Rural Household Non-farm Businesses:
Startup, Expansion, Contraction, or Exit?

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Introduction

Most household businesses in developing countries are self-employment enterprises without paid employees. These businesses face several constraints, such as access to capital, skilled labor, entrepreneurial ability, and government registry requirements, that limit growth. Self-employment does not automatically lead to enterprise growth and employment creation (Mondragon-Velez and Pena-Parga, 2008; de Mel et al., 2008; Schoar, 2009).

Among push and pull factors for rural households to start and expand a business, one might expect wealth to be the most important factor. Specifically, in the entrepreneurship literature, levels of household wealth often determine the probability of becoming an entrepreneur instead of a wage worker (Evans and Jovanovic, 1989; Banerjee and Newman, 1993; Hurst and Lusardi, 2004; Buera, 2009.)

Objectives

This study aims to understand the mechanism on the household side behind the entry, the growth process and the contraction of rural non-farm microenterprises and small-medium enterprises in Thailand. It will also explore the characteristics of non-farm household entrepreneurs who expand their businesses by hiring non-family members.

To explain why we observe the limitation of rural non-farm self-employment and microenterprise growth, the models of credit constrained and two-tiered labor market environment are applied. It is very important for policy implication of how we should support rural non-farm enterprises, especially as a key to stimulate rural growth.

Data

The Thai Socio-Economic Survey (SES) panel data were collected by the National Statistical Office of Thailand in 2005 - 2007, and 2010. The data are restricted to household whose members were employed and lived in rural areas and were younger than 70 years old in all 4 rounds of survey. Results are robust to possible attrition and sample selection problems.

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References

Banerjee, A.V. and A.F. Newman (1993). "Occupational Choice and the Process of Development.", JPE 101(2): 274-298.

Buera, F. (2009). "A Dynamic Model of Entrepreneurship with Borrowing Constraints: Theory and Evidence", *Annals of Finance* 5(3): 443-464.

Hurst, E. and A. Lusardi (2004). "Liquidity Constraints, Household Wealth, and Entrepreneurship", *Journal of Political Economy* 112(2): 319-347.

Miranda, A. and S. Rabe-Hesketh (2006). "Maximum Likelihood Estimation of Endogenous, Switching, and Sample Selection Models for Binary, Ordinal, and Count Variables", *The Stata Journal*, 6(3): 285-308.

Schoar, A. (2009). "The Divide Between Subsistence and Transformational Entrepreneurship", NBER Innovation Policy and the Economy.

Framework & Methods

- A framework here builds on familiar theories of occupational choice.
- Normalize household labor endowment to 1 which can be allocated to work on farm (L^F), non-farm employee (L^w), or run non-farm business (L^{NF}). Capital is used either in farm production (K^F) or non-farm business production (K^{NF}). Credit constraint is present.
- Profit from non-farm business:

$$\pi_{it+1}^{NF}(l_{it}, L_{it}^{NF}, K_{it}^{NF}) = \max_{l, L^{NF}, K^{NF}} p_{i,t+1} F(l_{it}, L_{it}^{NF}, K_{it}^{NF}) - w_{it} l_{it} - w_{it}^{H} L_{it}^{NF} - r K_{it}^{NF}$$

$$\text{s.t. } 0 \le K_{it}^{NF} \le A_{it} + s_{it} - K_{it}^{F}$$

- Wage working outside household > wage working for household business. MP of household worker > MP of non-family worker
- A business owner decides how many non-family labors, l_t, to be hired beside his own family members, and pays wage at t while receives revenue from operating the business at t+1.
- Suppose household utility is a function of consumption, c_t, and separable in each period. Household budget constraints also reflect whether household starts non-farm (NF) business or not. Then, the household's utility maximization problem is

$$\max_{c_t, L_t^F, L_t^W, L_t^{NF}, K_t^F, K_t^{NF}} u(c) = \sum_{t=0}^{\infty} \beta^t u(c_t),$$

- Subject to the following constraints,

$$c_{it} + s_{it} = \pi_{it}^{F}(L_{it}^{F}, K_{it}^{F}) + w_t^H L_t^W - w_t l_t - w_t^H L_t^{NF}$$

$$c_{i,t+1} + s_{i,t+1} = \pi_{i,t+1}^{FW}(L_{i,t+1}^{F}, K_{i,t+1}^{F}) - \pi_{i,t+1}^{NF}(l_{it}, L_{it}^{NF}, K_{it}^{NF}) - w_{i,t+1}^{H} L_{i,t+1}^{W} - w_{i,t+1} l_{i,t+1} - w_{i,t+1}^{H} L_{i,t+1}^{NF}$$

$$A_{i,t+1} = (1+r)\left[A_{it} + s_{it}\right]$$

$$0 \le K_{it}^{F} + K_{it}^{NF} \le A_{it} + s_{it}$$

$$0 \le L_{it}^{F} + L_{it}^{w} + L_{it}^{NF} \le 1$$

- Depending on whether household decides to start operating non-farm business by $\max_{l_{it}, L_{it}^{NF}, K_{it}^{NF}} \left\{0,\ \pi_{it}^{NF}(l_{it}, L_{it}^{NF}, K_{it}^{NF})\right\}$
- Each period the problem is to choose optimal *l** based on whether profits from starting/expanding business will be positive.
- For non-farm business production function as $F(l_{it}, L_{it}^{NF}, K_{it}^{NF}) = \left\{\alpha L_{it}^{NF} + (1-\alpha) l_{it}\right\} \cdot f(K_{it}^{NF})$, we have

$$l_{it}^{*} = \frac{\partial \pi_{it}^{F}}{\partial K_{it}^{F}} \frac{f(K_{it}^{NF})}{f'(K_{it}^{NF}) w_t} + \frac{r_t - \partial \pi_{it}^{F} / \partial K_{it}^{F}}{p_{t+1}(1-\alpha) f'(K_{it}^{NF})} - \frac{\alpha L_{it}^{NF}}{(1-\alpha)}$$

- **Empirical framework**:
  - Probit estimations on having NF business in 2010.
  - Multinomial logit of 4 choices: never having NF business in both 2006&2010, enter in 2010, exit in 2010, and still operating
  - Ordered probit with sample selection (Miranda & Rabe-Hesketh(2006):

1st stage: having NF business $Y_1 = \begin{cases} 1 & \text{if } X_1'\beta + \varepsilon_1 > 0 \\ 0 & \text{if } X_1'\beta + \varepsilon_1 \le 0 \end{cases}$

2nd stage:

$$Y_2 = \begin{cases} 0 & \text{if } Y_2^{*} \le a_1, \quad \text{self-employment without employees} \\ 1 & \text{if } a_1 \le Y_2^{*} \le a_2, \text{ microenterprise with <10 employees} \\ 2 & \text{if } a_1 \le Y_2^{*}, \text{small-medium sized with } \ge 10 \text{ employees} \end{cases}$$

where $Y_2^{*} = X_2'\beta + \varepsilon_2$ if $Y_1 = 1$, $\quad Y_1 = \mathrm{I}[\ v = X_1'\beta + \varepsilon_1\ ]$

Results & Discussion

Transition matrices in Table 1 shows how NF business status, based on firm size, changes over 2006 and 2010.

- Most households have never started their own NF business.
- Almost 40 percent of rural households operated NF businesses at some point in time during this period.
- The majority of rural NF businesses are self-employed without employees. But more NF employers converted to merely self-employed or reduced the firm size than maintained their status. It is tough to maintain a rural NF business with employees.

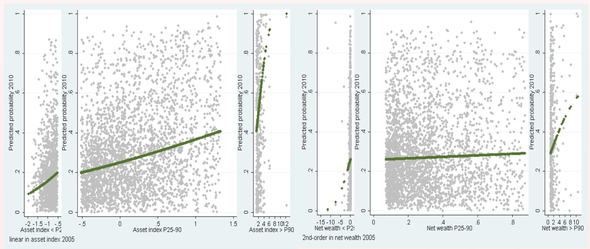
Table1 Transition matrix of NF business status 2006/2010

	2010				
2006	No NF business	NF self-employed w/o employee	NF Microenterprise (employees < 10)	NF SME (employees >= 10)	Total
No NF business	**1,356**	194	19	3	1,572
Row percentage	**86.26**	12.34	1.21	0.19	100
NF self-employed w/o employee	186	**370**	20	3	579
Row percentage	32.12	**63.90**	3.45	0.52	100
NF Microenterprise (employees < 10)	14	17	**24**	1	56
Row percentage	25.00	30.36	**42.86**	1.79	100
NF SME (employees >= 10)	4	1	2	**1**	8
Row percentage	50.00	12.50	25.00	**12.50**	100
Total	1,560	582	65	8	2,215
Row percentage	70.43	26.28	2.93	0.36	100

Probit estimations of operating NF business (in 2010) on linear in asset/net wealth (in 2005) and on quadratic terms

- Also check robustness with linear probability model >> similar graphs

Predicted probabilities of having NF business in 2010 on (a) asset index 2005 (b) net wealth 2005



Evaluate all other controls, except asset index/net wealth, at their sample means. The scattered gray areas reflect 95% CI predicted probabilities.

- No wealth effect in the middle range of wealth level:
  - HH may better work for wage employment rather than running NF business.
- Wealth affects at the lower and high (above 90th) wealth level
  - Less entry barriers for low-return NF business (subsistence)
  - Lumpy investment for high-return/growing NF business

Multinomial logit estimations of changes in NF business status between 2006 and 2010:

- Using asset index or net wealth and other control variables (household characteristics, past incomes and labor allocation) in 2005 to avoid potential endogeneity problem
- Estimate Bi-probit and calculate average marginal effects of P(having NF business 2010 = 1| having NF business 2006 = 1)

Table2 Multinomial logit of change in NF business status 2006/10

	Never have NF business		Enter		Exit		Remain operating	
	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.
Asset index05	-0.1121***	0.0151	0.0102	0.0101	0.0034	0.0098	0.0985***	0.0124
Asset index05^2	0.0165***	0.0061	-0.0072	0.0072	0.0047**	0.0019	-0.0140***	0.0049
Agri land (100 rai)	0.0005**	0.0002	-0.0001	0.0002	-0.0000	0.0001	-0.0004*	0.0002
Pseudo R2	0.2157							
Net wealth05 (million baht)	-0.0458***	0.0145	0.0040	0.0080	0.0164	0.0126	0.0254**	0.0125
Net wealth05^2	0.0012	0.0031	-0.0000	0.0014	-0.0005	0.0014	-0.0008	0.0017
Agri land (100 rai)	0.0005**	0.0002	-0.0001	0.0002	0.0001	0.0001	-0.0005*	0.0002
Pseudo R2	0.1952							

Average marginal effects are reported. S.E. are clustered at sub-district level. Number of observations is 2,131.

- Asset or wealth plays a role in NF entrepreneurship households to maintain their enterprise running (and in quadratic form).
- Scarcity of agricultural lands and reduction in farm income induce operating NF businesses.

Table3 Two-step ordered probit of NF business status in 2010

Coefficients	2nd stage		1st stage	
	Coef.	Std. err.	Coef.	Std. err.
Asset index05	0.3255**	0.1290	0.3893***	0.0554
Asset index05^2	-0.0182	0.0546	-0.0772***	0.0295
agri land (100 rai)	-0.0015	0.0017	-0.0018**	0.0009
age HH head	0.0542	0.0456	0.0301	0.0188
age^2 HH head	-0.0007	0.0005	-0.0002	0.0002
hhmembers	0.0506	0.0436	-0.0723***	0.0247
married	-0.2230	0.1872	0.1322	0.0948
ratio females in HH	-0.0726	0.3525	0.4358**	0.1964
educ: primary	-0.3029	0.2385	0.0326	0.1332
educ: secondary	-0.8890**	0.3488	-0.1522	0.1709
educ: high school	-0.1406	0.3058	-0.2400	0.1744
educ: college/above	-0.5947	0.4419	-0.6558***	0.2358
ratio Lfarm	-0.7202**	0.3530	-1.7533***	0.1622
ratio LNFwkr	-0.7956**	0.3131	-1.7647***	0.1735
ratio LNF w/o pay	0.5088	0.5695	1.6669***	0.3992
farm HH income (10k baht)			-0.2176***	0.0757
wage HH income (10k baht)			-0.0315	0.0345
Fornal financial access			-0.0291	0.0729
Informal financial access			0.0013	0.0652
aux: NF business size 2010				
_cut1	2.0624*	1.1648		
_cut2	3.0921***	1.1685		
N. of obs	2169			
Wald chi2 (34)	462.97			

- Allocation of labors in household are crucial for household to decision on running a NF business.
- Push factors seem to be main factors to encourage participating in rural NF businesses; hence limitation of enterprise growth.

Conclusions & Further studies

- This study finds wealth effects on running NF business at the lower and above 90th wealth distribution and on maintaining NF business status. We also observe the reduction in firm size rather than business expansion. It is difficult to see rural NF business growth.
- Further studies include i) specifying ordered probit estimation in transitions of NF business status given initial status; ii) estimating effects of NF business status on changes in wealth; iii) exploring possible exogenous shock, e.g. rainfall, to mitigate potential endogeneity problem.