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Farmers' preferences toward organic farming:

Evidence from a discrete choice experiment in Northern Vietnam

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Introduction

- Most Vietnamese farmers are involved in a conventional farming scheme highly dependent on chemical pesticides and fertilizers: organic farming in Vietnam represented only about 0.5% of total agricultural land (2017).
- In terms of organic production, in 2016, the organic agricultural product market gradually developed in Vietnam, with 10,150 organic producers.
- Vietnamese consumers consider organic food healthy and safe, so they are willing to pay a premium price for organic products.
- Our paper conducts a *discrete choice* experiment with farmers in Northern Vietnam, analyzing how various market factors (including sales contracts and logos with traceable codes) and non-market factors (including the role of networks, leaders and training) could influence farmers' preferences for adopting organic farming.

Objectives

Our study aims to:

1. investigate farmers' preferences and their willingness-to-pay to adopt organic farming;
2. better understands how various market factors and non-market factors could encourage farmers to make favorable decisions toward organic farming.

Materials and Methods

We carried out a discrete choice experiment with 586 farmers in Northern Vietnam.

Attributes	Attribute levels
Training and technical advice	Without lessons. ¹ With lessons.
Sale contract	No contract. ¹ Contract with a guaranteed price. Contract with a flexible price.
Traceability	Logo without traceability. ¹ Logo with traceability.
Neighbor	No neighbor producing organic. Other neighbors producing organic.
Leadership	No leader producing organic. ¹ Formal leader producing organic. Informal leader producing organic. Both formal and informal leaders producing organic.
Additional cost per unit	0% ¹ / 10% / 30% / 60% / 100% / 150%.
Experimental design	Fractional factorial orthogonal design.
Design approach	Two hypothetical alternatives (option 1 and 2) and one status quo alternative.
Alternatives	3 blocks.
Blocks	10 choice tasks per block.

Notes: ¹ is the baseline category.

	Organic farming option 1	Organic farming option 2	Status quo option
Training and technical advice			
Sale contract			
Traceability			
Neighbor			
Leadership			
Additional cost			
I choose:	Option 1 <input type="checkbox"/>	Option 2 <input type="checkbox"/>	Status quo <input type="checkbox"/>

I prefer the current farming situation

Hybrid Choice Model

Latent variables (LVs) could influence the respondents' answers to the attitudinal and perceptual questions and drive their behaviors in the actual choice situations.

$$LV_{i,k} = \sum_s \gamma_{LV_{i,k},s} z_{i,s} + \xi_{i,k}, \quad (1)$$

The indicators' measurement component:

$$I_{i,k} = \eta_{I_k} + h(LV_{i,k}, \zeta_{I_k}) + \psi_{I_{i,k}}, \quad (2)$$

The utility function is expressed as follows:

$$V_{i,n,t} = (\mu_{ASC} + \lambda_k LV_{i,k}) ASC_{i,n,t} + \tilde{\beta}_c (\pi_i + \pi_i c_{i,n,t}) + \sum_{l=1}^L \beta_l Attribute_{i,l,n,t} + \sum_{s=1}^S \gamma_s ASC_{i,n,t} * Control_{i,s}, \quad (3)$$

Results and Discussions

Hybrid Choice Model with "Perception" as the latent variable

Variables	Coef.	Variable	Coef.	Variable	Coef.
Choice model component		LV "Perception"		Measurement component	
ASC	-9.965** (5.171)	$\gamma_{Pep, Female}$	0.145 (0.125)	$\zeta_{Pep,1}$	1.192*** (0.371)
Training	1.008*** (0.075)	$\gamma_{Pep, Age}$	0.743*** (0.252)	$\tau_{Pep,11}$	0.997 2.234
Fixed contract	1.546*** (0.101)	$\gamma_{Pep, FarmSize}$	0.103** (0.049)	$\tau_{Pep,12}$ $\tau_{Pep,13}$	2.386 5.825
Flexible contract	1.223*** (0.095)	$\gamma_{Pep, MiddleIncome}$	0.122 (0.138)	$\zeta_{Pep,2}$	2.905*** (0.659)
Traceability	0.662*** (0.077)	$\gamma_{Pep, HighIncome}$	0.110 (0.314)	$\tau_{Pep,21}$ $\tau_{Pep,22}$	5.196 5.560
Neighbor(s)	0.441*** (0.065)	$\gamma_{Pep, GoodHealth}$	-0.045 (0.411)	$\tau_{Pep,23}$ $\tau_{Pep,24}$	6.119 13.622
Formal leader	0.516*** (0.116)	$\gamma_{Pep, VeryGoodHealth}$	-0.090 (0.459)	$\zeta_{Pep,3}$	0.599*** (0.220)
Informal leader	0.177 (0.124)	$\gamma_{Pep, HighSchool}$	0.444*** (0.156)	$\tau_{Pep,31}$ $\tau_{Pep,32}$	-0.184 1.522
Both leaders	0.414*** (0.098)	$\gamma_{Pep, College}$	0.914*** (0.344)	$\tau_{Pep,33}$ $\tau_{Pep,34}$	2.193 5.065
Cost	-0.335*** (0.028)	$\gamma_{Pep, Rice}$	-0.030 (0.160)	$\zeta_{Pep,4}$	1.181*** (0.369)
$\lambda_{LV_{Pep}}$	0.762*** (0.183)	$\gamma_{Pep, Vegetable}$	-0.160 (0.175)	$\tau_{Pep,41}$ $\tau_{Pep,42}$ $\tau_{Pep,43}$ $\tau_{Pep,44}$	0.519 2.383 3.879 7.618

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Willingness-To-Pay estimates (in thousand of VND/kg)

Attributes	HCM	RPL
Training and technical advice	3.00 [2.69,3.31]	2.74 [2.11,3.36]
Fixed contract	4.60 [4.18,5.03]	4.24 [3.45,5.02]
Flexible contract	3.64 [3.24,4.05]	3.10 [2.24,3.96]
Traceability	1.97 [1.69,2.25]	1.91 [1.34,2.48]
Neighbor(s)	1.31 [1.10,1.52]	1.45 [0.99,1.90]
Formal leader	1.54 [1.15,1.93]	1.16 [0.30,2.01]
Informal leader	-	-
Both leaders	1.23 [0.90,1.55]	1.11 [0.44,1.79]

Conclusions and Policy implications

- WTP of sales contracts with guaranteed prices and flexible prices are consistently higher than other attributes since smallholder farmers in Vietnam strongly depend on traders to sell their products, but traders are the ones who set the price, and farmers have to accept the price offered to them.
- Buyers' commitment (e.g., "contract farming") to the outcome of agricultural products is seen as an opportunity to support organic agriculture.
- A logo with a traceable code is the best tool for food quality control and encourages consumer confidence in organic products.
- Providing farmers with agricultural advisory services (i.e., agricultural extension agents visit farmers and provide them with agricultural information) could promote the adoption of organic farming.
- Presence of neighborhood farmers involved in organic farming plays a vital role in promoting organic agriculture in a region like Northern Vietnam.
- It is important to promote the role of formal leaders since farmers in the rural areas in Vietnam often rely on their formal leaders (e.g., village leaders or the president of farmers' association, etc.) to obtain information, knowledge and practical lessons about organic farming.