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**SUBJECT III**  
**AGRIBUSINESS/TRADE OPPORTUNITIES FOR INCLUSIVE GROWTH**

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**Behaviour of Premium Paid by Supermarket  
and Trade-off Facing Farmers**

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ABSTRACT

The argument that supermarkets might pay higher prices to farmers because of their economies of scale remains a contentious issue in India. Using procurement price data of one of the leading supermarket chains, Aditya Birla More (ABM), the impact of supply relationship on the premium paid to the farmers was analysed. The findings suggest that conditional premium associated with ABM chain is positively significant, which shows that farmers gain because of disintermediation. However, it is crop specific. At the same time, evidence shows that it poses challenges in the form of high price volatility, compared to traditional market, irrespective of the season. Further, season-wise mean analysis proves that ABM manages to procure good quality produce in the lean season by paying lower premium than the peak season.

**Keywords:** Supermarkets, Disintermediation, Premium, Supply relationship, High value commodities

**JEL:** Q10, Q13, Q18

I

INTRODUCTION

Structural changes in the Indian economy have transformed the way food is being consumed and produced. Diet diversification driven by consumer preferences has resulted in agricultural diversification in favour of labour intensive high-value commodities (HVC), in whose production the small farmers have comparative advantage. Both demand and supply of HVC have transformed the procurement system of agro-processing companies and supermarket chains; from spot market with numerous intermediaries to centralised market transactions, by entering into supply relationship with farmers, either through oral or written contracts (Reardon *et al.*, 2003; 2008). These new developments in the market structure have created an alternative domestic marketing channel for HVC with less strict grades and standards than that of the export chains (Berdegue *et al.*, 2005). This phenomenon has triggered considerable academic interest on the supply relationship between farmers and supermarkets, and how it can be exploited to foster income growth in rural areas.

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Recently, liberalisation of foreign direct investment (FDI) in multi-brand retailing remains a subject of controversy, more so in the sphere of intersection of critical issues of the producers and supermarkets. Advocates argue that FDI in multi-brand retailing would bring much needed investment in back end infrastructure to reduce post-harvest wastage, scale economies of supermarket chains may offer remunerative prices to the farmers, and reduce transaction cost of marketing by disintermediation. Few researches in India support the above mentioned arguments.<sup>1</sup> However, critics on the other hand, claim that multinational supermarkets with deep pockets would strive to raise its market share and possibly would reduce the prices offered to the farmers by their monopsonistic purchasing practices. And also research shows that farmers lose out for price insurance contract associated with multinational supermarkets.<sup>2</sup> Research on the behaviour of procurement price mean and volatility of a supermarket chain in the Indian context has received less attention, possibly because of lack of data.

Against this backdrop, this paper focuses on the market transaction between farmers and ABM, and its effect on the mean price distribution and variance compared to the traditional market. The paper also analyses the behaviour of premium (difference between supermarket procurement price and traditional market price) in the short run. Further, the study looks at the effect of intraday and inter-season quality variation in the traditional market on the premium. Hence, the ensuing analysis provides us with useful insights about the benefits obtained by suppliers of ABM, as well as trade-off facing the farmers in the form of high variance, at least in the short run. Data was obtained for the year October 2010 to September 2011. Firstly, the study obtained the daily procurement prices of the ABM collection centre in Pune district. Secondly, the historical daily prices of Manchaar, local traditional market, were collected from its office; and for the regional market Pune, data was collected from Agriculture Marketing Info (Agmark) database maintained by Ministry of Agriculture, (Government of India, 2012).

The organisation of the paper is such that Section II deals with description of field area and ABM procurement practices. The third section deals with comparison of mean and variance of the prices between ABM and traditional market. This is followed by analysis of conditional premium paid to the farmers supplying to ABM and the final section concludes.

## II

### DESCRIPTION OF FIELD AREA

Junnar and Ambegaon blocks of Pune district, Maharashtra, have been selected for the study, where some supermarkets have an active presence through collection centers (CC), which functions as an outlet for suppliers to sell vegetables. ABM is the focus firm, was established in 2007, and has oral contract with farmers dispersed in villages across the two blocks. Historically, these two blocks are horticulture zone,

endowed with relatively fertile and irrigated land holdings. They also have well connected road networks, linking major urban markets such as Mumbai, Thane, Pune and Nashik, which make it highly attractive for the supermarkets to invest.

### 2.1 Description of ABM Collection Centre (CC)

Two methods of sourcing strategies were observed; supermarkets such as *Aditya Birla More*, *Spencers* and *Reliance Fresh* procure directly from the farmers through their CC, while *Bharti-Walmart*, *Food Bazaar*, *Godrej Adhaar* and *Metro* procure through *dedicated traders*, where, *dedicated traders* have only supermarkets as their clientele. ABM procures all vegetables and seasonal fruits grown in the region. Its daily indent is around 12 to 15 tonnes for all commodities and procures only premier quality produce. The supermarket manager is informed about the requirement a day before; accordingly the manager communicates the same with the farmers over the phone. ABM benchmarks their price 30 per cent less against the Pune market. It follows product-specific quality standards, loosely defined on colour, size, freshness and volume. For instance, cauliflower and cabbage weighing more than 450 grams and crooked bottle gourd and sponge gourds are weeded out at the time of procurement.

Supply relationship between farmers and ABM are not without frictions, none of them seem to have moral obligation towards each other. Instances of both farmers and ABM renegeing on their oral agreement have been observed. The farmer side-sell their produce to alternative markets and ABM on many instances has rejected the produce of the farmers when their indent has been met for the day. In such circumstances, the decision to sell the produce to ABM is completely driven by alternative marketing opportunities for the commodity; otherwise the produce is retained at the CC for the next day without refrigeration, hence, the risk associated with reduction in the weight is passed on to the farmers.

### III

#### ANALYSIS OF PRICE MEAN AND VOLATILITY

Using the data collected from three market sources, on three commodities cabbage, cauliflower and bottle gourd, the analysis of the price mean and volatility of ABM prices in comparison to the traditional markets were performed. Even though there are two APMC markets, one in each block, Manchaar APMC market was chosen because it is proximate to ABM and suppliers of ABM also visit Manchaar if they have more or rejected produce to dispose. Produce quality differs across ABM and traditional markets. As mentioned earlier, limited indent and need of premiere quality produce makes ABM to procure only a portion of the farmer's produce. Detailed interviews with the participants and ABM manager revealed that ABM procures only 40 per cent of the farmers' produce, where as the traditional

markets procure almost 100 per cent only discarding the damaged produce. Because the underlying price formation at the traditional market is through auction, maximum price represent the highest quality produce.

### 3.1 Seasonality

Cabbage and cauliflower are predominantly winter crops grown between October to January; however they are grown all throughout the year because of the availability of different seed varieties for different seasons. Arrival of cabbage and cauliflower at the Manchaar APMC market, proxy for production shows the availability throughout the year, are displayed along with maximum and minimum prices in figures 1 and 2. Similarly, growing months of bottle gourd is between July to October but is produced all through the year as seen by the arrivals in the Manchaar market. The interview with the farmers, traders and supermarket manager, indicated the existence of substantial difference in the quality of the crops across seasons and is better during winter (December to mid February) compared to other seasons. The study hypothesises that the difference in quality across seasons might influence the pricing policy of ABM, so has analysed the season specific price spread.

For the study the peak season is assumed to be from June to January. Summary of the season wise average range/price spread (the difference in per day maximum and minimum prices) are tabulated in Table 1. As expected, the average range in lean season is low compared to peak season showing that the quality of supply of produce during the former season is at the lower end and there exists high quality variation during the peak season compared to learn. The rationale behind the phenomena is that during the peak season the spectrum of quality becomes quite evident because of various reasons such as quality of soil, damage during transportation, climatic conditions and pest attack.

TABLE 1: AVERAGE PRICE SPREAD OF THE COMMODITIES ACROSS SEASON

Crops (1)	(₹/kg)			
	Manchaar		Pune	
	Peak season (2)	Lean season (3)	Peak season (4)	Lean season (5)
Cabbage	3.17	1.3	4.33	2.7
Cauliflower	4.90	2.5	5.90	3.8
Bottle gourd	4.20	2.1	7.60	4.8

### 3.2 Comparison of Price Mean and Variance

The comparison of the price mean and variance between ABM and traditional markets were performed.<sup>3</sup> Because the ABM price is same for all the farmers, and because of lack of information on participant specific exact date of transaction at the ABM and the corresponding possible price realisation at the traditional market, no micro level analysis is feasible.

High transaction costs are the features of traditional markets in India. Detailed interviews with the farmers revealed that the transaction costs include transportation, traditional market fee for weighing, loading and unloading charges, commission agent fee and packaging costs. Because ABM procures at its CC, farmers have to bear the transportation cost, and because it is proximate to Manchar, the cost to reach both the transaction sites is approximately the same. Furthermore, ABM prunes the leaves of the cauliflower at the time of procurement, so the reduction in weight is compensated monetarily. Consequently, cauliflower crop is not identical across marketing channels. So, it was assumed that loss in weight is 15 per cent; accordingly the price estimates were constructed for comparison. It was also observed that transaction cost were constant during the study period (2010-11).

The participants generally faced less transaction cost in the ABM channel compared to traditional market; packaging materials are returned and no administrative cost are incurred. No extra cost or time is spent for grading, since it is done for both the channels. As mentioned earlier, ABM benchmarks its price 30 per cent less, against the Pune market, and because of limited indent, it procures only 40 per cent of the farmers' produce, only the premium quality produce, hence it was expected that ABM prices to be approximately the same/higher than that of the traditional market. The standard t-test was used to test the mean maximum prices of all the three marketing channels across three crops for the period October 2010 to September 2011. The results are tabulated in Table 2.

TABLE 2. COMPARISON OF MEAN AND VARIANCE OF ABM AND TRADITIONAL MARKETS

Crops (1)	Mean (₹/kg) (2)	Variance (3)	CV (4)	(p- value) (5)	Observations (6)
Manchar market					
ABM cabbage	5.20	8.79	0.57	0.08	308
Manchar cabbage	4.78	9.03	0.63		307
ABM cauliflower	13.52	48.53	0.52	0.00	315
Manchar cauliflower	6.27	13.03	0.58		307
ABM bottle gourd	9.67	13.62	0.38	0.00	294
Manchar bottle gourd	6.24	11.52	0.54		277
Pune market	5.20	8.79	0.57	0.28	308
ABM cabbage					
Pune cabbage	5.48	9.30	0.56		238
ABM cauliflower	13.52	48.53	0.52	0.00	315
Pune cauliflower	6.81	10.88	0.48		233
ABM bottle gourd	9.67	13.62	0.38	0.01	294
Pune bottle gourd	8.88	12.73	0.40		236

The results show that average farmgate prices of ABM are significantly higher than Manchar for all the commodities, while in comparison to Pune; ABM mean farm gate prices were significantly higher except for cabbage crop. However, variance of ABM prices is also higher compared to both the traditional markets except cabbage crop. The analysis reveals that ABM dominating in mean and having less variance is actually crop-specific, so it cannot be generalised for all the crops.

Moreover, the above analysis does not capture intraday and inter seasonal difference in the quality on ABM price. In other words, how the premium (difference between ABM and traditional market prices) is affected by the quality difference across seasons and what is the conditional premium after controlling for quality difference and supply?

## IV

## CONCEPTUALISATION AND BEHAVIOUR OF CONDITIONAL PREMIUM

Spot markets in India are fraught with inefficiency due to numerous intermediaries (Papola and Mamgain 2008). Since ABM has less transaction cost, positive premium can be explained in two different ways, one is the farmer saving on their transaction cost or ABM might be rewarding for the good quality produce. Premium ( $P_i$ ) is defined as the difference between the ABM and traditional market price. The price formation at the spot market is through auction and it is affected by various factors such as quality of the produce, demand and supply conditions. The spectrum of quality of produce arriving at the market is captured by range ( $R_i$ ). Incoming supply to the market is captured by market arrivals ( $A_i$ ). Season dummy is also incorporated to capture the inter-seasonal effects. As mentioned earlier, supply to the traditional market is assumed to represent the production in the area.

Our approach is to explain the proportion of premium when the other entire factors affecting premium are zero, i.e., our interest lies in finding the conditional premium after accounting for all possible factors that might affect premium. Model specification is given below

$$P_i = \alpha + \beta_1 R_i + \beta_2 A_i + \beta_3 L_i + \varepsilon_i$$

The term  $\alpha$  represents conditional premium when other factors assumes value zero. It can also be interpreted as gains to the farmers because of disintermediation. Since autocorrelation is the feature of the time series data, to overcome, the Prais-Winsten estimation approach was used, which is meant to take care of autocorrelation of type AR (1). This method is modification of Cochrane Orcutt estimation and does not lose the first observation, hence efficiency improves. Regression estimation was done crop wise separately for Manchaar and Pune markets and the results are given in Table 3.

The results show that the conditional premium captured by the constant term, is positively significant for all the crops. Because ABM prunes the leaves of the cauliflower at the time of procurement and the reduction in weight is compensated monetarily to incentivise farmers to supply regularly, the conditional premium of cauliflower is way above other commodities. The variable range capturing the intraday quality difference is negatively significant. This shows that the premium should be higher in the summer (lean) season compared to winter (peak) season.

TABLE 3. REGRESSION RESULTS

Independent variables (1)	Cabbage		Cauliflower		Bottle gourd	
	Manchaar market (2)	Pune market (3)	Manchaar market (4)	Pune market (5)	Manchaar market (6)	Pune market (7)
Range	-0.66*** (0.06)	-0.67*** (0.06)	-0.763***	-0.523***	-0.74*** (0.08)	-0.90*** (0.11)
Arrivals	-0.001 (0.01)	0.0003 (0.001)	-0.017	0.003	0.01 (0.01)	-0.04 (0.03)
Lean season dummy	-0.91*** (0.33)	-1.49*** (0.31)	-2.78**	-0.45	-1.28** (0.61)	-1.31* (0.75)
Constant (conditional premium)	2.17*** (0.32)	2.42*** (0.29)	10.13***	8.08***	5.65*** (0.46)	7.32*** (0.96)
R-squared	0.31	0.41	0.09	0.059	0.26	0.28
Durbin Watson statistic	2.11	2.05	2.00	1.88	2.12	2.16
Estimated premium	0.109	-0.49	6.10	6.24	3.20	0.53

\*\*\*, \*\*, \* denotes significance at 1, 5 and 10 per cent level respectively.

The argument is that during the peak season, there is high quality variation of produce arriving at the market and all the market players would be willing to bid higher prices to attract high quality produce. Hence, ABM should also be competitive enough to attract high quality produce. But during the lean season, when there is little variation in the quality of produce arriving at the market, and moreover the quality tends to be towards the lower end, it is enough that ABM bid marginally higher than the prevailing market prices to attract good quality produce. The lean season dummy variable is significant and negative for all the crops. This shows that the premium in the lean season is lower than that of the peak season. The results for season wise conditional premium analysis given in Table 4, indicated that on an average, conditional premium in the lean season is positive and significant in Manchaar market for all crops, however, it is lower than the peak season.

TABLE 4. COMPARISON OF SEASON WISE CONDITIONAL PREMIUM

Crops (1)	ABM and Manchaar		ABM and Pune	
	Peak season premium (2)	Lean season premium (3)	Peak season premium (4)	Lean season premium (5)
Cabbage	2.17***	1.26***	2.42***	0.93***
Cauliflower	10.13***	7.35**	8.08***	7.63
Bottle gourd	5.65***	4.37**	7.32***	6.01*

\*\*\*, \*\*, \* denotes significance at 1, 5 and 10 per cent level respectively.

Similarly, conditional premium for both the seasons is positive and significant in Pune market for all crops. To sum up, ABM premium during the lean season is significantly lower than that of the peak season implying that ABM pay lower prices in the lean season than the peak for the same good quality produce.

The results of season wise variance analysis given in Table 5, shows that even though the seasonal variance decreases for all crops except bottle gourd, ABM price variance during lean season is quite high compared to variance of the traditional



market prices for all the crops except cabbage. The reduction in variance associated with ABM supply relationship is actually crop specific.

TABLE 5. SEASON WISE VARIANCE COMPARISON

Crops (1)	Peak season variance (2)	Lean season variance (3)
ABM cabbage	7.81	0.72
Manchaar cabbage	7.50	0.91
Pune cabbage	10.16	1.45
ABM cauliflower	44.07	19.19
Manchaar cauliflower	17.74	2.77
Pune cauliflower	14.55	2.17
ABM bottle gourd	10.23	21.39
Manchaar bottle gourd	12.91	7.36
Pune bottle gourd	12.01	8.68

V

## CONCLUSIONS

This paper examined the supply relationship between one of the domestic supermarket chains, Aditya Birla More (ABM) and farmers in rural Pune district, Maharashtra. The findings suggest that the conditional premium associated with ABM chain is positively significant, which shows that farmers experience gains because of disintermediation. However, it is crop specific. At the same time, evidence shows that it poses challenges in the form of high price volatility, compared to traditional market irrespective of the season. Further, season wise mean analysis proves that ABM manages to procure good quality produce in the lean season by paying lower premium than the peak season. This makes us believe that ABM strategically exploits the quality difference across season to set prices so that it serves the twin purpose of attracting good quality produce at the same time keeping the transaction cost low.

To sum up, these new changes in the market structure has given farmers the opportunity to access new markets with more stringent grades and standards compared to traditional market, but less strict than export chains. These might further amplify in size and even the contractual terms might evolve because of entry of multinational retailers through FDI route. However, any remarks on the long term benefits to farmers would be a mere speculation, hence, sustainability of benefits to farmers in the form of high mean compared to traditional market is still an open question.

## NOTES

1. For discussion see Birthal *et al.*, (2006), Singh (2010), Singh (2011), Narrod *et al.*, (2009), Dev and Rao (2005).
2. For discussion see Stichele *et al.*, (2006) and Michelson *et al.*, (2012).

3. Another way of analysis could be to compare the ABM prices to that of the past prices of traditional market. Since ABM has been a minor player, a price taker and since their operations are very miniscule and do not influence the prices; we cannot undertake this exercise.

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