

Determinants of Poverty in Mukdahan Province, Thailand: A Household Level Analysis

Jintanee Jintranun*, Peter Calkins, Songsak Sriboonchitta and Chukiatt Chaiboonsri

** Faculty of Economics, Chiang Mai University
E-mail: jintanee@hotmail.com*

Poverty and inequality are persistent, shameful problems for global humanity. This study focuses on poverty and inequality in Mukdahan province as one of the poorest provinces in Thailand. Located near Savannakhet (Laos PDR), Mukdahan has benefited from a mega-transportation infrastructure project launched for both trade development and overall economic growth. As part of the East West Economic Corridors initiative, this project includes the Thai-Laos friendship bridge No.2 and four-lanes roads that should create income from transportation and tourism-based activities for Mukdahan residents.

This paper measures both poverty and inequality in Mukdahan through the quantitative analysis of original field survey data at the household level. We first measured relative inequality using the Gini and Shorrocks measures, and the incidence, depth, and intensity of absolute poverty using the Foster-Greer-Thorbecke approach. We then employed logit and tobit models to pinpoint the determinants of absolute poverty in Mukdahan province. The results revealed that the sources of income from various sectors are the only significant determinants of poverty. Working in the agriculture sector leads to deeper poverty, while industrial and business sector jobs improve the household's economic situation. Furthermore, despite high investments in road construction, transportation-related employment actually reduces household income. This suggests that highway investments support international logistics and national economic growth to a greater extent than local or provincial economic development. Moreover, local road improvements remain under construction, leading to transportation delays and bottlenecks. Once these economic variables are taken into account, socio-economic variables become non significant.

1. Introduction

1.1 The real-world problem

Extreme poverty and income inequality are two of the greatest problems faced by humanity in the past and remain persistent and socially unacceptable challenges for the present and immediate future. While humanity around the world suffers from outright hunger, Thailand has achieved many of the United Nations' Millennium Development Goals (MDGs). Since targets for ending poverty and hunger have been achieved at the national level, Thailand has even set ambitious targets beyond the original goals under the banner "MDG plus." MDG plus focuses on the subset of regions and groups that are being left behind. A target was set to reduce poverty to less than 4 percent by 2009, focusing on the northeast, three southernmost provinces and pockets of severe poverty.

Mukdahan province is a border node of the East-West Economic Corridor (EWEC). It also should be benefiting from a mega transportation investment project, the Thai-Laos Friendship Bridge 2 begun in December, 2003 and opened on December 20, 2007 to link the the capital cities of sister provinces: Mukdahan in northeastern Thailand and Laos' southernmost province Savannakhet. The two-lane concrete, 1600-meter bridge was the second, after that at Nong Khai, linking Thailand and Laos across the Mekong River. Its US\$69 million cost was partly financed by the Japanese government, with the remainder shared equally by the Lao and Thai governments.

The Mukdahan area has additional transportation projects to support the EWEC, such as the Construct Bypass High Way No.1 (8 km), the Mukdahan – Comechade road (35 km), the Comesoi – Luengnokta road (21 km), and the Maesod – Mukdahan and Leamchabung – Mukdahan highways. These infrastructures improve Mukdahan's economic potential to become a major gateway of trade and investment into Indochina and a pole of tourism and finance in the region.

The Greater Mekong Subregion (GMS) program involves stimulating the cross-border movement of tourists and workers. Indeed, Mukdahan has a privileged location for receiving and sending border tourists. Lying as it does on the Mekong between two countries (Thailand and Laos), and within 10 kilometers of its sister city Savannakhet, it has the potential to become the hub for package tours by foreigners and country nationals alike.

The mega investments from the EWEC project in and around Mukdahan are also hoped to act as an important channel of income redistribution to reduce poverty. Despite its favourable position from the point of view of transportation, Mukdahan remains one of the poorest provinces in Thailand. In 2008, Mukdahan had the 3rd lowest GPP of Thailand (following Maehongson and Amnatcharearn). GPP per capita was the 7th poorest of Thailand in 2005 but improved to be 15th lowest in 2008. Moreover, GPP grew at 3.4% in 2008, up from 3.2% in 2005, and 2.40% in 2004; but these rates were still lower than GRP growth rate of the entire Northeast region of 3.68% in 2005 and 5.9% in 2008. From the National Statistical Office's (NSO) poverty map¹, Mukdahan has been struggling with a poverty trap

¹ Thailand poverty map provided by following link
<http://service.nso.go.th/nso/povertymap/Mukdahan/Mukdahan.html>

for a long time, similar to other provinces in the Northeast region that still have a high poverty ratio. In 2006, around 21-30% of the population was poor, especially in Amphur Maung, Kumcha-e, Nong Soong and Dontal.



Figure 1: Map of Thailand, the North Eastern region, and Mukdahan

Source: http://upload.wikimedia.org/wikipedia/commons/thumb/e/e1/Thailand_Isan.png/200px-Thailand_Isan.png.

The economic structure of Mukdahan is similar to that of the Northeast region as a whole. The major sectors are agriculture, wholesale and retail sales, and industrial production. According to the work of Kuznets² and Chenery³, economic growth is expected to increase the relative share of non agriculture (wholesale and retail sales, transport, building, education and other services) while the relative share of the agricultural sector is expected to decline. Agriculture will still grow in absolute terms, however, with farmers expected to change from rice and other basic grain production to rubber plantations and locally-suited specialty crops.

² Kuznets, S. (1955). "Economic Growth and Income Inequality." *American Economic Review* **49**: 1-28.

³ Available in following book
(Timmer, 1994)

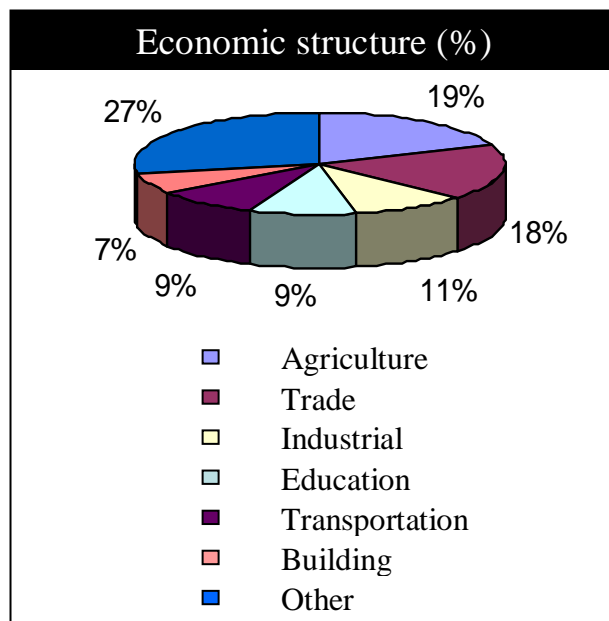


Figure 3. Mukdahan economic structure

Source: www.nesdb.go.th

1.2 The scientific problem

The poverty situation of Mukdahan clearly needs to be improved. The question becomes to what extent improved roads can become the catalyst for such improvement. Roads and border tourism were chosen as the targets for this research because they represent three separate avenues of public policy that are distinct from government cash income transfers to the poor. The present study will therefore attempt to carefully distinguish the roles of economic activities and infrastructure in one of the poorest areas of Thailand.

1.3 The goal of the study

The overall objective of this research is to evaluate what extent to which the EWEC project could substantially reduce the relative and absolute poverty at the provincial level of Mukdahan. Our aim is to identify the key economic and social factors that determinate poverty in Mukdahan and find out normative economic for poverty alleviation.

2. Literature review

As our research focuses on poverty impacts of the implantation of new infrastructure - especially the EWEC -- in one of the poorest provinces in Thailand, the literature to be presented will emphasize poverty reduction.

2.1 Poverty determinant around the world

Numerous previous researchers have sought to determine the factors that cause find poverty in a given geographical area. The results have pointed to the impacts of both economic and socio-demographic factors. In Africa for example, Aigbokhan (2008) found that education leads to higher welfare, but that larger household size, rurality, and age squared increased Nigerian households' probability of falling into poverty. Osinubi's (2003) regression analysis for the same country revealed that female gender, old age, and large household size are negatively related to the level of per capita expenditure; while education and income is positive effect on per capita expenditure. Similarly, Okurut et al. (2002) identified large household size, education, and poor physical and economic resources as key regional poverty determinants in Uganda. Geda et al.'s (2005) household level analysis further confirmed determined for Kenya that rural, female-headed, and agricultural (i.e. non-manufacturing) households have a greater likelihood of being poor.

Asian findings are broadly consistent with these results. For example, Kotikula et al. (2010) regression analysis in Bangladesh determined that large households tend to be poorer, along with non-Muslim and female heads, and households with low education. Agricultural land-owners have significantly higher incomes than other types of households in the rural area, especially daily wage workers. In urban areas, non agricultural self-employment has a positive and significant effect upon household consumption.

In the Philippines as well, Albert and Collada (2004) demonstrated that household welfare is more negative in households with children. Younger household heads also tend to be poorer than older, while high education leads to higher welfare. Interestingly, however, male-headed households are strongly and negatively associated with income. Finally, for Lao PDR Anderson et al. (2005) found that large household size, high dependency ratios, low education and imbalanced consumption patterns all affected poverty. Poverty incidence was higher among minority households due to limit access to productive resources.

2.2 The role of roads in poverty reduction

Several studies have argued that raising public and infrastructural investments is one possible path to growth, development and income redistribution. Among them, Mourmouras and Lee (1999) and Age'nor (2010) have stressed the long run positive effects of infrastructural growth in accordance with the Ramsey model of Arrow and Kurz (1970). The Mourmouras and Lee study lies within the theoretical framework of endogenous growth following the Barro (1990) model. It combines Blanchard's (1985) overlapping generations (OLGs) model and an adaptation of the finite horizon model. Mourmouras and Lee found that the growth rate under the finite horizon case was already bigger than in the infinite horizon case, and that infrastructure expenditure induced a larger change in the growth rate in the finite horizon case as compared to infinite horizon case.

More recently, the study of Age'nor (2010) presented an infrastructure-led development model. Based on his findings, public infrastructure is the engine of growth in long run development. The paper incorporated public spending on health care in the development model as it not only increases the endogenous growth rate of return on physical capital but also leads households to save more and improve consumption of health services. Through further network effects, public infrastructure may generate strong non convexity of

the economy's production technology, with substantial consequences for the relationship between public capital and economic growth. Additionally the degree of efficiency of public infrastructure becomes nonlinearly related to public (relative to private) capital stock itself. Age'nor demonstrated that, as a result of these nonlinearities, there may be either no equilibrium, a unique equilibrium, or multiple equilibria. Consequently, greater access to health services enhances not only workers' productivity, but also the ability to learn and accumulate human capital, particularly in low income countries.

Transportation has direct and indirect effects on social development via many channels. In general, high quality transportation can reduce the cost to access education, health and social services; increase the opportunity to access markets; and develop tourism. Many empirical studies have pointed to a strong relationship between transport and poverty passing through these intermediate benefits.

Setboonsarng (2008) summarized several policy issues surrounding transportation and its macro/micro level impacts. At the macro level, transportation infrastructural investment has contributed indirectly to poverty reduction through the channel of economic growth. Recent empirical studies confirm that transportation infrastructure's impact at the macro level is critical to ensuring sustained growth in output, employment, and income. At the micro level, whether or not transport infrastructure can directly contribute to poverty reduction seems to depend upon its impact on income and non-income dimensions of poverty. In the income poverty area, transportation infrastructure provides chances for the poor to raise the productivity of their limited resources by facilitating the commercialization of farm and nonfarm activities and agricultural diversification from low-value food grains to more perishable, high-value agricultural products. In terms of non-income poverty, transportation infrastructure can likewise generate direct impacts by lowering the cost of services needed by the poor, and by serving as a good complement to interventions that seek to improve access to health, education, and other social services. Transport investments may also play an important role in mitigating risks faced by poor households.

Likewise, Gannon and Liu (1997) have analyzed the linkages between transport and poverty reduction. In general, a transportation project is expected to contribute to poverty reduction through its indirect impacts on economic growth or its direct impact on the personal welfare of the poor. Local access to roads in poor rural and urban areas makes only a modest contribution to national income growth, but is likely to have a direct and significant impact on the daily life of the poor. On the other hand, inter-city transport modes such as trunk roads, rail and shipping are of strategic significance to a national economy and do less for poor households. Gannon and Liu's study of impacts on poverty reduction seems to operate indirectly by stimulating and facilitating national income growth. However, they suggest that transport may also create adverse impacts for the poor. For example, transport investment typically involves negative environmental impacts. If the effect is negative, the poor are the least able to respond, adjust or compensate; they may thus be the most vulnerable and the most "at risk."

National-level case studies tend to support these findings. For example, Okwi et al. (2007) included the role of transportation in their study of the determinants of poverty in rural Kenya. This paper concern transportation. Their regression results revealed that longer travel times to tarmac and murrum roads significantly increased the poverty level; while communities with easy market access, good infrastructure and public administration had lower poverty levels. Similarly, Achia et al.'s (2010) logistic regressions for Kenya indicated

that communities lacking roads and infrastructure, lying farther from the national capital, and in rural or semi-arid regions seemed to be poor.

2.3 Tourism and poverty reduction

Blake et al. (2009) studied the effect of tourism on the Brazilian economy. Their computable general equilibrium model focused on determining the effect of tourism on household income differentiation. The results revealed that a positive effect of tourism on overall income; but when considered by income group, the poorest income group received less benefit than the high income group. Blake *et al.* recommended that the Brazilian government create a tourism project to redistribute a higher share of benefit to poor. In this light, the WTO (2004) has given a clear set of guidelines as to actions that how enhance the poverty-reduction potential of tourism:

- 1) Employment of the poor in tourism enterprises
- 2) Supply of goods and services to tourism enterprises by the poor
- 3) Direct sales of goods and services to visitors
- 4) Establishment and running of tourism enterprises by the poor
- 5) Tax or levy on tourism income or profits with proceeds benefiting the poor
- 6) Voluntary giving and support by tourism enterprises and tourists
- 7) Investment in infrastructure stimulated by tourism also benefitting the poor in the locality

Muganda *et al.* (2010) employed a micro-level approach to ascertain from local people in Tanzania the role of tourism in poverty reduction. Their empirical results showed that tourism development creates positive impacts through the seven poverty alleviation channels above and has a strong impact on local facility development. However, a determining precondition is a poor household's relative proximity to a main road.

To create greater revenue to the poor, Bazaini (2008) applied the above list of seven positive impacts in a study of Albania. He recommended that the above strategies be employed by the tourist industry to reduce poverty in Albania and that micro-finance schemes further support tourism development projects. Such micro finance initiatives should be evaluated by four criteria:

- 1) the number of jobs created,
- 2) the reduction of migration from the country to cities,
- 3) the increase in revenue, and
- 4) the creation of access of poor people to basic infrastructure.

The testable hypotheses of the present study are as follows:

Hypothesis 1: The household socio-economic factors *large family size, high dependency ratio, rural, and agricultural* are associated with greater incidence, depth, and severity of absolute poverty.

Hypothesis 2: The household head characteristics *male gender, intermediate age and well educated* significantly alleviate the greater incidence, depth, and severity of absolute poverty.

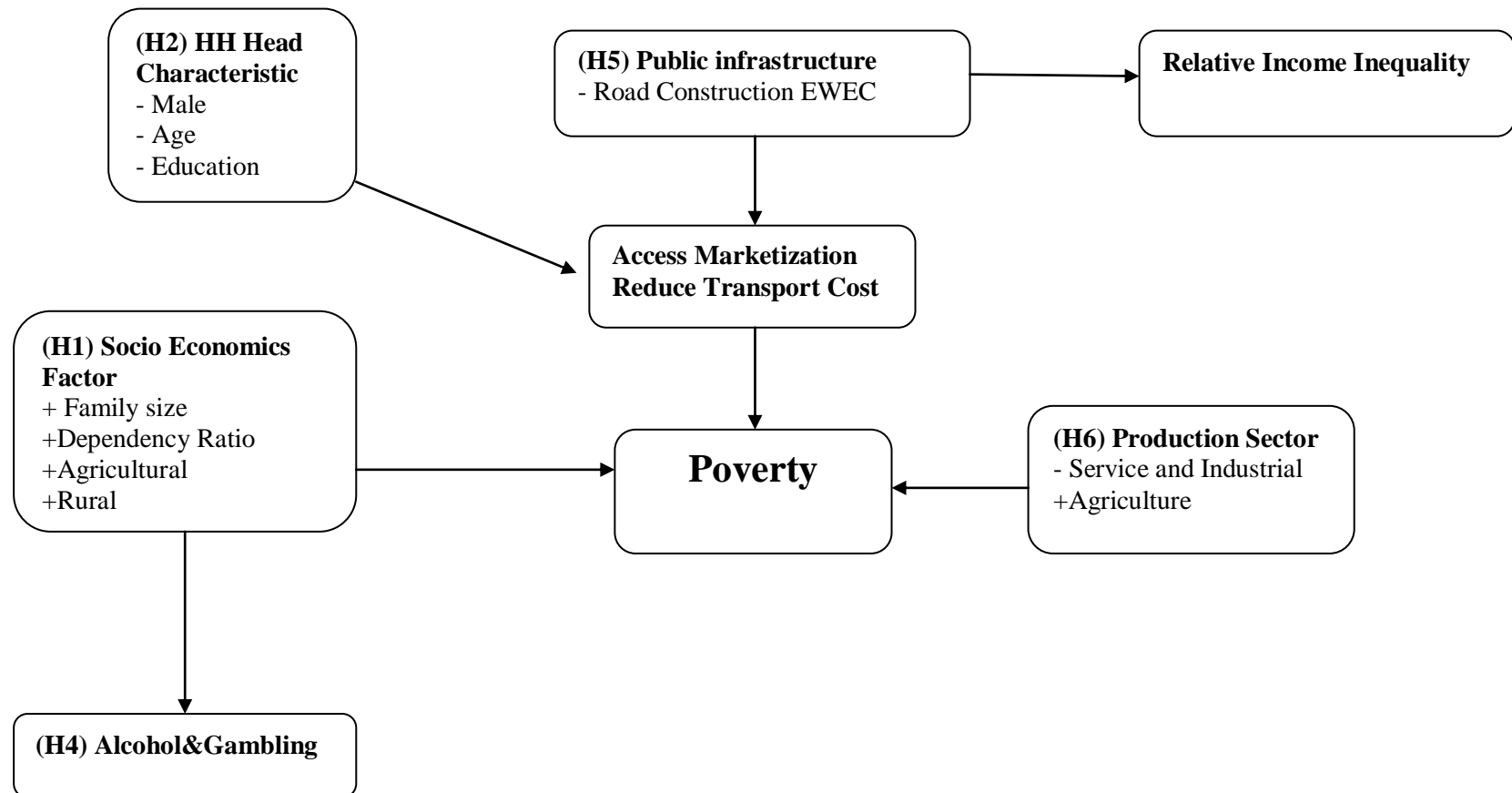
Hypothesis 3: Communities closer to roads and transportation infrastructure have lower levels of relative income inequality.

Hypothesis 4: Non-urban areas, although poorer, give a greater percentage of their income in charity and waste less in alcohol consumption and gambling; suggesting that community-based reciprocity is a substitute for infrastructure development.

Hypothesis 5: Public road construction infrastructure relieves poverty by easing access to marketization, reducing transportation costs, and increasing household income.

Hypothesis 6: Among production sectors, working in the service and industrial sectors significantly improves a households' economic situation, while working in agriculture reduces household income.

Figure 1 Conceptual Framework



3. Methods of modeling and estimation

The Foster Greer and Thorbecke (FGT) Index constitutes the general form of three measures of absolute poverty measurement. The formula of FGT giving by

$$FGT_{\alpha} = \sum_{i=1}^H \frac{\left[\frac{(z - y_i)}{z} \right]^{\alpha}}{N}$$

$\alpha = 0$ is the extent or “incidence” of poverty, also called the “head count ratio”

$\alpha = 1$ is the “depth” of poverty or the total poverty gap

$\alpha = 2$ is the severity or intensity of poverty, and gives more weight to the poorest of the poor.

Where Z is poverty line in this research we will employ 2 poverty lines; Mukdahan poverty line and World bank poverty line at \$1, y is household income, H is number of poor household (income lower than z) and N is number of household within economy.

For the econometric section of this paper, we will employ part of the FGT Formula as the dependent variable in constructing logit and tobit regression models.

$$FGT_{i\alpha} = \left[\frac{(z - y_i)}{z} \right]^{\alpha} \text{ for } \alpha=1,2$$

for $\alpha = 0$ FGT = 0 is not poor

or FGT = 1 is poor

Moreover, we will divide the household sample into ten (10) economic classes from poor to rich FGT = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 to estimate an ordered logit model (model 2 below). Finally, we shall estimate an OLS model (model 3 below) in an attempt to explain the continuous variable the dept and severity of poverty ($\alpha = 1, 2$).

For all three of these regression formulations, we hypothesize that a given FGT indicator is a function of

- 1) household resources: land, monetary capital, education and other forms of human capital.
- 2) household occupation, notably as regards employment in the transportation sector.
- 3) EWEC variable: distance between the house and the EWEC.
- 4) Household area: rural, semi-urban, urban.
- 5) Sociodemographic variables: gender, age, ethnic group, etc.

The relationships to be estimated can be summarized as:

$$FGT = f(\text{Household resources, occupation, EWEC variables, Household area, sociodemography})$$

The econometric models that we shall estimate in this research are:

Model 1 Logit model: We will apply this model for $\alpha = 0$ and set household is not poor if household income is above poverty line and household is poor if household income is under poverty line. Logit model formula is following;

$$P_i = E\left(\frac{Y_i}{n_i} \mid X_i\right)$$

$$\text{logit}(P_i) = \ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 x_{1,i} + \dots + \beta_k x_{k,i}$$

Model 2 Censored model These are alternative models to estimate household poverty. The model is usually regress when the dependent variable is observed in only some of the ranged. Tobit model is defined as follows

$$y^* = x_i' \beta + u_i$$

$$y_i = y^* \text{ if } y^*_i > 0$$

$$\text{and } y_i = 0 \text{ if } y^*_i \leq 0$$

And we apply truncated model to consider household under poverty line (Li)

$$y^* = x_i' \beta + u_i$$

$$y_i = y^* \text{ if } y_i^* < L_i$$

(y_i, x_i) not observed if $y_i^* \geq L_i$

Where

y_i are household income

x_i is a vector of exogenous variables

i are household index

L_i is poverty line that depend on household size.

4. Data

We collected primary data from questionnaires and interviews of Mukdahan residents in 2009. 353 households in 7 field survey districts out of a total of 101, 420 households located in Mukdahan province were surveyed. This is equivalent to a 0.35 % sampling rate of the population. The data consists of 76 households from urban area, 211 households from semi-urban areas and 66 households from the rural area. Household sample size is shown in table 1. Because of random sampling, we collected more data from the urban area than the others. For the other two areas, the project's budget constraint led us to target 0.30% of population. In reality, we were able to obtain slightly more.

Table 1 Household sample size

	Total households in Mukdahan munipality	Urban	Semi urban	Rural
Universe	101420	14635	66107	20678
Sample	353	76	211	66
Sample %	0.35%	0.52%	0.32%	0.32%
Multiplying factor for averages		0.144300927	0.6518141	0.20388498

Source: Calculated directly from primary survey data.

5. Results

5.1 Sample characteristics

This section reports the characteristics of the sampled households by rurality and economic class. This information portrays a picture of living conditions in Mukdahan. Table 2 details income per capita, length and time reached EWEC, age and gender of household's leader, total year attain in school, house size and total land. The results reveal that the rural area has a wider distribution curve of income than the urban and semi urban areas. That means there is high inequality in the rural area. Moreover, average length and time to reach the EWEC road system shows that high income urban group has the easiest access. When we consider characteristics of the household head, we can see that the richest group has a higher percent of male leaders than the poorest group. Similarly, human and household capital factors (education, house size and total land) are also more plentiful in the richest group.

In addition to these more permanent characteristics, we were also interested in the behavior of households in spending their income. The results revealed that both lottery ticket and alcohol purchase are highest in the poorest rural group and lowest in the richest urban group. Meanwhile, giving to the *wat* is the most popular charitable channel. The poorest group seems to contribute more to the *wat* than other groups. Interestingly, rural households make greater donations to *wats* than other areas, while the highest NGO donations are in the semi-urban areas.

Table 2 Sampling Characteristics

Economic class	Y	EWEC	TIME	AGE	GENDER	MEMBER	MALE	FEMALE	EDU	HOUSE_SIZE	LAND
Urban Avg											
1	6190	15	39	45	1	4.9	2.0	2.7	46	230	14
2	19597	11	28	54	1	5.0	2.3	2.7	52	278	9
3	49113	24	28	46	1	4.2	1.6	2.6	47	477	7
4	79005	16	24	45	1	4.5	1.9	2.5	53	176	341
5	166439	6	9	51	1	4.3	1.9	2.4	51	352	250
Semi-urban Avg											
1	4619	40	35	45	1	4.9	2.3	2.6	43	883	12
2	11829	62	54	46	1	4.5	1.9	2.6	40	343	36
3	21645	35	43	49	1	4.5	1.8	2.7	39	185	302
4	37489	35	38	46	1	4.4	1.7	2.7	39	414	927
5	173127	36	37	46	1	4.7	2.1	2.6	49	512	590
Rural Avg											
1	3648	19	27	49	1	4.7	1.6	3.1	46	236	10
2	9851	26	46	40	1	4.2	2.0	2.2	40	501	14
3	25895	28	23	49	1	4.7	1.9	2.8	45	116	18
4	52416	20	24	46	1	4.6	2.2	2.4	43	245	10
5	230246	13	16	47	1	4.5	2.2	2.3	53	278	4262
Total Avg											
1	4524	32	34	46	1	4.8	2.2	2.6	44	651	11
2	12523	48	50	47	1	4.5	1.9	2.6	40	350	196
3	25208	26	32	48	1	4.7	1.9	2.8	43	198	136
4	48510	37	38	46	1	4.5	1.8	2.7	43	433	744
5	186671	16	21	47	1	4.4	2.0	2.3	51	365	940

Source: From Calculation

Table 3 Household recreation and charitable giving expenditure

Economic class	LOTTERY	ALCOHOL	WAT	DIRECT	NGOs	EDUDONATE	OTHDONATE	SOCIAL TRANS
Urban Avg								
1.00	1.85%	0.62%	5.80%	0.40%	0.48%	0.84%	0.71%	3.84%
2.00	1.01%	0.93%	3.43%	0.37%	2.15%	0.21%	2.02%	3.55%
3.00	0.02%	2.02%	1.77%	0.47%	0.28%	0.30%	0.41%	1.37%
4.00	0.34%	0.53%	1.32%	0.09%	0.04%	0.07%	1.10%	0.85%
5.00	0.11%	0.00%	0.87%	0.08%	0.04%	0.21%	0.05%	0.81%
Semi-urban Avg								
1.00	4.51%	5.23%	12.19%	4.11%	2.97%	2.50%	1.52%	18.80%
2.00	2.26%	2.41%	5.87%	0.98%	0.65%	0.40%	0.42%	7.14%
3.00	0.73%	1.86%	2.12%	0.31%	0.20%	0.24%	0.21%	3.32%
4.00	1.16%	0.74%	2.12%	0.29%	0.07%	0.22%	0.39%	1.77%
5.00	0.33%	0.41%	0.69%	0.23%	0.18%	0.11%	0.02%	0.61%
Rural Avg								
1.00	4.91%	9.04%	18.25%	6.66%	0.73%	7.04%	0.00%	10.23%
2.00	1.48%	1.33%	6.83%	0.54%	0.00%	0.22%	0.00%	6.67%
3.00	0.75%	3.02%	1.19%	0.21%	0.12%	0.26%	0.01%	1.84%
4.00	1.15%	1.62%	1.22%	0.22%	0.12%	0.09%	0.02%	1.42%
5.00	0.34%	0.58%	0.60%	0.03%	0.01%	0.20%	0.00%	0.28%
Total Avg								
1.00	4.07%	5.03%	12.57%	3.73%	2.11%	2.95%	1.14%	14.73%
2.00	1.69%	1.85%	5.54%	0.73%	1.02%	0.33%	0.87%	6.40%
3.00	0.77%	1.42%	1.88%	0.24%	0.14%	0.21%	0.11%	2.28%
4.00	0.94%	1.40%	1.52%	0.30%	0.13%	0.23%	0.26%	1.37%
5.00	0.27%	0.36%	0.72%	0.15%	0.12%	0.13%	0.12%	0.57%

Source: From Calculation

5.2 Poverty and income distribution

This section first presents the analysis of poverty and income distribution from the household data survey. The principal tool employed is oneway ANOVA tests of significant differences in means by area and quintile subgroups. We then employ an econometric model to determine the relationship between household factors and both a) income and b) donations.

The oneway ANOVA analysis by area shows that education levels in urban areas are significant higher than in rural and semi-urban areas. Total donations from the urban area are higher than for the rural. In terms of road infrastructure, the results further show that the semi-urban area is far from EWEC and take more time to access than for households in other areas. This is despite the fact that the semi-urban area has a greater proportion of people working in transportation-related occupations.

Oneway ANOVA analysis by quintile shows that main income of the poorest people come from the agriculture sector, especially rice production. The poorest group also suffers from the highest dependency ratio. Surprisingly, the poorest group has the biggest house size and highest area of living space per capita. This result is partially of reflect of Northeast Thai culture. Residents usually construct big houses whether they are poor or rich. It is, rather, material possessions such as furniture and appliances that show the true economic situation of each household.

When we consider the richest group, they have both the highest income and the highest debt. Moreover, this group spends more on lottery tickets and alcoholic beverages than other groups. The same is true for donation expenditures.

Table 4 One Way ANOVA for testing differences of mean between areas

Dependent Variable	LSD		Mean Difference (I-J)	Std. Error	Sig.
	(I) Urban=2, semi-urban=1, rural = 0	(J) Urban=2, semi-urban=1, rural = 0			
ACCOM	Urban	Semi-urban	2.16*	0.85	0.011
		Rural	2.16*	1.07	0.045
ANTP	Urban	Semi-urban	4.09*	1.81	0.024
		Rural	4.02*	2.30	0.081
FRUIT	Urban	Semi-urban	2.23*	1.32	0.091
BUS	Urban	Semi-urban	9.65*	3.01	0.001
		Rural	13.58*	3.82	0.000
SAL	Urban	Semi-urban	23.78*	4.38	0.000
		Rural	12.08*	5.57	0.031
OTHERBUS	Urban	Semi-urban	9.90*	3.61	0.006
TOUR	Urban	Semi-urban	1.29*	0.71	0.067
WAGE	Urban	Semi-urban	20.82*	6.38	0.001
EDU	Urban	Semi-urban	2.00*	0.39	0.000
		Rural	1.08*	0.49	0.029
Y	Urban	Semi-urban	57590.17*	20006.53	0.004
QUANTILE	Urban	Semi-urban	.66*	0.19	0.000
		Rural	.56*	0.23	0.017
DONATE	Urban	Rural	2849.06*	1666.70	0.088

Dependent Variable	(I) Urban=2, semi-urban=1, rural = 0	(J) Urban=2, semi-urban=1, rural = 0	Mean Difference (I-J)	Std. Error	Sig.
CONSTRUCT	Semi-urban	Urban	5.12*	2.36	0.031
CROP	Semi-urban	Urban	8.08*	2.89	0.005
		Rural	7.58*	3.09	0.015
POUL	Semi-urban	Urban	4.13*	2.18	0.059
AG	Semi-urban	Urban	24.66*	4.53	0.000
MIG	Semi-urban	Rural	3.39*	1.95	0.082
RICE	Semi-urban	Urban	28.54*	5.18	0.000
		Rural	10.88*	5.55	0.051
WAGE	Semi-urban	Urban	6.70*	3.31	0.044
EWEC	Semi-urban	Urban	27.38*	9.59	0.005
		Rural	20.26*	10.41	0.052
TIME	Semi-urban	Urban	16.01*	7.43	0.032
		Rural	14.00*	8.01	0.081
TRANSPORT	Semi-urban	Urban	.20*	0.05	0.000
		Rural	.18*	0.06	0.003

Dependent Variable	(I) Urban=2, semi-urban=1, rural = 0	(J) Urban=2, semi-urban=1, rural = 0	Mean Difference (I-J)	Std. Error	Sig.
FISH	Rural	Urban	5.56*	1.84	0.003
		Semi-urban	4.16*	1.55	0.008
AG	Rural	Urban	20.70*	5.76	0.000
SAL	Rural	Semi-urban	11.71*	4.69	0.013
RICE	Rural	Urban	17.66*	6.58	0.008
TEXTILE	Rural	Urban	12.41*	3.77	0.001
		Semi-urban	12.31*	3.18	0.000
TRANSFER	Rural	Semi-urban	4.83*	2.27	0.034
VEG	Rural	Urban	4.09*	1.79	0.023
	Rural	Semi-urban	2.76*	1.51	0.069
WAGE	Rural	Semi-urban	14.04*	6.84	0.041
EDU	Rural	Semi-urban	.93*	0.41	0.025
FGT1	Rural	Urban	1758.57*	768.50	0.023
FGT2	Rural	Urban	19426501.41	9393009.23	0.039

Source: From Calculation

Table 5 One Way ANOVA for testing differences of mean between quintile

Dependent Variable	(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.
AG	Poorest	Better off	31.24*	5.27	.000
		Less poor	8.73	5.27	.099
		Medium	14.87*	5.29	.005
		Well off	47.18*	5.29	.000
RICE	Poorest	Better off	18.38*	6.59	.006
		Well off	30.92*	6.61	.000
DEPENDENCY	Poorest	Better off	0.40	0.21	.055
		Less poor	.54*	0.21	.009
		Well off	.55*	0.21	.009
HOUSESIZE	Poorest	Less poor	300.82	169.03	.076
		Medium	453.19*	165.23	.006
SPACE PER CAP	Poorest	Medium	93.91*	41.11	.023
CONSTRUCT	Well off	Poorest	5.71	3.00	.058
BUS	Well off	Poorest	11.59*	3.82	.003
		Less poor	11.54*	3.81	.003
		Medium	6.49	3.82	.090
SAL	Well off	Poorest	41.29*	5.30	.000
		Less poor	33.73*	5.28	.000
		Medium	32.21*	5.30	.000
		Better off	25.30*	5.28	.000

Dependent Variable	(I)	(J)	Mean Difference		
			(I-J)	Std. Error	Sig.
RELIGIOUS	Well off	Poorest	13.69 *	6.20	.028
TRANSPORT	Well off	Poorest	5.71 *	2.20	.010
		Less poor	5.71 *	2.19	.010
		Medium	3.72	2.20	.092
		Better off	4.31	2.19	.050
WAGE	Well off	Poorest	49.59 *	7.78	.000
		Less poor	31.39 *	7.75	.000
		Medium	30.97 *	7.78	.000
		Better off	18.12 *	7.75	.020
EDU	Well off	Poorest	2.41 *	0.48	.000
		Less poor	2.76 *	0.48	.000
		Medium	2.61 *	0.48	.000
		Better off	2.17 *	0.48	.000
EXP per CAP	Well off	Poorest	75917.09 *	12849.46	.000
		Less poor	71328.63 *	12804.14	.000
		Medium	69492.44 *	12849.46	.000
		Better off	56390.30 *	12804.14	.000
DEBT	Well off	Poorest	215379.71	61357.16	.001
		Less poor	176527.45	61357.16	.004
		Medium	181692.54	60639.33	.003
		Better off	179251.78	60872.06	.003
		Medium	242216.64	32770.18	.000
		Better off	190260.71	32654.59	.000

Dependent Variable	(I)	(J)	Mean Difference		
			(I-J)	Std. Error	Sig.
Y	Well off	Poorest	182147.35	23107.08	.000
		Less poor	174147.97	23025.57	.000
		Medium	161336.20	23107.08	.000
		Better off	137555.74	23025.57	.000
		Poorest	278212.63	32770.18	.000
		Less poor	265439.37	32654.59	.000
LOTTERY EXP	Well off	Poorest	1275.85	677.35	.061
		Less poor	1185.69	677.35	.081
		Medium	1220.03	664.29	.067
TOBAC&ALCOHOL EXP	Well off	Poorest	1824.66 *	884.26	.040
		Less poor	1847.15 *	887.97	.038
DONATE	Well off	Poorest	4963.00 *	1614.99	.002
		Less poor	4844.42 *	1614.99	.003
		Medium	6477.71 *	1597.33	.000
		Better off	4356.75 *	1608.95	.007

Source: From Calculation

Table 6 Poverty and income distribution in Mukdahan

<u>Region</u>	Income per capita all hhs	<i>Rank</i> <i>Income</i>	Decile ratio	Rank Decile	Quintile ratio	Rank Quintile
<i>Urban</i>	63,871.98	2	76.62855	1	28.39322	1
<i>Semi-urban</i>	49,608.50	1	104.1898	2	37.48459	2
<i>Rural</i>	64,796.95	3	159.0256	3	70.01816	3
Total sample	55,492.80					

Source: Calculated directly from primary survey data.

We disaggregated the 353-household survey data into urban, rural, and semi urban subsets to compare the economic situation among areas. The analysis reveals that rural areas have the highest income per capita, closely followed by the urban sample. Meanwhile, semi urban households constitute is the poorest group on average. But when we consider the distribution of income around that mean as evidenced by the decile and quintile ratios, it is the rural areas that have the worst situation since there exists high inequality among groups.

Urban leaders and/or the spontaneous processes of economic development seem to be doing an excellent job in creating growth with equity. Those processes include the direct effects of the transportation infrastructure and access to markets and education. Urban households enjoy the lowest inequality and the second-highest income. In contrast, there remains substantial unemployment in rural areas.

Figure 1 Mukdahan Gini Index (Mukdahan, Rural, Semi Urban, Urban, Thailand)

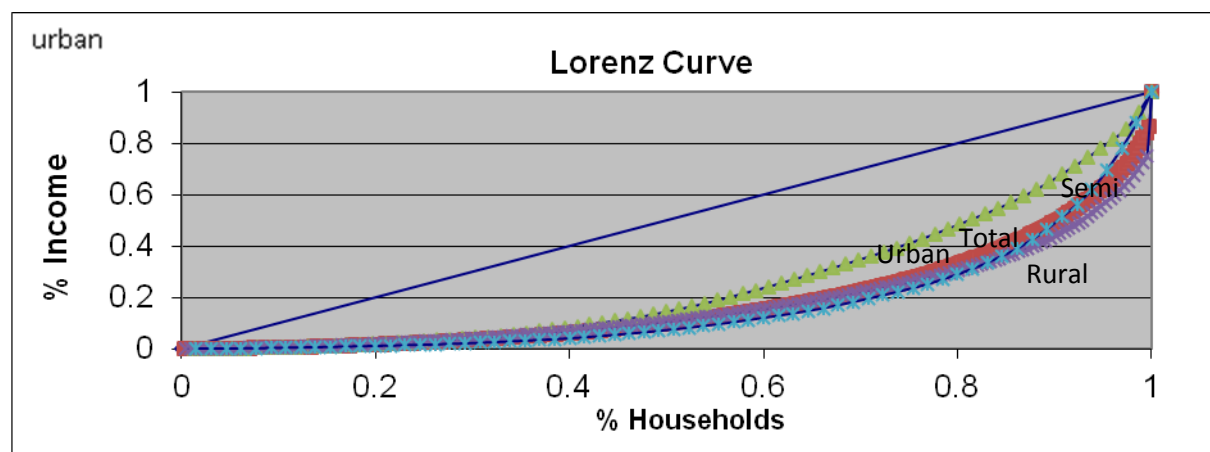


Table 7 Gini Index

Area	Gini index
Urban	0.506
Semi Urban	0.661
Rural	0.667
Total	0.640
Thailand	0.420

Source: Calculated directly from primary survey data, and NESDB data for Thailand as a whole.

To study income distribution, we may consider the Gini index. Mukdahan Gini ratio (0.640) is substantially higher than the Gini coefficient for Thailand as a whole (0.420). NESDB (2009). When we consider Gini coefficients by area, the calculation has the same direction as with the decile and quintile ratios. The urban area has the best situation (yellow line) and the rural area is the least equal. These results support the idea that local governments in urban areas have better poverty and income-distribution policies than their counterparts in rural areas. But it may also mean that the autonomous economic forces of access to jobs, roads, resources, and education operate more strongly in the in cities. We see that the semi-urban and rural areas have virtually the same Gini indices (Table 7), but that the quintile and decile ratios are much higher in the rural area. That suggests that, although the Gini index is a worldwide measure for inequality, it not adequate to explain inequality in detail. We should combine it with other indices.

We employed the FGT indices as the basis for our poverty alleviation policy recommendations. The calculations were performed twice, using poverty lines based on both a) the minimum cost of basic needs in Mukdahan (15,708 baht per year) and b) the World Bank's \$1 USD per person per day poverty criterion (10,950 baht per year). The results are reported in table 6. Rural areas have the highest incidence, depth, and intensity of poverty. Urban areas also suffer from severe poverty, even though their incidence and depth are less than in other areas.

We can probably reject the hypothesis that income is lowest in the rural areas because farmers sell their output to traders who then make use of the EWEC.

Table 8 FGT Indices

	Mukdahan Criteria			World Bank Criteria			
	Incidence of poverty	Depth of poverty	Intensity of poverty	Incidence of poverty	Depth of poverty	Intensity of poverty	
<i>Sum across poor households</i>	131	7772	78909255	101	4250	31013556	
<i>Sum across all households</i>	37.2%	2,892.40	224,174.02	28.7%	1,219.40	88,106.69	
<i>Sum across poor households</i>	Urban	22	6832	69592357	15	25554	27832011
<i>Sum across all households</i>		28.9%	1,977.56	915,688.90	19.7%	5,043.58	366,210.67
<i>Sum across poor households</i>	Semi-urban	83	7575	75300879	63	4053	28999276
<i>Sum across all households</i>		39.3%	2,979.63	356,876.20	29.9%	1,210.15	137,437.33
<i>Sum across poor households</i>	Rural	26	9197	98311831	23	5307	40135835
<i>Sum across all households</i>		40.0%	3,678.86	1,512,489.71	35.4%	1,877.71	617,474.39

Table 9 Shorrocks Order Two Index

Factor	Within Group	Between Group	Total
Area	3.71 (-99.55)	0.02 (-0.45)	3.73
Age	3.72 (-99.46)	0.02 (-0.54)	3.74
Sex	73.83 (-85.49)	12.53 (-14.51)	86.36
Occupation	3.52 (-89.74)	0.40 (-10.26)	3.92
Education per cap	3.29 (-79.17)	0.87 (-20.83)	4.15
Distance from EWEC	3.65 (-96.06)	0.15 (-3.94)	3.80

Source: Calculated directly from primary survey data. Figures in parentheses are t-statistics.

In this study, we employed Shorrocks order two index to decompose inter-household inequality. More specifically, we divided factors as follows:

1. Area: 3 groups; urban, semi urban and rural.
2. Age of household leader: 7 groups; less than 25 year old, equal and more than 25 and less than 40, equal and more than 40 and less than 50, equal and more than 50 and less than 60, equal and more than 60 and less than 70, equal and more than 70 and less than 80, more than 80.
3. Sex of household leader: 2 groups; male and female
4. Main household occupation: 7 group; farmer, state employee, state enterprise employee, private employee, entrepreneur, housewife.
5. Education per capita: 4 groups; 0-5 years, more than 5 to 10 years, more than 10 to 15 years, more than 15 years.
6. Distance from EWEC: 8 groups; can see, can push a cart, can walk, can bicycle, need small truck, need large truck, have go by van, have go by bus.

The study shows that education per capita displays the highest difference between groups, implying that differences in education lead to differences in income. Male gender is of next greatest importance, since there is high different income between the groups of male- and female- headed households.

5.3 Income, donation and poverty determinant: Econometric model

In this section we employed econometric models to determine the significant economic, geographic and demographic determinants of income, donations and poverty in Mukdahan. Table 8 shows variable code, description and variable type.

Table 10 Definitions and types of variables for the econometric analysis.

Variable Code	Variable definition	Min	Max	Mean	s.d.
EWEC	distance from EWEC	0	250000	6335.8	26972.1
TIME	time to EWEC	0	100	0.3	5.3
AGE	age of header	20	89	47.0	10.5
GENDER	sex of header; Gender=1 if household head is female, otherwise=0	0	100	2.3	14.9
EDU	Number of years attained education percapita	0	500	32.0	72.9
HOUSESIZE	house size	0	67.29	1.3	6.5
LAND	total land belong to households	0	90.91	0.3	4.8
AG	% of income from agriculture	0	100	36.6	35.4
IND	% of income from industrial jobs	0	55200	409.5	3645.1
BUS	% of income from service-sector jobs	0	100	6.4	16.5
SER	% of income from business	0	100	5.5	22.7
SAL	% of income from salary	0	100	2.6	12.2
MIG	% of income from migration	0	100	8.7	27.3
RICE	% rice income in agricultural income	0	100	24.5	34.2
VEG	% vegetable income in agricultural income	0	100	43.8	48.6
CROP	% cropping income in agricultural income	0	102000	5392.4	9615.6
FRUIT	% fruit income in agricultural income	0	40	0.8	2.1
CATTLE	% livestock income in agricultural income	0	100	3.5	17.8
FISH	% fishery income in agricultural income	0	100	2.2	9.9
POUL	% poultry income in agricultural	0	100	7.9	25.0
ANTP	% animal product income in agricultural income	0	100	2.2	13.6
TRANSFER	% transfer product income in industrial income	0	1	0.8	0.4
TEXTILE	% textile income in industrial income	0	360	35.3	56.2
HANDICRAFT	% handicraft income in industrial income	0	100	0.7	8.0
MASSAGE	% massage income in service income	0	98.43	3.7	13.7
TOUR	% tourist income in service income	0	100	2.7	16.0
TRANSPORT	% trinket shop income in bussiness income	0	100	6.1	22.8
ACCOM	% accomodation income in service income	0	100	0.5	6.4
PHONE	% phone service income in service income	0	100	51.8	40.5
HEALTH	% health income in service income	0.5	8640	394.0	907.6
OTHERSER	% other service income in service income	0	100	1.0	9.4
TRINK	Urban area; if household located in urban area = 1; otherwise =0	0	100	2.9	10.7
ALCOHOL	% alcoholic shop income in bussiness income	0	100	1.3	8.9
CONSTRUCT	% construction income in bussiness income	0	100	8.6	22.0
OTHERBUS	% other bussiness income in bussiness income	0	100	5.1	22.0
WAGE	% wage in employment income				
FARMWAGE	% wage from farm in employment income	0	1	0.4	0.5
DONATE	Total Household Donation	0	5	1.6	1.6
Y	income per capita	156	2601145	55492.8	151617.2
EWEC2	Distance square from EWEC	0	61.54	1.8	5.8
TRANS	% transport income in service income	0	100	1.8	13.1
FGT0		0	1	2892.4	4589.2
FGT1		0	15552	29367000	56007400
FGT2		0	2.42E08	2.1	11.0
AREA	area:rural semi urban				
RURAL	Rural area; if household located in rural area = 1; otherwise =0				
SEMI-URBAN	Semi- urban area; if household located in semi-urban area = 1; otherwise =0				

5.4 Poverty determinants

Table 9 reports poverty and its determinant, while table 10 shows the marginal effect of the models. The analysis began by calculating FGT indices $\alpha = 0,1,2$ and then employed the results as dependent variables. For *FGT0: incidence poverty* we employed the logit model; while for both *FGT1: Dept Poverty* and *FGT2: Severity Poverty* we estimated a tobit model.

The results from all models reveal that sources of income show a significant relationship with poverty. Households earning a greater share of agricultural income tend to a greater incidence, and severity of poverty. However, a higher share of cropping within agricultural income can reverse this tendency. Working in industry or the business sector has positive effects on poverty reduction. Wage and salary from the non-agricultural sector as a whole can reduce the intensity and severity of poverty.

6. Discussions

Hypothesis testing results

We can reject hypothesis 1 and hypothesis 2 that expects socio-economic factors of both the household and its head to significantly affect poverty levels and alleviation. To the contrary, the results from the logit and tobit models reveals that socio-economic factor have no significantly effect on poverty in Mukdahan.

With respect to hypothesis 3, to the effect that “communities closer to roads and transportation infrastructure have lower levels of relative income inequality,” we have found no significant relation between EWEC and poverty in the regression models. However, the more detailed oneway ANOVA analysis of means reveals that the poorer group has greater difficulty in accessing the EWEC than richer group. For this reason, we cannot reject this hypothesis.

Nor can we reject hypothesis 4, which states that “non-urban areas, although poorer, give a greater percentage of their income in charity and waste more in alcohol consumption and gambling; suggesting that community-based reciprocity is a substitute for infrastructure development.” The oneway ANOVA results show positive significant differences for non-urban areas in terms of all of these variables.

We cannot hypothesis 5, which predicts that public infrastructure (road construction) leads to easier access to market opportunities and reduced transportation

costs, and in turn increased household income and poverty alleviation. For Mukdahan, the results show the entirely opposite direction: a significant and positive relationship between transportation-related occupation and poverty. The explanation for this result may be that infrastructural projects are still under construction (especially local roads) leading to delays, inconvenience, and transportation bottlenecks. The ANOVA table further shows that transportation workers live mostly in semi urban areas that lie farther from the EWEC than other area. That explains why they cannot take profit from EWEC.

We cannot reject hypothesis 6: The sector in which one works is important for solving the poverty problem. Service and industrial sector occupations lead to improved economic situations for households, while working in the agriculture sector reduces household income.

Table 11. Poverty and its determinants

Variable	Logit		Tobit		Tobit	
	Incidence of Poverty		Depth of Poverty		Severity of Poverty	
	Coeff	Std.Err.	Coeff	Std.Err.	Coeff	Std.Err.
AG	0.018	0.005	76.36	18.48	778715	222214
P-value	(0.000)		(0.000)		(0.001)	
IND	-0.075	0.040	-317.87	159.94	-3735498	1932038
P-value	(0.063)		(0.048)		(0.054)	
BUS	-0.027	0.009	-108.32	34.04	-1346518	414632
P-value	(0.003)		(0.002)		(0.001)	
SAL	-0.014	0.005				
P-value	(0.007)					
TRANSPORT	.5758	0.346	3953.19	1448.91	49900000	17600000
P-value	(0.096)		(0.007)		(0.005)	
CROP	-0.029		-115.53	28.56	-1322299	344888
P-value	(0.000)		(0.000)		(0.000)	
OTHSER	-0.015	0.008	-76.591	33.340	-932447.5	408629
P-value	(0.054)		(0.022)		(0.023)	
ALCOHOL	0.028	0.015	101.16	52.17	1070774	626020
P-value	(0.064)		(0.053)		(0.088)	
WAGE			-46.92	13.15	-635178	158958
P-value			(0.000)		(0.000)	
_cons	-0.890	0.436	-4268.01	1848.14	-52500000	22400000
P-value	(0.041)		(0.022)		(0.019)	
	LL = -177.1		LL = -1445.7		LL = -2651.7	
	Pseudo R2 = 0.2185		Pseudo R2 = 0.0360		Pseudo R2 = 0.0191	
	LR chi2(8) = 99.04		LR chi2(8) = 107.83		LR chi2(8) = 103.28	
	Prob > chi2 = 0.0000		Prob > chi2 = 0.0000		Prob > chi2 = 0.0000	

Source: Calculated directly from primary survey data.

Table 12 Marginal Effects

Variable	Logit		Tobit		Tobit	
	Incidence of Poverty dy/dx	Std.Err.	Depth of Poverty dy/dx	Std.Err.	Severity of Poverty dy/dx	Std.Err.
AG	0.00	0.00	76.36	18.48	778715	222214
P-value	(0.00)		(0.00)		(0.00)	
IND	-0.02	0.01	-317.87	159.94	-3735498	1932038
P-value	(0.06)		(0.05)		(0.05)	
BUS	-0.01	0.00	-108.32	34.04	-1346518	414632
P-value	(0.00)		(0.00)		(0.00)	
SAL	0.00	0.01				
P-value	(0.00)					
TRANSPORT	0.119	0.072	3953.19	1448.90	49900000	17600000
P-value	(0.06)		(0.01)		(0.01)	
CROP	-0.01	0.00	-115.53	28.56	-1322299	344888
P-value	(0.00)		(0.00)		(0.00)	
OTHSER	0.00	0.05	-76.59	33.34	-932448	408629
P-value	(0.00)		(0.02)		(0.02)	
ALCOHOL	0.01	0.00	101.16	52.17	1070774	626020
P-value	(0.06)		(0.05)		(0.09)	
WAGE			-46.92	13.16	-635178	158958
P-value			(0.00)		(0.00)	

Source: Calculated directly from primary survey data.

7. Concluding remarks

This study employed Mukdahan field survey data to identify, measure, and test the significance of various poverty determinants in Mukdahan. We have disaggregated the poverty and inequality situation by rural, semi-urban, and urban areas. Gini index and Shorrocks order two indexes were employed to measure and compare relative income inequality. The three standard FGT indices were used to gauge the incidence, depth, and severity of absolute deprivation. Logit and Tobit models were then estimated to explain the three FGT indices as dependent variables.

The results reveal that sources of income bear significant effects upon poverty. While agriculture leads to reduced economic status, the industrial and business sectors can improve poverty alleviation. Socio-economic factors have no significant effect on the household's economic situation. Surprising, despite high investment in road construction to date, occupations related to transportation tend to keep workers poor.

9. Policy Implications

These results have useful policy implications. Since households which earn a greater percentage of their income from agriculture are poor, government programs and policies should target productivity enhancement, technological innovation, credit access, and other measures to increase agricultural income. The field surveys have shown that structure agricultural sector structure is going to evolve from traditional crop farms to rubber plantations. This phenomenon challenges researchers to re-study the Mukdahan agricultural sector in the future to determine whether such a massive change in agricultural structure will in itself lead to reduced poverty. However, income from improved cropping in distinct eco-agricultural subsystems may also help farmers to reduce poverty.

The shares of income from the industrial and business sectors are the two best sources to reduce the incidence, depth, and severity of poverty. The opportunity presented by the opening of the Thai Laos friendship bridge will lead to easier entry for new industrial- and business sector enterprises. That will also provide a new chance for Mukdahan households to rise above the poverty line.

ACKNOWLEDGMENT

The first author is grateful to the Office of Higher Education Commission, Ministry of Education, Thailand, for a CHE-PhD 2550 scholarship.

REFERENCES

- Achia, T. N., Wangombe, A., & Khadioli, N. (2010). A Logistic Regression Model to Identify Key Determinants of Poverty Using Demographic and Health Survey Data. *European Journal of Social Sciences*, 13 (1).
- Agénor, P. R., & Neanidis, K. C. (2010). *Innovation, Public Capital, and Growth*, Centre for Growth and Business Cycle. Research Discussion Paper Series 135, , The Univeristy of Manchester, Economics.
- Aigbokhan, B. E. (2008). *Growth, Inequality and Poverty in Nigeria*. Addis Ababa, Ethiopia: Prepared for United Nations Economic Commission for Africa (UNECA),.
- Albert, J. G., & Collado, P. (October 4-5, 2004). Profile and Determinants of Poverty in the Philippines. *9th National Convention on Statistics (NCS)*. EDSA Shangri-La Hotel.
- Anderson, Magnus; Engvall, Anders; Kokko, Ari. (2005). *Determinants of Poverty in Lao PDR*. Stockholm School of Asian Studies, Stockholm School of Economics, Department for Policy and Methodology. Stockholm: Sida 2006.
- Arrow, K. J., & Kurz, M. (1970). Optimal Growth with Irreversible Investment in a Ramsey Model. *Econometrica*, 38 (2), 331-344.
- Barro, R. J. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy*, 98 (5), S103-26.
- Bazini, E. (2008). *Impact of the Tourism Development on poverty reduction in Albania as a Country in Transition*. The Annals of The "Ștefan cel Mare" ., University Suceava, Fascicle of The Faculty of Economics and Public Administration.
- Blake, A., & Arbache, J. S. (2009). *Tourism and Poverty Relief*. Escola de Economia de São Paulo da Fundação Getulio Vargas FGV-EESP.

- Gannon, C. A., & Liu, Z. (1997). *Poverty and Transport. Transportation*. Discussion Paper TWU-30, World Bank, Water and Urban Development Department (TWU).
- Geda, A., Jong, N., Kimenyi, M., & Germano, M. (2002). *Determinants of Poverty in Kenya: A Household Level Analysis*. Working Paper Series No. 2005-44, University of Connecticut, Department of Economics, Storrs.
- Kotikula, A., Narayan, A., & Zaman, H. (2010). *To What Extent Are Bangladesh's Recent Gains in Poverty Reduction Different from the Past?* Poverty Reduction and Equity Group, Poverty Reduction and Economic Management Network. The World Bank.
- Kuznets, S. (1955). Economic Growth and Income Inequality. *American Economic Review*, 49, 1-28.
- Liu, Z. (2005). Transport Investment, Economic Growth and Poverty Reduction. *Journal of Transport and Infrastructure, under The Asian Journal*.
- Maddala, G. S. (2003). *Introduction to Econometric*. England: John Wiley & Sons.
- Mourmouras, A. I., & Lee, J. E. (1999). Government spending on infrastructure in an endogenous growth model with finite horizons. *Journal of Economics and Business*, 51 (5), 395-407.
- Muganda, M., & Sahli, M. (2010). Tourism's contribution to poverty alleviation: A community perspective from Tanzania. *Development Southern Africa*, 27 (5), 629-646.
- Okurut, F. N., Odwee, J. J., & Adebua, A. (2002). *Determinants of regional poverty in Uganda*. African Economic Research Consortium. Nairobi: The African Economic Research Consortium.
- Okwia, P., Ndeng'ec, G., & Kristjans, P. Spatial determinants of poverty in rural Kenya. *Proceeding of the National Academy of Sciences of United America*. Published online before print October 17, 2007, doi: 10.1073/pnas.0611107104.
- Osinubi, T. (2003). Urban Poverty in Nigeria: A Case Study of Agege Area of Lagos State, Nigeria. *Unpublished*.
- Paul, O. O., Ngeng'e, G. N., Kristjanson, P., Arunga, M., Notenbaert, A., Omolo, A., et al. (2007). Spatial determinants of poverty in rural Kenya. *PNAS*, 104 (43), 16679-16774.
- Setboonsarng, S. (2008). *The impact of rural infrastructure and agricultural support services on poverty: the case of agrarian reform communities in the Philippines*. Asian Development Bank.
- Timmer, C. P. (1994). *Patterns of Development 1950-1970*. London: Oxford University Press for the World Bank.