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Chawin Asavasaetakul

Abstract: The hilltribes of northern Thailand lead a unique rural lifestyle centered around agriculture, traditions and their community. Through field research in selected villages, this thesis analyzes and attempts to explore expenditure patterns of the hill tribes through an econometric model and in doing so gains valuable insight which can be utilized for evidence-informed public policy.

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1. Introduction

1.1 Overview

The Hill tribes of Thailand have long been an ethnic minority that continues to endure a centuries long challenge of systemic poverty. Scattered among the high lands of the North of Thailand (primarily in the provinces of Chiang mai, Chiang rai, and Mae Hong Son), the hill tribes of Thailand consist of seven main groups: Akha, Karen, Meo, Yao, Lahu and Lisu, with a combined population of one million. The vast majority of the hill tribes originated from China, Burma, Laos and Vietnam and settled in the northern part of Thailand mostly due to conflict in the respective countries. Ever since, their relocation in Thailand the hill tribes have lived below the poverty line, which in a vast majority cases have resulted in a number of illegal activities such as, participation in the drug trade, human trafficking, and deforestation. As a result, hilltribes came to connote a some-what true negative perception in Thai mainstream society (including text books, newspaper and official reports and documents), reaching its height during the 1950s, namely of communist insurgency operations, opium growing, and deforestation (Buadaeng, 2006). Now in 2000s, despite the end of communist activity, the dramatic decline in opium growing, and more controlled deforestation, the perception of the hill tribes - while is more positive than a few decades ago – is still tilted towards the negative, which in many cases have contributed to the problems (Australia, 1997). Regardless of these perceptions, it is clear that many deep-rooted problems still remain while at the same time new ones that have arose during the past ten years.

This paper will examine how their unique lifestyle of hill tribes effects their individual consumer behaviour. Thus, the goal of this paper is to measure whether the following factors – income, agricultural land, debt, number of children, and age– affects individual expenditure. The analysis is done in hope to serve as a resource for governmental agencies to adopt an effective policy to help the hill tribes navigate through their set of challenges.

Ever since their relocation in Thailand, the hill tribes have created and faced a vast number of challenges and problems. While issues such as, drugs and human trafficking remain an important aspect of the understanding of the hill tribes, for the purpose of this paper background information is not necessary as this paper looks at the general characteristics of the hill tribe population as a whole. The characteristics examined in this section are economic activity, loss of culture, citizenship, and government intervention.

1.2 Economic Activity

Agriculture remains the primary economic activity for hill tribes. The hill tribes have traditionally been primary subsistence farmers who practice slash and burn agriculture along with the shifting cultivation (Buergin, 2000). However, in the past few decades have seen a rapid rise in agricultural commercialization, to such a great degree that subsistence agriculture is an extreme rarity among the hill tribes' villagers. Currently, the main crops grown are corn, rice, maize, red beans and other forms of tropical fruits depending on the physical properties of the agricultural land. After these crops are grown the villagers will then sell these crops to a middle a man, offering very low prices, who will then take it to market. This system is not voluntary, but a necessity given the hill tribe villagers inability to directly access the market due to reasons such as, geographical isolation, cost of transportation, lack of infrastructure or simply the lack of knowledge.

Furthermore, the practice slash and burn agriculture along with the shifting cultivation has had profound long-term consequences on the hill tribe villagers. These practices done right will result in sustainable agriculture, however this is not the case with the hill tribes. Often the hill tribes would "slash-and-burn" the forest and start cultivating the land for a period of time until the soil fertility would decline and then "slash-and-burn" a new plot in the forest. The issue is that given the limited amount of forest land, the hill tribe villagers would return to cultivate the original plot of land before it could regenerate. Aside from the loss in the fertility of the land, when "slash-

and-burn” agriculture is practiced without consideration for the environment and practiced by a high number of villagers on a large scale, large scale deforestation occurs.

Given that over the past decade, government policies on the land the hill tribes villagers occupy has been harsher and more widely implemented, the hill tribes no longer can practice shifting cultivation as previously and is now restricted to one piece of land just as any rural farmer. Often these land’s fertility has been severely loss and thus, crops yield have been fruitful as previously in the past. Additionally, many hill tribes face the challenge of annual droughts often meaning that certain times of the year agriculture cannot be practiced and at times resulting in conflict regarding the allocation of water. Thus, it is often cited that the main causes of poverty among hill tribes is the combination of backwards agricultural practices, the inability to directly access market, and depletion and lack of natural resources. Nevertheless, it must be noted that this is only a generalization of the main issues regarding agriculture among the hill tribes and every village is affected by its own set of circumstances.

1.3 Loss of Culture

Given the challenges of agriculture, many new generations of hill tribe villagers have left their villages to seek more traditional forms of employment in urban areas in the north of Thailand breaking apart the traditional close-knit community. As a result, transmission of indigenous knowledge from one generation to another has been halted and the hill tribe’s culture is very much at risk of being lost (Australia, 1997). This includes the loss of their a number of distinct languages and traditions that have been passed down from generation to generation for centuries.

This is compounded by the growing acceptance of Thai language instruction in schools, exposure to modern knowledge and other religions like Buddhism and Christianity. Furthermore, Communication between the Thai-speaking younger generations and the “illiterate” older generations is sometimes hindered (Fujioka, 2002). The integration of hill tribe villagers to mainstream Thai society has put the hill tribe cultures at high risk of acculturation especially as

infrastructure develops and access to the internet becomes more widespread making the once isolated hill tribe villages more connected both physically and ideologically to Thai society than ever before.

1.5 Citizenship

Another important contributor to the hill tribe's way of life is the problem of citizenships many hill tribe villagers face. In the 1950s, the hill tribes were only eligible for a "hill tribe identification card." Based on the report by Heering:

"People sense uneasy that government efforts are pushing them out of the hills to work in towns, where, with a hilltribe ID card, they cannot own a house or work, at any but low-end jobs". ... In 1956 the government initiates a Household Registration for all citizens and makes an important step forward to assimilation of so-called entropy-resistant groups (Gellner 2006:63 and 65-6). But highlanders can only obtain a "Temporary Household Registration" by possessing special "hilltribe identification-cards" (Suppachai 1999:3), which gravely restricts free movement. 27 "Issued with temporary registration papers and cards identifying them as non-Thai, highland people were also under constant threat of expulsion" (McKinnon 2006:38). Obtaining IDcards becomes crucial for surviving in the modern era. (Heering, 2013)

Today, while the situation has improved some hill tribe villagers have been recognized as permanent citizens, but many others have yet to gain a permanent citizenship or a pink card (foreign residence card) despite claims that up to 50% of the hill tribe people have a legitimate claim. Consequently, these hill tribe villagers are stateless and unable to vote, purchase land, seek legal employment, access social welfare benefits or travel between provinces, thus hindering their potential to improve their livelihood (Australia, 1997). The lack of citizenship means that these hill tribe villagers may be arrested at any time despite living in Thailand for their whole lives.

Nonetheless, over the last decade new government policies have made it easier for hill tribe villagers and their children to gain citizenship.

1.5 Government Intervention

Lastly, the government has played a large role in the livelihoods of the hill tribes especially in terms of land. Not until the 1950s did the Thai Government attempt to extend administrative control over the highlands and highlanders this was due to the border security because of its border areas because of the Indochina conflict and the presence of communists in Burma (now known as Myanmar). Government interest also increased after 1958 ban on opium production, which has long been cultivated by some hill tribes (Ann, 1988). Subsequently, the Thai government built new roads and infrastructure, launched new welfare programs, and pursued a policy of resettlement and repatriation. Due to the increase in emphasis by Thai society and NGOs regarding environmental preservation, the motive behind these resettlement programs can be attributed to the negative perception of the hill tribe's responsibility of destroying the forest through the practice of the slash-and-burn agriculture as detailed by Kesmanee:

Since 1960, when the Hill Tribe Welfare Committee was created, Thailand's hill tribes have repeatedly been accused of destroying the country's forests. Such accusations have appeared with increasing frequency of late, and are currently promoted through the mass media. Kamphaeng Phet Province provides a good case in point: "[in this province] alone, hilltribe encroachment and destruction of forests amounts to 10,000 rai [approximately 4,000 acres]". About one month later, another article appeared, stating: "The Third Army [responsible for the northern region] together with the Royal Forestry Department arrested 50,000 hilltribe families in Khlong Lan National Park because these families have destroyed more than 50,000 rai of forest". (Kesmanee, 1988)

This perception has led to three major and repatriation as detailed in a report by Ann:

First, the government claimed that hill tribes should be collected in more accessible villages to facilitate the delivery of educational, health and other services. Accordingly, it established four pilot "settlement areas" (nikhom) in the early 1960s. Then, in the late 1960s and early 1970s, the government evacuated hilltribe people from areas of suspected communist insurgency into large, low-lying settlements. Most recently, the Committee for Control of Hill Tribe Destruction of Forests in 1986 adopted the current resettlement policy, which resulted in the eviction witnessed by Eudey (Ann, 1988).

However, currently the situation has changed. Despite the land hill tribes currently reside and cultivate in are formally owned by the government with many hill tribes being located in a designated national park area, the local authorities have pursued a more moderate policy than previously described. Most hill tribes' villagers are able to keep some land (some parts of their land may be reclaimed, but enough land to sustain their livelihoods), in the agreement with the authorities that they will not encroach further land. For most parts this agreement has been effective with the authorities able to track the land area of hill tribes through GPS and drone mapping techniques.

2. Literature Review

Very few, if any, economic studies have been conducted on the expenditure patterns of the hill tribes of northern Thailand. However, there been numerous theories of consumption expenditure. This research looks into the following factors that affect expenditure: income, land, number of children, debt, and age.

One of the most widely cited determinants of expenditure is income. Firstly, Keynes conjectured that income is the primary determinant of consumption and that the interest rate does not have an important role (Mankiw, 2010). Keynes postulated the absolute income hypothesis (AIH) or otherwise known as the Keynes Psychological Law. According to Keynes the “fundamental psychological law, upon which we are entitled to depend with great confidence, ... is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income.” (Keynes, 1936) Thus, accordingly, the marginal propensity to consume (MPC) is less than the average propensity to consume (APC). In addition, as income increases, APC decreases. This can be summarized as:

- i. The MPC is greater than zero but less than one
- ii. The APC decreases as income increases

Keynes theory is backed up by the positive correlation between consumption expenditure and per capita income in Nigeria (Adetotun, 1978). Another investigation by Alimi (2013) found that that as income increases, the Average Propensity to Consume (APC) is reduced as Keynes indicated. However, in the long run although the Marginal Propensity to Consume (MPC) is less than one, and is thus not stable. Building on Keynes’ works, Duesenberry postulated the relative income hypothesis (RIH). The Hypothesis states that the APC is dictated by the person’s income relative to the income of others in the immediate community. As a result, a person cares less about his or her well-being, consumption and earnings in isolation and his or her past consumption than what people around that person consumes (Duesenberry, 1949).

Another important determinant of consumption as identified by (Dynan, 2012) is debt. Results from studies conducted by (Dynan & Kohn, 2007) illustrates that a majority of households' primary finance living expenses instead of unnecessary consumption. Thus, the increase in household debt is the result of increasing consumption level. Likewise, (Johnson & Li, 2007) indicated that debt had an indirect effect on consumption due to its influence on income. Furthermore, a study by (Nizar, 2015) indicates that consumer debt is significantly affected by household consumption, however mortgage debt isn't.

Children has also been a subject of research for many economists. Based on Cigno's findings, one of the reasons for having children, assuming that humans are rational beings, is that children can be considered a genuine investment that provides return later on in the parent's life cycle. Parents must invest in their healthcare, education, and overall well-being. However, all these investments are most likely to increase the ability and willingness to support their parents later on in old-age. Thus, it is a system of mutual exchange between two generations (Cigno, 1993). Additionally, Leibenstein argues that children can also be seen as advantageous given the consumption motive of parents. This is a strong motive as their children will contribute to their income in the future (Leibenstein, 1958). Furthermore, Rosenzweig and Evenson states that children can also be seen as an economic asset in rural areas practicing agriculture in Lesser Economically Developed Countries (LEDCs) because they help their parent's agricultural business even as a child (Rosenzweig & Evenson, 1977). However, a study by muller also suggests that children have a negative value, that "up to the time they become parents themselves, children consumer more than they produce. (Mueller, 1976)" However, findings by Sivakumar on her research in India indicated no correlation between family size, income or expenditure (Sivakumar, 1976).

3. Methodology

3.1 Data Collection

The data collected was of hill tribe villagers in a village called Mae Jon located in the prefecture of Chiang Dao and the province of Chiang Mai in Northern Thailand. The data collection was separated into two parts. The first part being the collection of data on the hill tribe's villager land from the Sri Lanna National Park Department. The second part being the collection of expenditure, income, number of children, debt, and age of the hill tribe villagers through the survey of the villagers of MaeJon.

Firstly, the Sri Lanna National Park Department provided a spreadsheet of the villager's name and the land he or she owned as of the last survey in 2017. From this list, 110 names and their respective land ownership were randomly chosen. These 110 people were then physically surveyed in November of 2017 over the course of three days. From the survey, data on expenditure, income, number of children, debt, and age of the hill tribe villagers were collected. The specific criteria and cases of each of the variable surveyed is detailed in the Description of Variables section.

3.2 Description of Variables

In the simple regression the relationship between the expenditure per hill tribe villager (explained variable) and income per hill tribe villager (explanatory variable) will be examined. Income is one of the best indicators of consumption expenditure and patterns among the hill tribes as it is the basis for expenditure. In general, income is the source for expenditure (assuming no money borrowed or saved from previous income). Thus, income will be used as the explanatory variable in the simple regression.

In the second stage, four more explanatory variables are added to the existing one (income per hill tribe villager) to form a multiple variable regression. The four explanatory variables include land per hill tribe villager, number of children per hill tribe villager, current debt per hill tribe

villager, and age of hill tribe villager. These four added explanatory variables can have an impact on the expenditure.

3.3 Explained Variables

exp

Expenditure per hill tribe villager in 2017 (Baht); This describes the individual amount spent on all types of durable and non-durable goods in the Gregorian calendar year 2017. This also includes expenditure for the whole household (such as, rent, electricity, and education). It should be noted that only one person per household is surveyed, thus there will be no repetition of expenditure for whole household. For example, if both the parents were surveyed, the expenditure for each person may both include education for children or forms other expenditure for the whole households repeating the same expenditure twice.

3.4 Explanatory Variables

inc

Income per hill tribe villager in 2017 (Baht); Income will be defined as money earned through his or her occupation(s) (such as, agriculture and laborer), through state welfare benefits and other sources of income. Money borrowed will not be considered income. *

Ind

Land per hill tribe villager in 2017 (rai); Land will include agricultural land along with land used for residence. Theoretically, the higher number of agricultural lands used leads to higher agricultural produce, thus higher income, resulting in higher expenditure. Thus, land may be indicator of expenditure. *

noc

Number of children per hill tribe villager; This only includes children that are still are not employed, brings in any income him or herself and the hill tribe villagers needs to provide financial support (or in other words, he or she is still a financial burden). Furthermore, the child or children of an expecting mother that has not yet been born will not be counted. Children are an influential

factor of expenditure given the financial resources required by the parents to sustain, at the minimum, an adequate livelihood for them.*

dbt

Current debt per hill tribe villager; This only includes the personal debt (such as, education for children, health care and household consumption) of that person and not of others in his or her household. The debt surveyed also includes interest of the money that has not yet been paid to the creditor. Debt is a good indicator as it provides financial resource for more expenditure.

age

Current age of hill tribe villager; Ages effects expenditure as during different cycles of life spending varies. It may also illustrate the unique consumption patterns of hill tribes compared to the people living in more conventional settlements.

Variable	Variable Type	Abbreviation	Year	Data Source
Expenditure per hill tribe villager in 2017	Explained	exp	2017	Survey
Income per hill tribe villager in 2017 (Baht)	Explanatory	inc	2017	Survey
Land per hill tribe villager in 2017 (rai)	Explanatory	lnd	2017	SriLanna National Park
Number of children per hill tribe villager	Explanatory	noc	2017	Survey
Current debt per hill tribe villager	Explanatory	dbt	2017	Survey
Current age of hill tribe villager	Explanatory	age	2017	Survey

3.5 Regression Models

The following simple regression models the expenditure per hill tribe villager and Income per hill tribe villager:

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + u$$

The following model was used by adding land per hill tribe villager:

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{land} + u$$

The following model was used by adding number of children per hill tribe villager:

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{land} + \beta_3 \text{noc} + u$$

The following model was used by adding current debt per hill tribe villager:

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{land} + \beta_3 \text{noc} + \beta_4 \text{dbt} + u$$

The following model was used by adding current age per hill tribe villager:

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{land} + \beta_3 \text{noc} + \beta_4 \text{dbt} + \beta_5 \text{age} + u$$

To conduct the simple and multiple regression, the data must meet the following Gauss-Markov Assumptions:

1. Linear in Parameters

The simple and multiple regression model must be linear in parameters such that

$$y = \beta_0 + \beta_1 x_1 + u \text{ or } y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + u \text{ is true.}$$

2. Random Sampling

Data collected was 110 hill tribe villagers in the hill tribe village of Mae Jon. The hill tribe villagers is comprised of randomly selected male and female individuals.

3. No Perfect Collinearity

There must not be any perfect linear relationship among the independent variables and none of the independent variable is a multiple of another.

4. Zero Conditional Mean

In the models, the expected value of the error term (u) given any values of the independent variables:

$$E(u | x_1, x_2, \dots, x_k) = 0 \text{ implies } E(u) = 0$$

5. Homoscedasticity

The variance of the error term (u) given any values of the independent variables:

$$\text{Var}(u | x_1, x_2, \dots, x_k) = \sigma^2 \text{ implies } \text{Var}(u) = \sigma^2$$

4. Results

4.1 Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
exp	150	79582.89	63152.73	33,000	190,000
inc	150	81905.45	73060.37	5500	360,000
lnd	150	7.177667	5.22368	1	15
noc	150	2.84	1.023745	0	5
dbt	150	25502	19708.8	0	120,000
age	150	42.85333	19.14844	21	76

The values for each variable was documented with every household that was interviewed. High levels of inequality are highlighted by the range of the expenditure and income values (157,000 THB and 354,500 THB respectively), which is further exemplified by high standard deviations for all monetary related variables (expenditure, income and debt). The mean of expenditure and income is at 79,583 THB and 81,905 THB respectively. While the average area of land (7.18 rai) is noticeably below the national average of 25.25 rai (Soni, 2016). In contrast, the average number of children on average is 2.84. This is data is incomparable to the national average given that only people with children that are currently dependent on them are counted (explained in page 11). This illustrates the remarkably different livelihoods hilltribes have compared to the rest of Thailand. The average debt of 25,502 THB is below the national average of 179,000 THB as of 2017 (Phulsarikij, 2018). This may be due to the reluctance of banks to lend money given the low credit rating of the hill tribe villagers given their socioeconomic position. Also, given their agricultural occupation and semi-subsistence lifestyle, not a large sum of money is required. The

variation of the descriptive statistics and the national average justifies that the variables are worth studying and exploring further.

4.2 Regression Estimate Table

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
inc	0.8445309*** (0.0151433)	0.7964387*** (0.024996)	0.7690559*** (0.0268695)	0.737713*** (0.0339771)	0.7302791*** (0.0278243)
lnd		866.9946** (349.6035)	866.9946** (343.6564)	1012.5*** (355.7479)	793.91821** (330.2309)
noc			3203.413** (1275.814)	2072.981 (1477.992)	3089.976** (1224.16)
dbt				0.1536089 (0.1026332)	
age					-259.7936*** (70.23877)
Intercept	10411.21*** (1659.613)	83335.779*** (1848.933)	1272.336 (3348.616)	2088.197 (3378.748)	16428.07*** (5206.454)
Observations	150	150	150	150	150
R squared	0.9546	0.9563	0.9581	0.9587	0.9617

Standard Errors are located in parentheses. Coefficients are statistically significant at *10%, **5% and ***1% significance level.

4.3 Simple Regression Model

Model 1

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + u$$

$$\hat{\text{exp}} = 10411.21 + 0.8445309 \text{inc}$$

Given that expenditure is most likely affected by income, the most appropriate simple regression model would be between oncome and expenditure. It is noticeable that an increase in income by 1 baht would on average result in a 0. 8445309baht increase in expenditure. The significance of the coefficient of the inc variable was determined by the p-value and its level of significance (the coefficient to be significant, the p-value must be below its level of significance). In this regression, both the coefficient of the inc variable and the constant had p-values of 0.000, below the 1%, 5% and 10% levels of significance. The value of R-squared is 0.9546 indicating 95.46% of the variation in the expenditure of the hill tribes can be explained by their income. Both the p-value and R-

squared shows the strong influence income has on expenditure, which is not an anomaly given that intuitively how much you spend is based on how much you earn. To further explain the factors influencing expenditure more variables were included into the regression.

4.4 Multiple Regression Models

Model 2

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{land} + u$$

$$\hat{\text{exp}} = 83335.779 + 0.7964387 \text{inc} + 837.9391 \text{land}$$

In order to test other explanatory variables that may influence agriculture, land was chosen to be included given that it is most closely related to income. The inclusion is justified by the argument that the increase land will theoretically increase the agricultural area, thus increasing income from the agricultural produce, which then naturally increases their expenditure. Similar to Model 1, an increase in income by 1 baht would on average result in a 0.7964387 baht increase in expenditure ceteris paribus and the p-value still remains below the 1%, 5% and 10% levels of significance. In terms of land, an increase in 1 rai of land will on average increase in 837.9391 baht of expenditure ceteris paribus. The coefficient of land is also statistically significant with a p-value of the coefficient of land also significant below the 5% and 10% levels of significance. Additionally, the R-square 0.9563 indicates the 95.63% variation in expenditure can be explained by the income and land, which is an increase from the first regression, albeit by a very small value.

Model 3

$$\text{exp} = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{land} + \beta_3 \text{noc} + u$$

$$\hat{\text{exp}} = 1272.336 + 0.7690559 \text{inc} + 866.9946 \text{land} + 3203.413 \text{noc}$$

In this model the explanatory variable of the number of children was added. Very similar to the model 3, an increase in 1 baht of income on average results in 0.7690559 baht increase expenditure ceteris paribus and an increase in 1 rai of land on average results in an 866.9946 baht increase in

expenditure ceteris paribus. Likewise, the former remains statistically significant below the 1%, 5% and 10% levels of significance, and the latter also remains statistically significant below the 5% and 10% levels of significance. Examining the coefficient of the number of children demonstrates that on average increase in 1 child will on average increase the expenditure by 3203.413baht ceteris paribus. It is also statistically significant to the 5% and 10% levels of significance. Furthermore, the strength of this model is confirmed by the value of the R-square, which continues to remain at approximately, 0.9581.

Model 4

$$\hat{exp} = \beta_0 + \beta_1inc + \beta_2lnd + \beta_3noc + \beta_4debt + u$$

$$\hat{exp} = 2088.197 + 0.737713inc + 1012.5lnd + 2072.981noc + 0.1536089dbt$$

After reviewing the explanatory variables, debt was added into the model in hope of better explaining the regression. However, the p-value for the coefficient of debt indicates that debt is statistically insignificant. Thus, it is discarded as a variable in the following regression models.

Model 5

$$\hat{exp} = \beta_0 + \beta_1inc + \beta_2lnd + \beta_3noc + \beta_4age + u$$

$$\hat{exp} = 16428.07 + 0.7302791inc + 793.9182lnd + 3089.976noc - 259.7936age$$

Following from the previous model, debt was dropped as a variable, while age was included instead. Model 5 proved to be the most complete regression (relative to the other models discussed in this paper) with all the explanatory variables being statistically significant. As with the other models, an increase in 1 baht of income on average results in an increase in 0.73 baht of expenditure ceteris paribus, an increase in 1 rai of land on average results in an increase in 793 baht of expenditure ceteris paribus and an increase in 1 child on average results in on average a 3089 baht increase in expenditure ceteris paribus. On the other hand, an increase in 1 year of age

will on average result in a decrease in 259 baht of expenditure *ceteris paribus*. The coefficients for the explanatory variables are all statistically significant, with the coefficients of income and age being below the 1%, 5% and 10% levels of significance and the coefficients of number of children and land below the 5% and 10% levels of significance. The R-Squared values is at the highest of all the models at 96.17%.

5. Conclusion and Discussion

Based off the results, income, land, number of children, and age all effect expenditure as anticipated. The first conclusion worth examining from the regression is that the hilltribes for every additional baht earned, less is spent. This may stem from numerous reasons such as, the willingness for hill tribe villagers to save, the low cost of living, or the lack of access to financing.

The second conclusion highlights the importance of land in terms of expenditure, which also highlights the fact that agriculture is still the main income stream for the hill tribes. In many ways, this further highlight future problems that needs to be addressed by both the state authorities and the hill tribe villagers themselves given that the majority of the hill tribe villagers in Thailand (including the villagers interviewed) do not currently own any legal rights to the land. It is not likely that the state authorities would be willing to allow the hill tribes to get more land, which naturally would increase their income and thus increase their expenditure. This allow them to spend more on goods and services that would improve their standard of living. This means that to increase the income of the hill tribe villagers and improve their standard of living, the hill tribe villagers must find a way to increase the value of their agricultural produce with the limited amount of land (such as, finding a way too eliminate the middle man and selling products directly to market, producing value-added products, growing crops that yield higher prices or improving their farming practices) or through exploring alternative careers.

When it comes to the number of children, it is clear that the hill tribes do not deviate from any economic norms. An increase in the number of children will increase the expenditure.

The third and final conclusion demonstrate the hill tribe villager's way of life. As a villager grows older, expenditure decreases. This is due to elderly villagers requiring little spending because food, medication and other basic necessities are mostly provided by their family or other neighbors. Expenditure is also very high during the younger years given that the hill tribes tend to invest in their agricultural practice and have children at a younger age.

All the four explanatory variables indicate the unique socio-economic context of the hill tribes that should be explored further.

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Appendix

Stata Output Model 1

regress exp inc

Source	SS	df	MS	Number of obs	=	150
Model	5.6726e+11	1	5.6726e+11	F(1, 148)	=	3110.19
Residual	2.6993e+10	148	182386999	Prob > F	=	0.0000
				R-squared	=	0.9546
				Adj R-squared	=	0.9543
Total	5.9425e+11	149	3.9883e+09	Root MSE	=	13505

exp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
inc	.8445309	.0151433	55.77	0.000	.8146058	.874456
_cons	10411.21	1659.613	6.27	0.000	7131.614	13690.81

Stata Output Model 2

regress exp inc lnd

Source	SS	df	MS	Number of obs	=	150
Model	5.6827e+11	2	2.8414e+11	F(2, 147)	=	1607.82
Residual	2.5978e+10	147	176721431	Prob > F	=	0.0000
				R-squared	=	0.9563
				Adj R-squared	=	0.9557
Total	5.9425e+11	149	3.9883e+09	Root MSE	=	13294

exp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
inc	.7964387	.024996	31.86	0.000	.7470408	.8458366
lnd	837.9391	349.6035	2.40	0.018	147.0409	1528.837
_cons	8335.779	1848.933	4.51	0.000	4681.856	11989.7

Stata Output Model 3

regress exp inc lnd noc

Source	SS	df	MS	Number of obs	=	150
Model	5.6935e+11	3	1.8978e+11	F(3, 146)	=	1112.66
Residual	2.4903e+10	146	170566521	Prob > F	=	0.0000
Total	5.9425e+11	149	3.9883e+09	R-squared	=	0.9581
				Adj R-squared	=	0.9572
				Root MSE	=	13060

exp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
inc	.7690559	.0268695	28.62	0.000	.7159524 .8221594
lnd	866.9946	343.6564	2.52	0.013	187.8107 1546.178
noc	3203.413	1275.814	2.51	0.013	681.9641 5724.861
_cons	1272.336	3348.616	0.38	0.705	-5345.686 7890.358

Stata Output Model 4

regress exp inc lnd noc dbt

Source	SS	df	MS	Number of obs	=	150
Model	5.6973e+11	4	1.4243e+11	F(4, 145)	=	842.14
Residual	2.4524e+10	145	169130023	Prob > F	=	0.0000
Total	5.9425e+11	149	3.9883e+09	R-squared	=	0.9587
				Adj R-squared	=	0.9576
				Root MSE	=	13005

exp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
inc	.737713	.0339771	21.71	0.000	.6705585 .8048674
lnd	1012.5	355.7479	2.85	0.005	309.3783 1715.621
noc	2072.981	1477.992	1.40	0.163	-848.2105 4994.173
dbt	.1536089	.1026332	1.50	0.137	-.0492416 .3564593
_cons	2088.197	3378.748	0.62	0.538	-4589.762 8766.156

Stata Output Model 5

regress exp inc lnd noc age

Source	SS	df	MS	Number of obs	=	150
Model	5.7150e+11	4	1.4287e+11	F(4, 145)	=	910.40
Residual	2.2756e+10	145	156936151	Prob > F	=	0.0000
				R-squared	=	0.9617
				Adj R-squared	=	0.9607
Total	5.9425e+11	149	3.9883e+09	Root MSE	=	12527

exp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
inc	.7302791	.0278243	26.25	0.000	.6752855	.7852726
lnd	793.9182	330.2309	2.40	0.017	141.2301	1446.606
noc	3089.976	1224.16	2.52	0.013	670.4738	5509.479
age	-259.7936	70.23877	-3.70	0.000	-398.6177	-120.9695
_cons	16428.07	5206.454	3.16	0.002	6137.724	26718.41