The Effect of Asymmetric Information on Smallholders Participation and Net Income: Empirical Evidence from India

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Introduction :

- Modern food retail chains (MFRC) have recently attracted attention due to the growth in the number of stores and sales of F&Vs in the last two decades (Reardon et al. 2009).

- The Institutional framework is responsible for creating an atmosphere for the emergence of MFRC in India. This paper demonstrates how contract farming used by the MFRC functions as an economic institution. The Institutional Economics framework provides a way in which MFRC contracting overcomes certain types of market failures (i.e., Uncertainty, risk sharing, and coordination failure) (Grosh,1994; Hobbs,1997; Kedar & Dsouza: 2020).
- Due to a lack of understanding of transaction costs (TCs), a limited attempt was made in the literature to measure the TCs incurred by farmers due to lack of enforcement in the contract.
- Coase (1960) Williamson (1979, 1985) has also argued that the theoretical development has not been accompanied by successful measurement of TCs, which are not easy to quantify.

Research Question :

a. How can we quantify the impact of asymmetric information and opportunity behavior by the MFRC in India?

b. How have the TCs impacted the net income and farmers participating in the MFRCs in developing countries like India? How can we increase the participation of smallholder farmers in the global markets?

Objectives :

- This study empirically measures the TCs incurred by the farmers across different institutional arrangements of MFRC. This study would help in implementing policies aimed at reducing TCs.

Data collection :

- The primary survey was conducted in 2017 from the Kolar District of Karnataka. Kolar district is known for having the highest number of MFRC and is a major producing area of Chili.
- We interviewed 300 chili households, with 100 each under MFRC with Production Contract (PC), MFRC with Marketing Contract (MC), and Independent Farmers (IF), respectively.

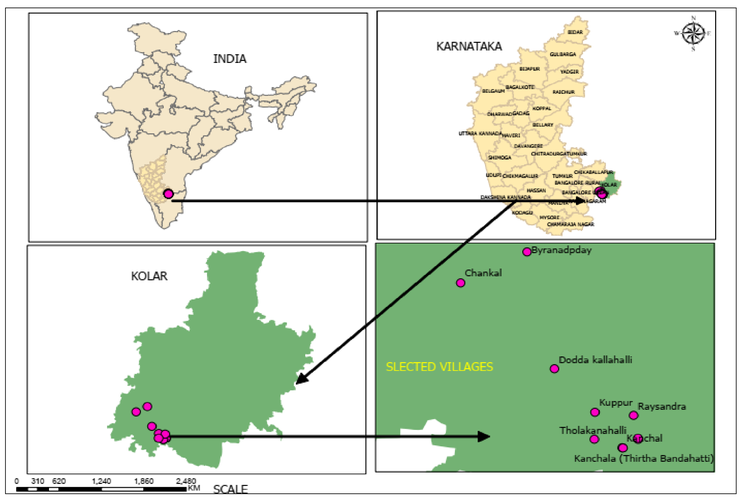
Table 1. **Variables used for measuring TCs incurred by farmers**

Sl No	Variable	Individual Transaction costs	Nature of the measurement
01	Information costs (Incur due to uncertainty & asymmetric information)	Search for the reliability of potential buyers	Actual
		Price uncertainty	Actual
		Quality standard/ product quality uncertainty	Actual
		Other information required on (seeds type + Packaging materials etc.)	Actual
02	Bargaining/ Negotiation costs	Unequal Bargaining Power	Relative
		Frequency of sale	Actual
		Cost and time spent on negotiating the prices and quality of the product with the company	Actual
		Monetary value due to opportunist behavior	Actual
03	Monitoring Costs	Product Quality	Actual
		(Supervision cost to fulfill the MFRCs quality, extra effort spent by the owner farmers)	
		Grade uncertainty	Actual
		(Ensuring that the product is graded as per contract at the field as well as collection centers)	

Two types of MFRC: PC, MC

- PC: Fixed Price in advance, Input & output contract, Provision of technical support.
- MC: Output contract and technical guidance, Flexible price
- IF: No provision of inputs, Farmers carry product to APMC Mandis

Figure 1: **Selected area for conducting the primary survey**



Empirical Framework, Method :

- There are two potential sources of bias- the farmer's participation may differ from non-participation farmers with respect to observed characteristics (education and wealth).
- We control for observed characteristics by using Propensity Score Matching Estimator (PCM).
- PCM compares outcomes between only those MFRC ("Treated") and IF ("Control") farmer that are similar in terms of another observable characteristic (i.e., education, age), therefore, reducing the selection bias that would have been occurring otherwise when the two groups are systematically different (Rao et al. 2010).
- The study applies the NNM matching estimator, an important and most commonly used method.

Table 2 **Characteristics of contract and independent Chili producers, India**

Variable	IF	PCs	MCs
Land area (*acre*)	3.84	4.76	3.44
Age of head of household (HH, in *years*)	48.12	41.45**	44.32**
Farming experience of HH (*years*)	*13.86*	*16.08*	*14.08*
Household size (*number*)	4.00	5.00	4.00**
Loan amount (Lakhs Per HH)	0.77	3.09**	1.78***
Distance to input market (In Km)	12.80	6.98***	7.00***
Near road distant from agri. field (in kms)	1.06	1.11	0.93***
Near other collection centers (in Kms)	13.52	16.82**	10.44*
HH member, education (in *years*)	2.66	9.12***	7.7***
Area under chili per acre	1.55	1.22***	1.15***
Total labour cost acre (*Rs*)	3,154	16,264	15,746
Total input per acre (*Rs*)	18,778	3,305	12,869
Total variable costs per acre (*Rs*)	26,522	58,349	54,310
Total cost per acre (*Rs*)	48,454	77918***	82,925***
Total revenue per acre (*RS*)	82,810	1,35,228***	1,23,328***
Total profit per acre (*Rs*)	34288	57310**	40403*
Procurement Prices (Rs per Kg.)	18.38	21.41***	20.20*
Yield (Kg. *per acre*)	4.92	7.95***	7.39***
Number of observations	*100*	*100*	*100*

* Significant at the 10% level; ** Significant at the 5%; *** Significant at the 1% level.
Source: Authors Primary survey (2017)

Figure 2. Comparison of net profit of chili for PC, MC and IF

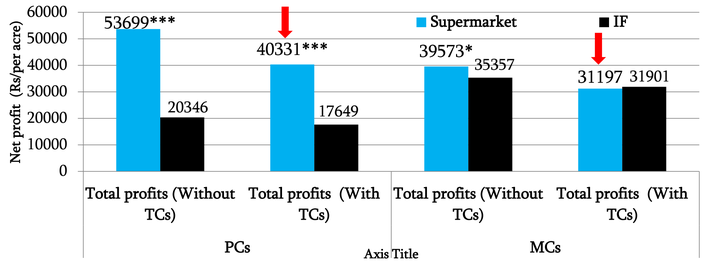


Table 3 **Average treatment effects and results of sensitivity analysis MFRC, Chili**

Matching algorithm	Outcome (Rs. per acre)	Treated	Controls	Difference	*t*-stats
(1) PC vs IF Nearest neighbor matching (NNM)	Information costs per acre	819	668	151	0.57
	Monitoring costs per acre	8,465	1,335	7,131	6.61
	Bargaining costs per acre	3,740	1,844	1,896	3.43
	Total Transaction costs per acre	13,025	3,846	9,178	6.00
	Cost per acre (C1) (including TCs)	89,820	63,070	26,750	3.92
	Profits per acre (including TCs)	40,331	17,649	22,682	2.54
	Profits per acre (excluding TCs)	53,699	20,346	33,353	3.74
(2) MC vs IF Nearest neighbor matching (NNM)	Information costs per acre	1,228	684	545	2.86
	Monitoring costs per acre	4,784	1,336	3,447	4.75
	Bargaining costs per acre	2,364	963	1,402	4.51
	Total Transaction costs per acre	8,376	2,982	5,394	5.08
	Cost per acre (C1) (including TCs)	87,498	49,846	37,652	4.36
	Profits per acre (including TCs)	31,197	31,901	-704	-0.08
	Profits per acre (excluding TCs)	39,573	35,357	4,216	0.50

Source: Authors Primary survey (2017).

Conclusion and Policy Recommendations:

- We found that production-contract farmers have significantly higher (1% of the level of significance) profits (Rs 57,310/ acre) than independent farmers have (Rs 34,288/acre) and that marketing-contract farmers have higher profits (Rs 40,403/acre) than independent farmers. However, transaction costs were significantly higher for contract farmers than in IF.
- Transaction costs accounted for 14.5% of total costs for production-contract farmers and for 9.60% of total costs for marketing-contract farmers, whereas transaction costs were less than 6% for independent farmers.
- Most existing studies have neglected to capture the transaction costs and overestimated the benefits of MFRC. Looking at the breakup of TCs, monitoring costs accounted for 65% followed by negotiation costs, 28.7%, and information costs, 6.3%, respectively.

- Our results suggest that opportunistic behavior by the chains imposes significant transaction costs on chili farmers. Asymmetric information on price and grading uncertainty also significantly increased farmers' transaction costs. This has implications for farmers' participation in modern food retail chains.

- We suggest the governments introduce proper institutional setups in written and oral contracts between the chains and farmers.
- We also suggest a strict enforcement mechanism, which would make the cost associated with opportunistic behavior less critical for farmers and might increase farmers' participation.

Study Limitations and Future Scope :

- A panel data with the same households would have produced better results.
- PCM can overcome the selection bias that arises due to unabsorbable characteristics.

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