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Is there a Future for Agriculture in the Rural Villages of Northeast Thailand?

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Introduction

A major downside of the impressive economic growth of many emerging market economies in Asia is the growing income gap between rural and urban areas. For a long time, development policy has been geared towards rapid industrialization encouraging the transfer of cheap rural labor to urban industrial centers. This policy has been successful to shift agricultural-based countries into the category of transforming, middle income emerging market economies. However, in some cases these disparities have led to social and political instability. It is now increasingly recognized that the rural urban divide leaving farmers behind causes an “agricultural problem in high performing Asian Economies” (Hayami, 2007, p. 1).

Agriculture is no longer the major share of household income. In 2007 farming contributed only around one fourth to Thai households’ incomes (NSO, 2009). A large share of the rural population migrates to urban centers for employment. Nevertheless, rural households hold on to their land as a safety measure due to low quality and vulnerable employment conditions (Amare et al., 2012). This might inhibit the necessary structural change towards professional farming and the creation of sufficient farm size and farm organization (Leturque & Wiggins, 2011). The food price crisis of 2008 has revealed the agricultural problem of Thailand. Farms especially in low potential areas of Northeast Thailand were unable to capitalize from higher commodity prices (Völker et al., 2012), although opportunities for profitable agricultural investments were and still are large (de Janvry & Sadoulet, 2010). The need for a modernization of agriculture and fostering structural change by promoting a class of professional, specialized farmers, who invest and innovate is now recognized (Hayami, 2007; Leturque & Wiggins, 2011). In this paper, we analyze the investment behavior of rural households in Northeast Thailand and address the following questions:

- (1) To what extent do farm households in the three sample provinces in Northeast Thailand invest in agriculture?
- (2) What are the determinants of agricultural investments?
- (3) What are the factors that influence the intensity of agricultural investments?

Data

For the analysis we draw on a unique and rich three year household panel data set of three provinces in Northeast Thailand, namely Nakhon Phanom, Buriram and Ubon Ratchathani, which was collected under the 'DFG FOR 756' project on vulnerability to poverty. The provinces

are characterized by a high poverty incidence and importance of agriculture despite rather poor agricultural potential. The survey was conducted in 2007, 2008 and 2010 using a comprehensive questionnaire and contains data of 2.105 households, representative for the rural population of these provinces.

Empirical model

Investments are usually distributed with an excess of zeros, which is also true for our data. This is due to the decisions of some farmers not to invest, but also reflects an infrequent and lumpy nature of investments in general (Hirshleifer, 1958). Investments are therefore accumulated from 2007 to 2010 (Elhorst, 1993). The distribution of zero inflated data is based on two different decisions underlying the investment outcome: First, whether or not to invest at all, and second how much to invest. This can be modeled by a Cragg double hurdle model:

$$(1) y^*_1 = Z_1\alpha + \varepsilon_1$$

$$(2) y^*_2 = Z_2\beta + \varepsilon_2$$

where: y^*_1 and y^*_2 are latent variables describing the decision to participate and the amount of investment between 2007 and 2010, respectively. Z_1 and Z_2 are sets of explanatory variables, containing household and village characteristics. To avoid endogeneity problems, household and village characteristics enter the model as lagged variables of 2007. α and β are vectors of parameters and ε_1 and ε_2 error terms. The observed amount of investment, y , measured from 2007 to 2010, is described as:

$$(3) y = \begin{cases} Z_2\beta + \varepsilon_2 & \text{if } y^*_1 > 0 \text{ and } y^*_2 > 0 \\ 0 & \text{otherwise} \end{cases}$$

The investment decision is estimated as a probit model, the amount of investment as a truncated normal regression, conditional on the investment decision. In this model the dependent variable, amount of investment, is logarithmised (Cragg, 1971).

Results and Discussion

The situation in the villages included in our sample can be characterized as follows: (i) higher levels of poverty than in the rest of the country (ii) distinct inequality in wealth, (iii) small land holdings of about 3 ha on average (iv) over-aged village population (iv) low levels of education as compared to migrants. In addition high labor shares in agriculture reflect the patterns known from many transforming economies. The dominant crop is rice, of which a large share is for self-consumption.

The survey instrument included a special module on investments. In 2010, households have been asked about their investments for business or farm purpose during the last 5 years. The share of households who reported investments is small (see table 1). 65 % of the households did not invest; households with only farm investments account for 25%. 7% of the households invested in business, which means small and micro enterprises, and 3% made farm as well as business investments.

Table 1: Households' investment behavior, 2007 -2010

HHs with	Freq.	Percent
Farm investments	524	24.89
Business investments	142	6.75
Farm and business investments	65	3.09
No investments	1,374	65.27
Total	2,105	100

Source: own calculations based on household surveys 2007 - 2010

Most investments were made for tractors, motorcycles and livestock, mainly cattle and buffalos (see table 2), only one large investment for the establishment of a chicken farm was reported. Less frequent were investments in irrigation, land and permanent crops, like rubber plantations. The majority of agricultural investments are of a smaller scale. .

Table 2: Agricultural investment types, 2007 -2010

Investment type	Percent	Mean (\$ -PPP)	Std. Dev.
Tractor	22.41	8740	13030
Motorcycle	16.81	2042	912
Livestock	14.27	2558	12871
Irrigation	10.89	554	294
Land	10.47	11419	11851
Further farm equipment	7.72	2071	6040
Permanent crops	7.19	912	806
Pick up & trucks	6.34	18270	13782
Buildings	3.91	1845	3383
Total	100	5378	10792

Source: own calculations based on household surveys 2007 - 2010

Table 3 shows the results for the double hurdle model on agricultural investments between 2007 and 2010. Household and village characteristics are from 2007. The first part of the model (column 1 and 2) describes the decision whether to invest in agricultural assets. The second part (columns 3 and 4) explains the amount of investment for those households with a positive investment decision. Since different determinants are found to be significant for the two parts, the double hurdle model proves to be the correct choice over a simple Tobit model.

Table 3: Double hurdle model explaining agricultural investments 2007 -2010

	Part 1: Investment Decision		Part 2: Amount of Investment	
HH size (no.)	0.091***	(0.023)	0.104**	(0.046)
Age HHH (years)	-0.005*	(0.003)	-0.003	(0.005)
Female HHH (1=yes)	-0.172**	(0.073)	-0.060	(0.133)
Education HHH (years)	0.017	(0.012)	0.063***	(0.023)
Income pc (log PPP-\$)	0.208**	(0.098)	-0.088	(0.224)
HH has crops (1=yes)	0.226***	(0.073)	-0.145	(0.122)
HH has livestock (1=yes)	0.207***	(0.064)	-0.001	(0.110)
HH has own business (1=yes)	-0.142*	(0.082)	-0.016	(0.149)
HH has off-farm employment (1=yes)	-0.136**	(0.067)	0.012	(0.116)
Persons occupation agriculture (no.)	0.019	(0.034)	0.119**	(0.058)
Persons occupation business (no.)	-0.134**	(0.061)	-0.009	(0.124)
Shock experience (1=yes)	-0.131**	(0.063)	0.035	(0.108)
Savings (log PPP-\$)	0.006	(0.012)	0.046**	(0.021)
Land size pc (ha)	0.079**	(0.033)	0.196***	(0.047)
Asset value pc (log PPP-\$)	0.116***	(0.034)	0.192***	(0.061)
Distance to market (minutes)	0.006**	(0.003)	-0.007	(0.005)
Distance to town (minutes)	-0.009**	(0.004)	0.006	(0.006)
Buriram (1=yes)	-0.440***	(0.085)	0.075	(0.152)
NakhonPhanom (1=yes)	0.286***	(0.088)	0.073	(0.128)
Cons	-2.808***	(0.630)	5.691***	(1.381)
Sigma: _cons			1.269***	(0.032)
N			2042	
Log likelihood			-2078.56	

Note: Only significant variables are reported. * p<0.1, ** p<0.05, *** p<0.01. Standard errors in parentheses are robust. Model is robust to the exclusion of income and loan. Data are of 2007 if not remarked otherwise.

Source: own calculations based on household surveys 2007 - 2010

Household size, size of owned land, and wealth measured as asset value are positive determinants for both, investing decision and a high investment amount. Income and savings on the contrary have only a positive influence on the amount of investment. Households with older or female household heads invest in agriculture less often. Also shock experience discourages agricultural investments. The model also gives some insights on the influence of labor diversification on agricultural investments. Commercial crop farming (dummy variable HH has crops) and owning livestock positively influences the investment decision, while having off-farm employment or an own business are negative determinants. A larger number of household members being employed in the own business is an additional negative influence factor for the decision to invest, while a large number of persons being employed on the own farm has a positive effect on the amount of investments.

Summary

The results show that only about one third of the households in the three provinces invest in agriculture. Most investments are made in mechanization. Smaller investments prevail; the distribution of the investment amount is positively skewed. Non-investors in agriculture tend to be potentially marginalized households with female or older household heads and shock experience. Larger and wealthier households invest more and larger amount, which might further increase inequality within the villages and therefore impair village development. Agricultural investment and off-farm employment do not complement each other; households who concentrate on off-farm employment seem not to spend their income on agricultural investment.

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