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Can rising tourism income compensate fading agricultural income? A general equilibrium analysis of income distribution and welfare in a rural village in Northern Thailand

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ABSTRACT

This study applies CGE model to investigate the effects of rising tourism income and fading agricultural income in Mae Kam Pong village in Chiang Mai, Thailand, on 4 issues: the expansion and recession of major economic sectors, income distribution, social welfare of the village, and welfare of the poorest households. Simulations show that services and construction sectors will expand while tea, commerce and tourism sectors will face the recession. Tourism sector will fade out from the village when tea price drops 20% and tourism price increases around 30%. For the income distribution, the richest quintile will be the top gainer whereas the poorest quintile will be the top loser. The village can maintain its social welfare by raising tourism price 46.5% to compensate the drop of tea price around 10%. It is impossible to maintain the social welfare when tea price drops 20%. The dropping welfare of the poorest households cannot return to its original level after tourism price increases.

Keywords: Welfare, Income Distribution, Community-based Tourism, Computable General Equilibrium Model, Sustainable Development

JEL Classification: D58, O12, Q01

1. Introduction

Tourism is proven that it can reduce poverty (Suriya, 2008). It reaches rural villages as community-based tourism (CBT). Its income raises the villager's quality of life. Villagers who participate in CBT and its related business, e.g. souvenir production, get higher income and higher probability to get out of poverty (Suriya, 2011)

Community-based tourism in Mae Kam Pong village in Chiang Mai, Thailand generates more than THB 1 million (around USD 30,000) annually. This source of income supports 116 Households and around 300 villagers. Their original source of income is fermented tea for chewing. However, the tea is not popular among young generations. Its demand will gradually fade out. The threat will be clearer within next 10 years.

The village hopes that the rising income from CBT can compensate the dropping income from tea. However, it is not obvious that this hope will come true. Tea is the major source of income for almost all households while tourism is limited to around one-third of households. Moreover, tea income supports poor households while tourism income concentrates on rich households. (Suriya, 2011)

This study will investigate what will happen when the income from tea drops and tourism income rises. It will examine the effects on the expansion or recession of several economic sectors in the village, income distribution among the rich and the poor, social welfare of the village and the welfare of the poorest households. To be specific, the research questions are to find what sectors will expand or shrink under the simulation of rising tourism and fading agricultural income; whether the income distribution is even; who will be the top gainer and top loser by the measurement of real income change, and whether it is possible to maintain social welfare and the poorest households' welfare at their original levels.

2. Literature review

The effect of tourism on economic development is a critical issue in the modern world. The debates among scholars remains active. Jamieson and Nadkarni (2009) proposed a reality check of tourism's potential as a development tool. Skerritt and Huybers (2005) investigated the effect of international tourism on economic development.

Several studies uses Computable General Equilibrium (CGE) model to investigate the effects of tourism on the economy both at the national level and the village level, e.g. Li, Blake and Cooper (2011), Suriya (2011), Chen and Yang (2010), Wattanakuljarus and Coxhead (2008), Skerritt and Huybers (2005) and the study of Kim and Kim (1998). The model simulates several scenarios on tourism demand and other variables. Its results lead to development policies (Richins, 1997).

Scholars around the world concern the issue of distribution of tourism income to the poor. Ashley and Mitchell (2007) as well as Mitchell and Ashley (2007) are among the first academic papers that introduce the pathway how tourism income reaches the poor. However, the benefit from community-based tourism (CBT) is not clear. Goodwin (2006) argued that CBT failed to deliver the prosperity to the poor by several reasons.

Several other studies have tried to prove the pro-poor effect of tourism, e.g. Harris (2009), Suntikul, Bauer and Song (2009), Marcouiller and Xia (2008), Suriya (2008), Untong et al (2006) and Lee (1996).

An important reason that prevents the poor to gain tourism income lies on their participation in tourism activities. Unless the poor participate in tourism, they cannot get benefits from it. Scholars have tried to find the influencing factors that encourage poor people to participate in CBT. Kayat (2002) conducted a study in Malaysia. Suriya (2011) studied a case of CBT in Northern Thailand while Pongponrat (2011) studied another case study on fisherman village in Southern Thailand. Nualt (2011) did the research on the same focus in Mongolia.

Several studies suggest policies on how to encourage the poor to participate more in tourism activities. First, a better tourism product development may generate wider opportunities for the poor to participate (Chaisawat, 2006). They may get jobs in micro and small enterprises which grows by tourism income (Mshenga et al, 2010). Second, a better income distribution scheme between villagers and tourism enterprises may create more attractiveness to the poor to join the sector (Stone and Stone, 2010 and Lapeyse, 2009). Third, the collective decision of the community to develop tourism activities in the village may encourage the poor villagers to come to offer the assistance (Richins, 2000).

CBT in villages where agricultural income is the major source of income exists at several locations in the world such as Chiba, Japan (Ohe, 2008), Africa and Latin America (Davis, 2002). However, there is no study that simulates the conditions of rising tourism income against the fading agricultural income at the village level.

3. Methodologies

This study uses Computable General Equilibrium model based on a CGE program written in Matlab by Johannes Broecker, University of Kiel Germany. Taylor and Adelman (1996) introduced the first CGE at the village level with several case studies around the world. Suriya (2011) modified the model by including tourism sector into a village economy.

The model works on the expenditure of households and cost of firms. The model applies CES technology for expenditure, cost and revenue function. Applying Sheppard's Lemma to expenditure and cost functions, it yields optional quantity of household consumption and production inputs. Then the model solves a system of non-linear equation using iteration methods to find prices.

The model measures welfare by real income. At the original level, it normalizes the welfare of each household quintile and social welfare to be unity. Welfare growth represents the dynamic of welfare of each household quintile as well as the whole economy. Income distribution refers to the comparison of welfare growth rates among 5 household quintiles. The social welfare growth is the summation of all household

quintiles' welfare growth. The economy reaches the original level of social welfare when the social welfare growth is zero.

The studies simulate 3 major simulations. The first simulation aims to find the growth rate of production value of major economic sectors. It includes 16 scenarios. They are the combination between 4 rates of the drop of tea price; 0%, 10%, 20% and 30% and 4 rates of the rise of tourism price; 0%, 10%, 20% and 30%. Under these 16 scenarios, the study will also find the effect on real income distribution and the social welfare of the village.

The second simulation will find a growth rate of tourism price that make social welfare of the village return to its original level at different rates of tea price drop; 10%, 20% and 30%. The study may skip some simulations if the outcome is impossible according to the results suggested by the first simulation, i.e. cases that the growth rate of an economic sector exceeds -100% which means that the sector totally fades out from the village economy.

The third simulation will also find a growth rate of tourism price that make the poorest households' welfare return to its original level. It will also vary the rates of tea price drop of 10%, 20% and 30%.

4. The data

This study uses the data from Mae Kam Pong village. The village is located in Mae On district, Chiang Mai, Thailand. It is a high land village, around 1,300 meters above sea level. Villagers are local Northern Thai. They speak Northern Thai and official Thai languages. The village includes 116 households. It has operated community-based tourism since 2000. Its tourism revenue tops other CBT villages in the North. The village gained more than THB 1 million in 2007 (Suriya, 2011).
Suriya (2011) constructed the SAM of Mae Kam Pong village by conducting a census of 116 households with a 125-page questionnaire. The reference period was May 2007 and April 2008. The structure of the SAM follows Subramanian (1996).

The SAM consists of 14 sectors; tea coffee, livestock, commerce, services, plants, manufacture, construction, pillow, pillow sewing, utilities, administration, infrastructure and tourism. It divides households into 5 quintiles; the poorest, the second poorest, the middle, the second richest and the richest quintile.

5. Sustainability of community-based tourism

The results focus on four points. First, it shows the effect on the expansion or recession of major economic sectors in the village. Second, it highlights the effect on income distribution among households. Third, it figures out how much tourism income is needed to maintain the social welfare of the village constant when agricultural income fades. Fourth, it presents the possibility that the poorest households can maintain their welfare under the situation.

5.1 Effects on the expansion or recession of major economic sectors

Tourism, service and construction sectors expand under the simulation of rising tourism price and constant tea price (table 5.1). Commercial sector does not clearly expand or shrink. In contrast, tea sector shrinks. The rising tourism sector needs more labors for the production in the sector and related sectors which are services. These sectors attract labors from tea sector. Then tea production drops.

Under constant tourism price, the fading agricultural income leads to the shrinkage of tea, tourism and commercial sectors. Tourism shrinks because their labors move to service and construction sectors. When households lose agricultural income which is their major income they have to move to other sectors that can pay as much income as agriculture. Usually, services and construction generates income for households more than tourism. Then households move to these sectors instead of tourism. The rising of services and construction attracts more labors from tourism and lead to the shrinkage of tourism output.

TABLE 5.1: Effect of tea and tourism prices on the growth of major economic sectors in the village

Growth of tea price (%)	Growth of tourism price (%)	Growth of tea value (%)	Growth of tourism value (%)	Growth of commercial value (%)	Growth of service value (%)	Growth of construction value (%)
0%	0%	0.00	0.00	0.00	0.00	0.00
	10%	-2.03	17.76	0.60	1.23	4.74
	20%	-9.17	30.72	0.25	6.16	8.69
	30%	-7.71	40.31	-0.64	10.35	12.14
-10%	0%	-8.59	-33.72	-8.24	32.19	9.63
	10%	-11.26	-26.58	-8.84	37.98	13.93
	20%	-14.44	-22.78	-10.13	44.17	17.46
	30%	-17.94	-22.16	-11.84	48.10	20.65
-20%	0%	-20.32	-82.46	-19.36	73.06	19.45
	10%	-23.61	-85.96	-21.11	80.10	23.05
	20%	-27.31	-92.25	-23.28	84.96	26.28
	30%	-31.31	-102.02*	-25.81	87.28	29.39
-30%	0%	-36.25	-147.73*	-34.20	117.84	29.11
	10%	-40.16	-162.81*	-36.99	122.71	32.34
	20%	-44.37	-181.04*	-40.06	125.49	35.55
	30%	-48.81	-203.11*	-43.37	127.02	38.79

Source: Simulation

Note: * The growth of tourism value is less than -100 percent. It means that tourism sector fades out from the village economy. The simulation results in these cases are not valid for any other interpretations.

In general, the collective effect of fading agricultural and rising tourism price improves the outcome of tourism sector relatively to the case of constant tourism price. However, when tea price drops around 20 percent, the rising tourism price makes the outcome in

tourism sector worse than the case of constant tourism price. This is because of two reasons. First, labor heavily moves to service and construction sectors to find more income to compensate the heavily dropped agricultural income. Second, too high tourism price leads to heavy shrinkage of tourists. Tourism output drops at the faster rate than the price growth.

The rising tourism price also negatively affects commercial sector. Under the constant tea price, the effect is unclear with the combination of small positive and negative outcomes. After agricultural price drops, commercial sector loses their trading income from agricultural products and starts to shrink. Its value drops further when tourism price increases. This is because of two reasons. First, labors in commercial sectors move to work in tourism sector. At the 10 percent decrease of tea price, tourism sector grows slightly when its price increases. Tourism cannot find labors from other big sectors such as services and construction because of they are more competitive in the generation of household income. Then, it acquires labors from commercial sector where less number of labors from agricultural sector move there. Therefore, commercial sector loses its labors and shrinks. Second, induced demand from tourism sector to commercial sector drops after tea price drops 20 percent with increasing tourism price. This is because tourism output drops dramatically. Consequently, tourism buys less amount of input from commercial sector and leads to the shrinkage of commercial value.

Service and construction sectors grow rapidly in the situations of fading agricultural and rising tourism price by two reasons. First, after losing agricultural income, labors move to these sectors to find additional income to their households. The additional labor produces more output to both sectors. Second, the expansion of tourism sector generates higher induced demand for related services and leads to the expansion of the service value. However, after the 20 percent drop of tea price with the rising tourism price, tourism sector shrinks and their labors need to switch to service and construction sectors to find additional income.

Tourism sector fades out from the village economy after the tea price drops 20 percent and tourism price rises 30 percent. When tea price drops 30 percent, any level of tourism price rise confirm that the sector disappears from the village. The results occur because tourism sector has not enough labor input for its production.

5.2 Effects on income distribution

The fading agricultural and rising tourism income leads to the uneven income distribution in the village. The richest quintile is the top gainer of the welfare. Their real income increases around 5, 11 and 18 percent when tourism income rises 10, 20 and 30 percent at a constant tea price (table 5.2). The second richest income is the second top gainer. Tourism benefits concentrate among these wealthy households because the history of Community-based tourism in the village. The rich brought tourism into the village in 2000. They were the pioneers in offering homestay and other tourism services. Consequently, they are more specialized than the poor in tourism skill.

Moreover, they were the regulators in the sector. Therefore, they are more advantage than the poor in gaining tourism income.

The poorest quintile is the top loser in the situation. They lose around 2, 4 and 6 percent of their real income when tourism price grows 10, 20 and 30 percent. The second top loser is the second poorest quintile with almost the same degree of dropping real income as the poorest quintile. The reason is that these poor households participate less than the rich in tourism activities. Just a small portion of tourism income flows to them. The real income of the poor decreases when consumer's price increases. Their nominal income growth is less than the inflation rate.

TABLE 5.2: Effects on income distribution among households

Growth of tea price (%)	Growth of tourism price (%)	Growth of welfare of the poorest quintile (%)	Growth of welfare of the second poorest quintile (%)	Growth of welfare of the middle quintile (%)	Growth of welfare of the second richest quintile (%)	Growth of welfare of the richest quintile (%)	Growth of social welfare (%)
0%	0%	0.00	0.00	0.00	0.00	0.00	0.00
	10%	-1.93	-1.75	-0.93	1.32	5.04	0.35
	20%	-3.89	-3.75	-1.96	2.88	11.36	0.93
	30%	-5.85	-5.90	-3.07	4.67	18.61	1.69
-10%	0%	-8.27	-7.74	-6.43	-1.81	1.48	-4.55
	10%	-9.67	-9.30	-7.25	-0.39	7.14	-3.89
	20%	-11.22	-11.16	-8.24	1.31	14.06	-3.05
	30%	-12.81	-13.19	-9.34	3.28	21.91	-2.03
-20%	0%	-14.29	-15.27	-12.69	-3.08	4.57	-8.15
	10%	-15.49	-16.82	-13.52	-1.42	11.33	-7.18
	20%	-16.85	-18.65	-14.55	0.56	19.24	-6.05
	30%	-18.28	-20.62	-15.69	2.84	28.10	-4.73

Source: Simulation

The inverse rank of the top losers between the poorest and second poorest households occurs after agricultural price drops around 20 percent. The second poorest turns to be the top loser. This result shows that the second poorest quintile depends on agricultural income more than the poorest quintile. When labors in this quintile lose the agricultural income, they hardly find jobs in other sectors. Therefore, they gain not enough additional income to compensate the losing income.

The fading agricultural price raises the welfare of the richest quintile. The income structure of the richest households combines diversity of income, e.g. commerce, services and tourism. They gain less agricultural income than other quintiles. When agricultural sector loses its labor to service sector, then the richest households gain more income after the rise of service sector.

5.3 Effects on social welfare of the village

At the 10 percent drop of tea price, the rising tourism income can compensate the agricultural income slightly. It improves the social welfare from -4.55 percent to -3.89, -3.05 and -2.03 percent after tourism price rises 10, 20 and 30 percent (table 5.3). It can bring the social welfare back to the original level, around zero, when tourism price rises 46.50 percent

Table 5.3: The possibility that tourism can maintain social welfare

Growth of tea price (%)	Growth of tourism price (%)	Growth of social welfare (%)
-10	0.0	-4.55
	10.0	-3.89
	20.0	-3.05
	30.0	-2.03
	46.5	0.06
-20	0.0	-8.15
	10.0	-7.18
	20.0	-6.05
	30.0	-4.73
	62.0	0.899

Source: Simulation

At the 20 percent drop of agricultural price, the village economy needs the 62 percent rise of tourism price to level the social welfare. However, this is impossible. After raising tourism price to around 30 percent, tourism output fades to zero. Tourism sector disappears from the village from then. Therefore, the economy cannot achieve the increasing 62 percent of tourism price in this situation.

5.4 Effects on the welfare of the poorest households

The welfare of the poorest quintile decreases when tourism price increases at any level of tea price. The welfare cannot return to be zero unless tourism price reduces to its original level. The model presents no other possibilities. Even the results (table 5.4) show that the welfare will return to zero when tourism price growth is 230 and 320 percent at the tea price drop of 10 and 20 percent, these outcomes are impossible because tourism outputs are less than zero.

Table 5.4: The possibility that tourism can maintain the poorest households' welfare

Growth of tea price (%)	Growth of tourism price (%)	Growth of welfare of the poorest quintile (%)
0	0	0.00
	10	-1.93
	20	-3.89
	30	-5.85
-10	0	-8.27
	10	-9.67
	20	-11.22
	30	-12.81
	230	0.31
-20	0	-14.29
	10	-15.49
	20	-16.85
	30	-18.28
	320	0.02

Source: Simulation

6. Conclusions

In the situation of rising tourism and fading agricultural income, service and construction sectors expand while tea, commercial and tourism sectors shrink. Tourism sector will fade out from the village after tea price decreases 20 percent and tourism price increases around 30 percent. Tourism income distributes unevenly; the richest quintile is the top gainer while the poorest quintile is the top loser. It is nearly possible that the social welfare can remain constants under the situation. It is also impossible that the poorest households can maintain their welfare after the rise of tourism price.

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