamtha	**-0.21408*****	0.04591	**-0.22700****	0.14583	-0.04791	-0.07880
	(0.050)	(0.054)	(0.069)	(0.087)	(0.078)	(0.071)
Oudomxay	**-0.41653*****	0.05483	**-0.34739*****	0.14459	**-0.33884*****	-0.06308
	(0.045)	(0.051)	(0.065)	(0.079)	(0.068)	(0.067)
Bokeo	-0.08986	-0.06909	-0.04845	0.13651	0.03643	**-0.17128****
	(0.057)	(0.045)	(0.117)	(0.074)	(0.078)	(0.059)
Luangpabang	**-0.13845****	0.04901	**-0.24476*****	0.13768	0.05508	-0.03813
	(0.047)	(0.040)	(0.070)	(0.070)	(0.069)	(0.054)
Huaphanh	**-0.24899****	-0.06217	-0.16519	0.03614	-0.13798	**-0.16520****
	(0.076)	(0.043)	(0.151)	(0.081)	(0.089)	(0.056)
Xayyabouly	**0.14727*****	**0.19155*****	0.00686	**0.16847***	**0.31578*****	**0.14048***
	(0.044)	(0.042)	(0.083)	(0.068)	(0.065)	(0.058)
Xiengkhouang	**-0.32049*****	-0.06523	**-0.25634****	0.03649	**-0.18640***	**-0.17212****
	(0.056)	(0.048)	(0.089)	(0.089)	(0.076)	(0.061)
Vientiane Province	**-0.08287***	**-0.12026****	-0.13363*	-0.04849	0.08203	**-0.20615*****
	(0.041)	(0.039)	(0.057)	(0.059)	(0.063)	(0.055)
Bolikhamxay	-0.04028	-0.02536	-0.15009	-0.18762	**0.12929***	-0.07476
	(0.042)	(0.046)	(0.121)	(0.103)	(0.063)	(0.059)
Khammouan	-0.07804	**-0.10357***	0.15365	-0.13186	-0.04304	**-0.17001****
	(0.048)	(0.040)	(0.086)	(0.090)	(0.065)	(0.053)
Savannakhet	**-0.16795*****	-0.04873	**-0.20966****	0.04245	-0.03160	**-0.13851****
	(0.046)	(0.037)	(0.073)	(0.059)	(0.069)	(0.051)
Saravane	-0.07570	0.00263	**-0.20866****	**0.20922***	0.07694	**-0.11257***
	(0.048)	(0.040)	(0.070)	(0.083)	(0.071)	(0.053)
Champasack	**-0.15942*****	**-0.13157***	**-0.14736***	0.04866	-0.06348	**-0.29811*****
	(0.045)	(0.054)	(0.067)	(0.081)	(0.069)	(0.073)
Sekong	0.00076	**0.21831*****	0.00546	0.04950	0.07164	**0.21901*****
	(0.054)	(0.037)	(0.085)	(0.057)	(0.078)	(0.052)
Attapeu	**-0.25615*****	0.00358	**-0.36245****	**0.38351*****	-0.09073	**-0.11732***
	(0.048)	(0.041)	(0.111)	(0.110)	(0.067)	(0.054)
Xaysomboun	**-0.34777*****	**-0.25708*****	-0.18310	**-0.32619****	**-0.23876****	**-0.29865*****
	(0.070)	(0.065)	(0.133)	(0.122)	(0.086)	(0.077)
Constant	**10.13213*****	**11.63582*****	**10.19211*****	**11.93435*****	**10.04354*****	**11.68286*****
	(0.106)	(0.111)	(0.337)	(0.259)	(0.124)	(0.125)
No. of Observations	4,663	4,730	1,495	1,382	3,168	3,348
R^2	0.287	0.321	0.245	0.215	0.300	0.338

Note: Robust standard errors in parentheses. Estimated coefficient statistically significant at a (***) 99%, (**) 95%, and (*) 90% confidence level. Values are (-) dropped out because of perfect multicollinearity.

4.2 Results of Nuemark Decomposition

To investigate the contribution of growth of social factors and their returns on expenditure growth, we conduct Neumark decomposition by using the results obtained in the previous section. Tables 3, 4, and 5 present respectively the decomposition results for over-all Laos, urban, and rural areas. These Tables show that as large as 95% of per-capita expenditure growth for over-all Laos is attributable to the growth of returns to social factors, and the remaining, only 5% is due to the improvement of social factors themselves. Looking at the urban households, the decomposition results show that 777 % of per-capita expenditure growth is 93.5% attributable to the growth of returns to social factors and 6.5% is due to the improvement of social factors. The corresponding result for rural households is indeed 97 % and 3 % respectively. There are three potential background scenarios to this decomposition results.

Table 3.
Decomposition results for the entire Laos, 1997 - 2008

Variables		*Sources of change in expenditure due to change in social factors*		*returns to social factors*	
		change	*share (%)*	*change*	*share (%)*
Log of per capita real expenditure					
2008	12.4423				
1997	10.2203				
Change	2.2220				
Household characteristics		0.1001	4.50	0.2917	13.13
Area of land		-0.0372	-1.68	0.0080	0.36
Educational level		-0.0060	-0.27	0.0066	0.30
Occupation		-0.0094	-0.42	0.0417	1.88
Village endowments		0.0332	1.50	0.1469	6.61
Provinces		0.0122	0.55	0.1157	5.21
Constant				1.5037	67.67
Total		0.1077	4.85	2.1142	95.15
No. of observations			9,393		

Table 4.
Decomposition results for urban areas, 1997 - 2008

Variables		*Sources of change in expenditure due to change in social factors*		*returns to social factors*	
		change	*share (%)*	*change*	*share (%)*
Log of per capita real expenditure					
2008	12.6467				
1997	10.4005				
Change	2.2462				
Household characteristics		0.1240	5.52	0.2789	12.42
Area of land		-0.0026	-0.12	0.0059	0.26
Educational level		0.0030	0.13	-0.0158	-0.70
Occupation		-0.0189	-0.84	0.0953	4.24
Village endowments		0.0243	1.08	-0.1710	-7.61
Provinces		0.0165	0.74	0.1642	7.31
Constant				1.7422	77.56
Total		0.1464	6.52	2.0998	93.48
No. of observations			2,877		

Table 5.
Decomposition results for rural areas, 1997 - 2008

Variables		*Source of change in expenditure due to change in social factors*		*returns to social factors*	
		change	*share (%)*	*change*	*share (%)*
Log of per capita real expenditure					
2008	12.3579				
1997	10.1353				
Change	2.2226				
Household characteristics		0.0922	4.15	0.3397	15.29
Area of land		-0.0639	-2.87	0.0136	0.61
Educational level		-0.0055	-0.25	0.0151	0.68
Occupation		0.0391	1.76	0.2464	11.09
Village endowments		0.0423	1.90	0.2216	9.97
Provinces		0.0076	0.34	-0.0915	-4.12
Constant				1.5037	67.65
Total		0.0750	3.37	2.1476	96.63
No. of observations			6,516		

Increased Share of Formal-Sector Employment with FDI Inflow FDI inflow into Laos amounts to USD 12 billion from 2001 to 2009. This has an impact on the movement of labor force from agricultural to non-agricultural sectors. Labor force in agricultural sector has decreased from 85.4% in 1995 to 78% in 2005. The proportion of labor force in manufacturing sectors increased from 3.5 % to 4.8% and that in the service

sector increased from 11.1 % to 16.7% over this period of times (Ministry of Planning and Investment, Government of Lao PDR and UNDP, 2009). This suggests that the share of formal sector employment has increased in line with an increase in FDI into Laos during the same period. Given that informal sector income is less changing depending on age than that in formal sector which tends to increase with respected tenure i.e, age, this explains why return to age is higher in 2008 compared to 1997. Returns to land have similar background as increased marginal productivity of land due to FDI results in higher returns.

Microfinance Increases Return to Arable Land The number of commercial banks in Laos increased from 11 in 1996 to 24 in 2008 (Bank of Lao PDR, 2009). The number of microfinance institution has also increased from only one in 1996 to 26 in 2009, covering 1,566 villages over the country. At the same time the number of village funds has increased from 435 villages in 1998 to 4,113 (out of 8,704 villages) in 2009 (Ministry of Planning and Investment, 2009). Accessibility to microfinance gives farmers an opportunity to invest in their land and improve their agricultural productivity through purchasing machines and fertilizers. This implies that the significant increase in returns to arable land is attributable to this rather dramatic improvement of financial accessibility of farmers.

ODA Improves the Return to Non-Arable Land Ownerships Official Development Assistance (ODA) inflow into Laos between 2001 and 2010 amounts to USD 3.4 billion. The ODA is used to implement social and physical infrastructure development projects and programs nationwide by mainly focusing on four prioritized areas, namely education, healthcare system, road, and water supply. As reported from World Bank, from 2003 to 2007, 50 bridges and 2,420 km of rural roads were maintained and newly constructed using ODA funds in Laos (World Bank, 2008). Improvement in infrastructure enhances the value of land in the concerned area, and hence the increase in ODA is one of major factors that affects the increase in returns to non-arable land.

5 Conclusions

This paper investigated the evidences of rapid expenditure growth in Laos between 1997 and 2007 by modeling the determinants of per-capita expenditure at the household level. This study employed comprehensive household survey data obtained from LECS 2 and LECS 4. Descriptive statistics have shown that the expenditure growth for over-all Laos was as rapid as 802%, while the growth rates are 777% and 832% respectively for urban and rural areas. We then, via OLS examined the determinants of per-capita expenditure on two different time points separately for the entire Laos, as well as urban and rural areas separately. Results consistently show that education as well as village endowments such as access to roads, electricity, and water have positive impact on per-capita expenditure. We also conducted Neumark decomposition to investigate the sources of the expenditure growth and found that vast majority of improvement is due to the growth in the returns to social factors, not the growth in social factors themselves. These findings suggest that, in the backdrop of the rapid growth of per-capita expenditure there is an increased FDI inflow and the resulting movement of labor from informal to formal sectors; extended accessibilty to the microfinance network throughout the country, in particular village funds, to enable farmers to access to credits and thereby increasing productivity of labor and land in agriculture; and increasing government investment including ODA on constructing physical and social infrastructure such as road and providing training to increase the returns to non-arable land as well as the productivity of labor.

References

[1] Ali, I. and E. M. Pernia, (2003). "Infrastructure and Poverty Reduction—What is the Connection?," *ERD POLICY BRIEF SERIES, No. 13,* Economics and Research Department, Asian Development Bank.

[2] Andersson, M., A. Engvall, and A. Kokko, (2006). "Determinants of poverty in Lao DPR," *EIJS Working Papers Series*, (223).

[3] Bourdet, Y. (1998). "The dynamics of regional disparities in Laos: the poor and the rich," *Asian Survey*, Vol. 38, No. 7, pp. 629-652.

[4] Deaton, A. and C. Paxson, (1998). "Economies of scale, household size, and the demand for food," *Journal of political economy*, 106(5), pp. 897-930.

[5] Eastwood, R. and M. Lipton, (1999). "The impact of changes in human fertility on poverty," *The Journal of Development Studies*, 36(1), pp. 1-30.

[6] Engvall, Anders, Magnus Lindelow, and Nina Fenton. (2010). *Poverty in Lao PDR 2008: Lao expenditure and consumption survey 1992/03-2007/08.* Washington, DC: World Bank.

[7] Government of Lao PDR (GOL), Bank of the Lao PDR (BOL). (2009). *Lao Monetary Statistics Quartery I 2009.*

[8] Halvorsen, R. and R. Palmquist, (1980). "The interpretation of dummy variables in semilogarithmic equations," *American economic review*, 70(3), pp. 474-75.

[9] Jalan, J. and M. Ravallion, (2002). "Geographic poverty traps? A micro model of consumption growth in rural China," *Journal of Applied Econometrics*, 17(4), pp. 329-346.

[10] Lanjouw, P. and M. Ravallion, (1995). "Poverty and household size," *The Economic Journal*, Vol. 105, No. 433, pp. 1415-1434.

[11] Ministry of Planning and Investment, Government of Lao PDR. (1996). *The Fourth Five-Year National Socio-Economic Development Plan (1996-2000)*, Vientiane Capital, Lao PDR.

[12] Ministry of Planning and Investment, Government of Lao PDR. (2004). *National Growth and Poverty Eradication Strategy (NGPES)*, Vientiane, Lao PDR, June.

[13] Ministry of Planning and Investment, Government of Lao PDR. (2009). *Microfinance in Lao PDR*, 2009.

[14] Ministry of Planning and Investment, Government of Lao PDR and UNDP. (2009). *Employment and Livelihood, Lao PDR 2009, National Human Development Report.*

[15] Kakwani, N., G. Datt, B. Sisouphanthong, P. Souksavath, and L. Wang, (2002). "Poverty in Lao PDR during the 1990s*," mimeo*, Asian Development Bank*,* Manila.

[16] Neumark, D. (1988). "Employers' discriminatory behavior and the estimation of wage discrimination," *Journal of Human resources Vol. 23, No. 3,* pp. 279-295.

[17] Warr, P. (2005). *Road development and poverty reduction: the case of Lao PDR* (No. 64). Asian Development Bank Institute.

[18] World BanK (2008), *Community-Driven Approaches in Lao PDR: Moving Beyond Service Delivery*, Volume 2. Main Report. Washington, DC. World Bank.

[19] World Bank (2014), *Laos Country Data.*