

Do Location and Cross-border Activity Matter in the Presence of Cross-border Economic Integration?

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I. INTRODUCTION

Cross-border economic integration is broadly defined as cooperation between two bordering countries or among countries in a region that aims to facilitate and enhance the movement of goods, labor, and capital across the borders concerned. In general, cooperation could include economic interactions, resource and infrastructure interactions, and policy and governance interactions. An example of cross-border economic integration is regional economic integration in the Greater Mekong Subregion (GMS), which focuses on building transportation linkages among the GMS economies and setting up cross-border rules and regulations in order to facilitate and enhance the cross-border movement of goods and labor. Therefore, people in border provinces would directly or indirectly benefit from cross-border economic integration through the increasing movement of labor, capital, and trade, resulting in higher income. However, the benefits of cross-border economic integration might not be evenly distributed to all households, depending on where the households live and how the households make their living.

In this article, we study factors determining the income of households in two of Thailand's border provinces where the extent of cross-border economic integration is substantial. The two provinces are Mukdahan in the north-eastern part of Thailand and Sa Kaeo in the eastern part. Mukdahan borders the Lao People's Democratic Republic, and Sa Kaeo borders

Cambodia. In the model, we use per capita household expenditure as a proxy for households income. We examine whether or not households that are more exposed or more relevant to cross-border economic integration, such as households living in the border area and households engaged in border activities, have significantly higher income than other households. In other words, we examine the relationship between the households' location and border activities, and the households' income.

In both Mukdahan and Sa Kaeo, cross-border activities are concentrated in the border areas. Near border gates, there are markets where both Thais and non-Thais come to trade. The border markets, especially the ones near the international gates, have grown significantly in size in the last decade, and the border markets have become one of the main tourist attractions in the provinces concerned. Some of the border markets, for example Rong Kleu market near the Sa Kaeo international gate, are famous among not only Thai but also foreign tourists. Since business activities are concentrated in the border areas, the local people living in those areas have advantages over those living in non-border areas. Generally, the people living in the border areas would have relatively more opportunities to involve themselves in and benefit from border activities. Interestingly, we find that living in those border areas does not significantly increase the households' income. This phenomenon could imply that the people in the border areas might not have sufficient knowledge and

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financial capital to benefit from cross-border integration or to participate in cross-border activities.

In addition, we find evidence that factors such as participating in cross-border activities, living near a main road, and higher educational achievement significantly increase the income of households in Mukdahan and Sa Kaeo. The results imply the importance of and the need for policies to develop knowledge and skills to help the local people adjust to integration, to become involved in border activities, and to benefit from such activities. In addition, the government should increase access to the main roads in order to increase people's ability to participate in cross-border activities.

Despite the high intensity of the cross-border economic integration in both Mukdahan and Sa Kaeo, they are still poor provinces. This situation would suggest that the benefits from cross-border integration might more heavily befall people from other provinces than the local people. However, analyzing the impacts of cross-border economic integration at the macro level is beyond the scope of this article. Nonetheless, our results identify some important factors that might prevent the local people from obtaining the benefits of integration. The results are also useful in the recommendation of policies that would help to solve the problems concerned.

While existing studies related to cross-border economic integration are descriptive and qualitative at the provincial level, our article is an empirical study at the household level; it uses econometric technique and a unique household survey conducted in 2005 of 816 households: in Mukdahan, 415 households and in Sa Kaeo, 401 households. Examples of the existing literature are the Development Analysis Network (2005), National Economic and Social Development Board (1995 and 2003), Srawooth et al. (1997), Thailand Development Research Institute (1996), and Office of Industrial Economics, Ministry of Industry (1995). In addition, the existing literature uses tools such as interviews, researchers' observations, and analysis of secondary data. Consequently, the studies often suffer from a lack of reliable and comprehensive data sets; thus, they do not find robust empirical evidence at the household level. Unlike in previous studies that focus on finding the impacts of economic integration in border provinces, in our study we do not try to identify the impacts of cross-border economic integration. Given that the selected provinces have experienced large-scale cross-border economic integration, we focus on finding the factors determining the households' income.

The article is divided into eight sections, as follows. After the introduction in section I, section II provides economic background information on Mukdahan and Sa Kaeo. Section III provides the data source, and section IV presents the econometric model. Section V describes the variables and expected signs of the coefficients. Section VI presents results, while section

VII provides a set of policy recommendations. The conclusion is presented in section VIII.

II. ECONOMIC BACKGROUND OF MUKDAHAN AND SA KAEO

As logistical hubs and gateways for international trade and labor movement, Mukdahan and Sa Kaeo are two important border provinces of Thailand. Supported by the Asian Development Bank (ADB), the economic corridor project is aimed at developing international roads, widely known as economic corridors, in order to link together the economies of the GMS. An economic corridor passes through both provinces. The Eastern Corridor passes through Sa Kaeo to Poi Pet and Phnom Penh in Cambodia, and Ho Chi Minh City and Vang Tao in Vietnam. The East-West Corridor passes through Mukdahan to Savannakhet in Lao PDR and Danang in Vietnam. Although these corridors are not yet fully completed, their partial completion already helps, to some extent, in facilitating the flow of goods and labor among the GMS economies, and in attracting trade and investment from both within and outside the Subregion.

Mukdahan and Sa Kaeo are important gateways for cross-border trade. In 2005, the value of cross-border trade in Mukdahan exceeded 6,325 million baht, accounting for 16.41 percent of the total cross-border trade between Thailand and Lao PDR. Despite a declining trend in Mukdahan's share of the total cross-border trade value, cross-border trade in Mukdahan has been rising. Compared with Mukdahan, Sa Kaeo is an even more important gateway. In 2005, the value of cross-border trade in Sa Kaeo was 10,674 million baht, accounting for 50.73 percent of the total cross-border trade between Thailand and Cambodia.

Mukdahan and Sa Kaeo are important gateways for labor. The number of people crossing the Thailand-Cambodia border via the Sa Kaeo international gate in Aranyaprathet district, including both in-bound and out-bound movements, has increased considerably in recent years, that is, from 159,494 persons in 1999 to 3,135,967 persons in 2004.¹ Similarly, the number of people crossing the Thai-Lao border via the Mukdahan international gate in Muang district has increased from 152,249 persons in 2000 to 220,965 persons in 2004.² Moreover, owing to the completion of the Thai-Lao Friendship Bridge or the Second Mekong Bridge, linking Lao PDR to Thailand via the Mukdahan international gate, it is very likely that the number of people crossing the border will rise sharply in 2007.

Cross-border economic integration creates economic opportunities for the local people in both provinces. Such integration facilitates the movement of people and goods across the borders. Therefore, it increases cross-border trading activities and promotes border markets, resulting in new job opportunities for

local people. In addition to jobs associated with trade, new job opportunities associated with transportation services are also created. Cross-border economic integration also allows cheap foreign labor to enter Thailand in order to work temporarily in certain sectors experiencing labor shortages. On the other hand, integration enables Thai labor to seek better job opportunities abroad.

Although cross-border integration in the two provinces has been significant and has played an important role in economic development, Mukdahan and Sa Kaeo are poor provinces, and the majority of the households are still in the agricultural sector. Based on statistics of the National Economic and Social Development Board, Sa Kaeo and Mukdahan are considered to be among the poorest provinces in Thailand. In 2004, Sa Kaeo had real GDP per capita of 34,406 baht, while that of the Eastern region and the national real GDP per capita were 156,547 baht and 101,304 baht respectively. Mukdahan is even poorer than Sa Kaeo. Mukdahan's real GDP per capita is only 27,343 baht, which is lower than the North-eastern region's real GDP per capita, i.e., 31,351 baht. In considering the incidence of poverty, the headcount ratio, Sa Kaeo has the seventeenth highest incidence of poverty in the country, and Mukdahan, the nineteenth highest incidence.

III. DATA AND SURVEY DESIGN

The data used in this article have been extracted from the Thailand household survey conducted for the research project entitled "Reviewing the poverty impact of regional economic integration in the Greater Mekong Subregion."³ As mentioned previously, the survey, which was conducted in 2005, covered 415 households in Mukdahan and 401 households in Sa Kaeo. The Thailand household survey involved two-stage samplings, with unequal probability sampling. The details of the survey design are as follows.

In each province, the data were collected according to the following multi-stage sampling. In the first stage, villages or blocks were randomly and independently selected within each first-stage stratum.⁴ Fixed in advance, the first-stage stratum was divided into four strata according to the location characteristics as follows: town in border area, village in border area, town in non-border area, and village in non-border area. The number of villages in each stratum was chosen proportionally according to the fraction of the number of households in the villages to the total number of households in the province.

In the second stage, the households in each chosen village were divided into three predetermined and mutually exclusive strata according to household members' occupations. The households were considered as belonging to the second-stage stratum (one household) if at least one member in the household was

involved in cross-border trade. The rest of the households were further divided into two strata, second-stage stratum (two households) if at least one member in the household was involved in cross-border work, and the second-stage-stratum (three households) if otherwise. In each village or block, the minimum number of households selected in each stratum was three, unless there were fewer than three households in the stratum. In cases where there were fewer than, or equal to, three households, all of them were selected. For the stratum in which there were more than three households, we randomly selected households proportionally to the population of the households in each stratum. It should be noted that the selection of the villages and households was done without replacement.

IV. THE MODEL

We built a model based on a standard expenditure regression widely used by labor economists.⁵ In our model, the per capita household expenditure was used as a proxy for per capita household income. Although income seems to be a more appropriate variable, there are many inconveniences associated with using income data. In general, the data on income are difficult to collect in the survey. Households are unwilling to provide information about their income, but they are relatively more comfortable with providing information on their expenditure. In addition, income data from surveys, particularly in developing countries, often suffer from the fact that few people receive formal wages, and the income sources are varied, seasonal, and often unrecorded. Moreover, the household survey could provide reasonably good quality data on expenditure.

We regressed the per capita household expenditure (a proxy for per capita household income) on each household's characteristics, such as size, sex, age, and education. Since our main purpose was to examine whether or not the households exposed to cross-border economic integration are associated with higher income, we added additional independent variables, such as the location of the households, their cross-border activities, and the distance of their houses from the main roads. The regression model can be written as follows:

$$\begin{aligned} \ln pcex_i = & \alpha + \beta_1 hsize_i + \beta_2 sex_i + \beta_3 age_i \\ & + \beta_4 agesquare_i + \beta_5 edu_i + \beta_6 dborder_i + \beta_7 durban_i \\ & + \beta_8 dactivity_i + \beta_9 droad_i + \beta_{10} dprovince_i + u_i, \end{aligned}$$

where $i = 1, \dots, I$ (I is the total number of households), and

$\ln pcex_i$ is the natural logarithm of the per capita household expenditure of household i . The total household expenditure consists of the expenditure on food items (in cash and in kind) and non-food items (in cash only).

$hsize_i$ is the size of household i .

sex_i is a dummy variable indicating the sex of the head of the household i . The variable is equal to 1 if the head of household i is male, and equal to zero if the head of household i is female.

age_i is the age of the head of the household i .

$agesquare_i$ is the square of that person's age_i .

edu_i is the year of school attendance of the head of the household i .

$dborder_i$ is a dummy variable indicating the location of the household i . The variable takes on the value of 1 if household i is located in a border area, and equal to zero if otherwise.

$durban_i$ is a dummy variable indicating the development level of the location. The variable is equal to 1 if household i is in a town, and equal to zero if household i is in a village.

$dactivity_i$ is a dummy variable indicating whether or not a household has at least one member involved in border activities such as trade and work. The variable is equal to 1 if household i has at least one member involved in a border activity, and equal to zero if otherwise.

$droad_i$ is a dummy variable indicating the distance of household i to the main road. The variable takes the value of 1 if the distance from the house of household i and the main road is more than or equal to 500 meters, and equal to zero if otherwise.

$dprovince_i$ is a dummy variable that takes the value of 1 for Mukdahan and the value of zero for Sa Kaeo.

u_i is the error term.

It should be noted that the total effect of age_i on $lpcex_i$ equals $\beta_3 + 2\beta_4 age_i$.

Owing to the complexity of the survey, featuring correlated data with unequal probability of selection, the ordinary least squares (OLS) estimates are unbiased and inefficient. Therefore, we estimated coefficients and standard errors by the weighted least square method, taking into account the effects of stratification and clustering. To estimate the model, we pooled the Mukdahan and Sa Kaeo data. In addition, since we sampled without replacement, we applied a finite population correction (FPC) for the variance estimates.

V. VARIABLES AND EXPECTED SIGNS OF COEFFICIENTS

The gender, age, and education variables are characteristics associated with the head of the household. It could be argued that using the characteristics of the head of a household is not appropriate because some households might have an older or retired person as its

head, while others might have a main earner as head. It would therefore be more appropriate to use the characteristics of the main earner instead of the head. However, for the majority of the households in Mukdahan and Sa Kaeo, the heads of the households are the same persons as the main earners. Therefore, either using the head of the household or the main earner of the households should not alter the results significantly.

In general, the larger is the size of the household, the smaller is the per capita household expenditure. If the size of household is larger, the income has to be shared among more people, resulting in lower per capita household expenditure. Thus, we expect β_1 to have a negative sign. We expect a positive sign for the coefficient of sex_i , that is, the household with a male head should earn a higher income than the household with a female head. This is particularly true for most provinces in Thailand where the male generally receives more opportunities, both social and economic. Normally, the expenditure initially increases and then decreases after a person reaches a certain age. Therefore, we expect a positive sign for the coefficient of the age of the household head, age_i , and a negative sign for $agesquare_i$. Higher education leads to a higher income. Therefore, we expect the coefficient of edu_i to be positive.

Now we turn to the location variables $dborder_i$ and $droad_i$ which are associated with cross-border integration. We expect the households living in the border areas and the households living near the main road to be more exposed to cross-border economic integration and thus have more opportunities to extract benefits than the other households. As a result, the households with location advantage should have a higher income than other households. However, it is possible that the households with location advantage could lack the skills and capital necessary to benefit from cross-border integration. If location advantage really plays a more important role in generating income, we would expect to see a negative coefficient for $droad_i$ and a positive coefficient for $dborder_i$. Otherwise, we would see the opposite signs. The sign of the coefficient for $dactivities_i$ could be positive or negative. There is no obvious reason to expect that the households engaging in a cross-border activity should have a higher income than those not so engaged. However, it is likely that cross-border traders and workers might make more money than other people, particularly those engaged in agriculture.

Another location variable not directly associated with cross-border economic integration is $durban_i$, which reflects the development level of an area. In general, the households located in urban areas would have greater access to various kinds of capital than households in villages. Consequently, the households located in urban areas should have greater opportunities to benefit from cross-border economic integration than other households. Another reason is that households in urban areas usually have more business opportunities

than those in rural areas. In addition, high-income households could afford to pay for the relatively higher cost of living in urban areas. We expect to see a positive coefficient for $durban_i$. The sign of the coefficient for $dprovince_i$ tells us whether or not the households in Mukdahan have a higher income than the households in Sa Kaeo. The positive coefficient of $dprovince_i$ means that households in Mukdahan have a higher income than the households in Sa Kaeo. Table 1 provides a summary of the expected signs.

Table 1 Expected Signs of the Independent Variables

| Variable | Signs of the coefficients |
|-----------------|---------------------------|
| $hsize_i$ | positive |
| sex_i | positive |
| age_i | positive |
| $agesquare_i$ | negative |
| edu_i | positive |
| $dborder_i$ | positive or negative |
| $durban_i$ | positive |
| $dactivities_i$ | positive or negative |
| $droad_i$ | positive or negative |
| $dprovince_i$ | positive or negative |

VI. RESULTS

Table 2 shows the results of the estimated coefficients. The coefficient for $dactivities_i$ is positive and significant. The households engaging in border activities, either trading or working, have income about 26 percent higher than those that not engaging in border activities. The results show that being involved in cross-border activities results in higher income. The location variables are all statistically significant at the 1 percent level, except $dborder_i$. This result is very interesting. In general, the border areas should receive direct impacts from cross-border economic integration. The households in the border areas should have more opportunities to get involved and seek benefits from integration and thus should have higher incomes. However, we find no evidence that the households living in the border areas have higher income than the households living in non-border areas. The result suggests that there might be factors that limit households in the border areas from getting benefits from cross-border economic integration. It is possible that the people in the border areas might not have sufficient knowledge and financial capital (a) to extract benefits from cross-border integration or (b) to participate in cross-border activities and obtain benefits from such activities.

The coefficient for $droad_i$ is negative and significant. The households living near the main roads have about 17 percent higher income than the households living far away from the main roads. This result clearly points to the importance of transportation infra-

structure in the provinces. The coefficient of $durban_i$ is positive and significant, as expected. The households living in urban areas have income approximately 61 percent higher than that of other households.

As we expected, the coefficient for $hsize_i$ is negative and statistically significant at the 1 percent level. The coefficient for sex_i is negative but not significant. The coefficients for age_i and $agesquare_i$ have the signs expected. If age_i is less than 37.5 years, the percentage change in income increases as age_i increases. When age_i is equal to or exceeds 37.5 years, the percentage change in income decreases as age_i increases. However, it is only the coefficient for age_i that is statistically significant. The coefficient for edu_i is positive and significant at the 1 percent level. An additional year of education for the head of the household results in a 4 percent increase in the household's income. The coefficient for $dprovince_i$ is positive but not significant, that is, there is no evidence that households in Mukdahan have a significantly higher income than households in Sa Kaeo.

Table 2 Estimated Coefficients

| Variable | Coefficient | Standard error |
|-------------------|-------------|----------------|
| constant | 10.059 *** | 0.295 |
| $hsize_i$ | -0.161 *** | 0.014 |
| sex_i | -0.006 | 0.050 |
| age_i | 0.015 | 0.011 |
| $agesquare_i$ | -0.0002 ** | 0.0001 |
| edu_i | 0.041 *** | 0.006 |
| $dborder_i$ | 0.031 | 0.050 |
| $durban_i$ | 0.607*** | 0.052 |
| $dactivities_i$ | 0.258*** | 0.063 |
| $droad_i$ | -0.172*** | 0.047 |
| $dprovince_i$ | 0.033 | 0.050 |
| Sample size | 816 | |
| Adjusted R-square | 0.419 | |

* $p < .10$

** $p < .05$

*** $p < .01$

VII. POLICY RECOMMENDATIONS

Our results suggest that the top priority for the government should be to help the local people, particularly the poor and people living in the border areas, to become more involved in cross-border activities and to seek to benefit from the opportunities created by cross-border economic integration. We therefore recommend the following policy options:

1. The government should help the local people, particularly the poor, to participate in border activities by providing appropriate

occupational training programs and financial support. The government should create a special trading zone in border markets or near international gates that would enable poor people to rent spaces at affordable prices. The government should provide financial support to small and medium-sized local enterprises conducting business associated with border activities. In addition, the government should increase the competitiveness of local firms by helping local enterprises to develop high-quality products and services that meet international standards.

2. The government should provide access to good-quality education in the border provinces in order to build local capacities to adjust to cross-border economic integration and to extract benefits from it.
3. The government should develop transportation networks by linking local roads to main roads. In addition, the government should maintain roads in a good and safe condition.
4. The government should take advantage of the border locations by promoting tourism activities in the border areas, giving more focus to pro-poor tourism activities rather than mass-tourism activities.
5. The government should aim at encouraging cross-border economic integration in the region. However, the government should also prepare measures to mitigate the negative impacts that might occur because of integration.

VIII. CONCLUSION

In this article, we test the significance of location and border activities in determining household income in Mukdahan and Sa Kaeo. We find that the location of households plays an important role in determining the income of households. We find evidence that living near the main roads and living in urban areas are associated with higher income. Quite surprisingly, living in the border areas does not result in a higher income. This could be because the people in the border areas might not have sufficient knowledge and financial capital to extract benefits from cross-border integration or to participate in cross-border activities and to derive benefits from them. In addition, we also find that the households engaging in border activities have higher incomes than those that do not.

The government could help the households in Mukdahan and Sa Kaeo to increase their income by helping the households to be more involved in the cross-border activities and seek benefits from the opportunities created by cross-border economic integration. There are

many ways to help the households. For example, the government should provide appropriate occupational training programs and financial support. The government should provide small and medium-sized local enterprises conducting business associated with border activities with financial support. The government should increase local firms' competitiveness by helping local enterprises to develop high-quality products and services that meet international standards. In addition, the government should develop good transportation networks by linking local roads to main roads and maintaining roads in a good and safe condition.

ENDNOTES

- ¹ From the Sa Kaeo immigration checkpoint.
- ² From the Mukdahan immigration checkpoint.
- ³ The research project is under the joint collaboration of the Asian Development Bank and Thailand Development Research Institute (TDRI 2007).
- ⁴ In Thailand, rural areas are divided into villages, and urban or municipal areas are divided into blocks.
- ⁵ Examples are Glewwe (1991), Datt et al. (1999), and Wodon (2000).

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