

The Future of Agriculture in Rural Villages in Northeast Thailand

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Background

- Thailand had great success in reducing overall poverty by constant economic growth, but faces a large rural urban divide: the “agricultural problem in high performing Asian Economies” (Hayami, 2007, p.1)
- For rural households, a large share of income is generated by off-farm employment
- Nevertheless, rural households hold on to their land as safety measure
- This might inhibit necessary structural change & professionalization of farmers

Research Questions

- To what extent do farm households in Northeast Thailand invest?
- What are the determinants of agricultural investments?
- What are the factors that influence the intensity of agricultural investments?

Data

- Three year household panel data set (2007, 2008, 2010)*
- 2105 households in three provinces in Northeast Thailand
- Comprehensive questionnaire on vulnerability to poverty including a module on investment

Descriptive Results

Rural Livelihoods

- Poverty and inequality are widespread
- The village population tends to be over aged with lower levels of education as compared to migrants
- Low income and high labor shares in agriculture
- Almost all households have income from agriculture
- The dominant crop is rice, cultivated on rather small farms; a large share of output is produced for self-consumption

Agricultural 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

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

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References:

Cragg, J.G., 1971. Some statistical models for limited dependent variables. *Econometrica*, 39(5), 829-844.
Elhorst, J.P., 1993. The estimation of investment equations at the farm level. *European Review of Agricultural Economics*, 20(2), 167 -182.
Hayami, Y., 2007. An emerging agricultural problem in high-performing Asian economies. World Bank Policy Research Working Paper 4312, Washington DC.

*Data from DFG FOR 756
<http://www.vulnerability-asia.uni-hannover.de/>

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Empirical Model

- Investments distributed with an excess of zeros; infrequent and lumpy

→ Double Hurdle Model

- Dependent variable: Agricultural investments, accumulated 2007 - 2010 (log PPP- $\text{\$}$)
- Two decisions necessary for a positive investment outcome, described by latent variables (Cragg, 1971; Elhorst, 1993):

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

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

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

With

y^*_1 : latent variable: decision to invest, estimated by probit model

y^*_2 : latent variable: amount of investment, estimated by truncated normal regression

Y: outcome variable: agricultural investments

Z: explanatory variables; α, β : vectors of parameters; ε : error terms

Empirical Results

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

	Part 1: Investment Decision	Part 2: Amount of Investment
HH size (no.)	0.091***	0.104**
Age HH head (years)	-0.005*	-0.003
Female HH head (1 = yes)	-0.172**	-0.060
Education HH head (years)	0.017	0.063***
Income pc (log PPP- $\text{\$}$)	0.208**	-0.088
HH has crops (1 = yes)	0.226***	-0.145
HH has livestock (1 = yes)	0.207***	-0.001
HH has own business (1 = yes)	-0.142*	-0.016
HH has off-farm empl. (1 = yes)	-0.136**	0.012
Persons occupation agric (no.)	0.019	0.119**
Persons occ. business (no.)	-0.134**	-0.009
Shock experience (1 = yes)	-0.131**	0.035
Savings (log PPP- $\text{\$}$)	0.006	0.046**
Land size pc (ha)	0.079**	0.196***
Asset value pc (log PPP- $\text{\$}$)	0.116***	0.192***
Distance to market (minutes)	0.006**	-0.007
Distance to town (minutes)	-0.009**	0.006
Buriram (1 = yes)	-0.440***	0.075
Nakhon Phanom (1 = yes)	0.286***	0.073
Cons	-2.808***	5.691***
Sigma: cons		1.269***
N		2042
Log likelihood		-2078.56

Note: Only significant variables are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Data are of 2007 if not remarked otherwise.

Conclusions

- One third of households invested in agriculture between 2007 and 2010
- Most investments are made in mechanization, small investments prevail
- Non-investors in agriculture tend to be potentially marginalized households with female or older household heads.
- Larger and wealthier households invest more often and larger amounts
- Diversification in wage and self-employment as well as shock experience discourages investments

→ Most rural households in Thailand neglect agriculture. This can increase inequality in wealth further and impair village development