



Agricultural Commodity Futures in India

KEYWORDS

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ABSTRACT *The article analyses the role of commodity futures market in India, especially in the agriculture sector. Commodity derivatives were introduced with the aim of mitigating and lowering the price risk that the farmers face. This article tries to highlight and contrast the behaviour of futures market for export and import crops. Firstly, price discovery is analysed with the help of Granger causality test and the question of why futures market do not fulfil this role for some crops is discussed. Secondly, statistical analysis of the relation between spot and future price shows differences across crops.*

EVOLUTION OF AGRICULTURAL FUTURES IN INDIA

The future market for commodities in India dates back to more than a century. Bombay Cotton Trade Association was the first organized future market that came up in 1875 to trade in cotton derivatives¹. Cotton derivatives were followed by futures trading in oilseeds, food grains etc. The outbreak of two world wars saw a growth in number of commodity exchanges trading future. In the backdrop of supply shortage for major commodities and given the series of crop failure that engulfed certain parts of the country along with scorched-earth policies² of the government in pre-independence era, future trading was prohibited under Defence of India Act.

Although during the 50's and first half of 60's, the futures trading picked up pace but again due to distressed situation prevailing in country owing to two drought years and food shortage prevailing in those times, futures trading was banned in the country except for two commodi-

ties i.e. pepper and turmeric. In the 80's, futures trading opened up to few more commodities like potato, castor seed and jaggery. By the late 90's and early 2000, trading extended to edible oil seeds and sugar. In 2003, the government thereof decided to lift off the prohibition on commodities which were banned for future trading and additional 54 commodities were introduced along with the recognition of three major National Commodity Exchanges namely MCX, NCDEX and NMCE. These exchanges are not only confined to future trading and reporting daily spot prices to agricultural commodities but these extend to energy products, precious metals as well as base metals.

SELECTION OF CROPS

This study has focused on few selected crops. These are wheat, mentha oil and cotton. The table shown below depicts the value and volume of trading for the selected crops from 2010 onwards³.

TABLE 1: Volume and Value of trade for selected commodities from 2010-11 to 2013-14

	V	O	L	U	M	E(lkh ton)	V	A	L	U	E(rs cror)	
YEAR/CROPS	2010-11	2011-12	2012-13	2013-14	2010-11	2011-12	2012-13	2013-14	2010-11	2011-12	2012-13	2013-14
Cotton	NL	1.99	15.90	35.05	NL	2026.09	15824.33	48829.14				
mentha oil	4.92	4.36	4.42	3.72	45787.14	51933.03	60088.67	34364.85				
wheat	21.49	19.27	31.91	8.45	2657.99	2264.9	4568.82	1317.04				

Source: Forward Market Commission, Monthly Bulletin (2010-14)

Keeping in view, the interest of the farmers the government announces Minimum Support Prices for major crops; wheat and cotton are among them. MSP's which are set by the government serve as floor prices, below which market prices can not fall. It would be interesting to compare the volatility in prices listed under MCX and the MSP for the time period under consideration.

Mentha again is widely cultivated in India and it is the leading exporter and producer of Mentha oil in the world. The table above reveals however, that although for Mentha oil the average volume traded for the first three years under consideration i.e. from 2010-13 has been around 4.5 lakh tonnes but the value of trade for Mentha oil, on an average has been higher compared to wheat and cotton.

GRANGER CAUSALITY TEST – DOES FUTURE PRICE ALWAYS PREDICT SPOT PRICES?

The Granger Causality is a statistical concept which is based on method of prediction and is used to analyse whether price discovery process is there or not. Suppose, St_i is the spot price of commodity 'i' in period t. Let $F(t-1)_i$ be the future prices of commodity i in period (t-1). Then, if it is the case that $F(t-1)_i$ granger causes St_i , then the former set of price should contain some information that helps predict latter set of prices. This, in a way also serves the purpose to solve the problem of 'missing market'. How far this has been successful in case of the above selected commodities mentioned above could be analysed using the VARGRANGER statistics mentioned below. The granger causality test shown here has two null hypotheses. H_0 : is spot prices does not granger causes future prices

and H_2 : is future prices does not granger causes spot prices. Testing at 5% significant level, if the p-value is less than 0.05 and assuming that the null hypotheses is true, then we shall reject the null hypotheses and vice versa.

TABLE 2: SHOWS BELOW THE p-VALUE STATISTICS FOR GRANGER CAUSALITY WALD TEST

COMMODITY/ p-VALUE	SPOT PRICE DOES NOT CAUSE FUTURE PRICE	FUTURE PRICE DOES NOT CAUSE SPOT PRICE
COTTON	0.006	0.001
MENTHA OIL	0.574	0.001
WHEAT	0.358	0.001

It can be inferred from the table presented above, that the hypothesis that future price does not granger cause spot price gets rejected for all. . The other hypothesis gets accepted except for cotton, showing a bi directional causal link for this crop. Why might this be the case?

In case of cotton; import, export and MSP's are heavily influencing price factors, so here we can nullify the hypothesis that future prices does not cause spot prices (i.e. this hypothesis does not holds true) but again the other hypothesis is getting accepted. So a bi directional causal link is obtained. Other considerations like domestic demand-supply scenario, cost of production, international prices and inter crop price parity plays a role in affecting the prices.

However, the use of granger-causality tool has its limitations because it does not allow us to distinguish between cause and effect, but nonetheless is useful for predicting price movements.

CASE OF STABILIZING SPECULATION

TABLE 3: SHOWING ELASTICITY OF DIFFERENT COMMODITIES WHERE; ELASTICITY = (Δ IN SPOT PRICES/ Δ IN FUTURE PRICES)

The elasticity, so calculated by the formula shows a case of stabilizing speculation i.e. elasticity < 1 which implies any change in future prices causes less change in spot prices (given the causality running from future to spot prices).

Commodity	ELASTICITY
COTTON	0.23
WHEAT	0.25
MENTHA OIL	0.55

A COMPARISON OF VOLATILITY ACROSS CROPS

Commodity	S.D. SPOT (volatility)	S.D. FUTURE(volatility)
COTTON	0.83	3.89
WHEAT	3.19	1.18
MENTHA OIL	2.89	3.88

Volatility is a measure of dispersion in prices. The table below provides a comparison in standard deviation for spot as well as future prices. There are two sets of prices under consideration here; spot prices and the future prices. Time period under consideration is from January 2008-march

2014. Volatility in itself does not tell us anything about the direction of changes in the prices because while calculating standard deviation, all differences whether negative or positive are squared.

A comparison could be observed in case of wheat with a low future price volatility compared to volatility in MSP or spot. The government policies with regards to MSP, Buffer stock are very influential in context of Indian wheat prices and thus lead to less anticipatory future price changes. Cotton future prices also show high volatility compared to spot prices. Irrespective of the variety, fluctuations in export demand and global production has direct influence on future prices¹. Mentha oil has moderate amount of volatility in spot. Mentha oil, although having less than 1 % share in total volume traded in agricultural commodities has a decent share in value traded).

A GRAPHICAL COMPARISON OF MSP LISTED CROPS AND THIER MONTHLY SPOT PRICES

TABLE 4; SHOWING MSP AND MONTHLY AVERAGE SPOT PRICE FOR COTTON IN RUPEES/MAUND [JAN-08 TO JULY 10]

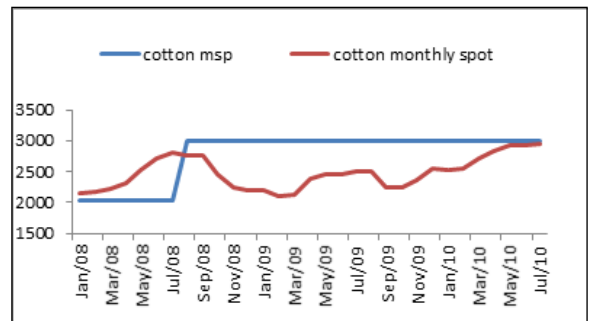
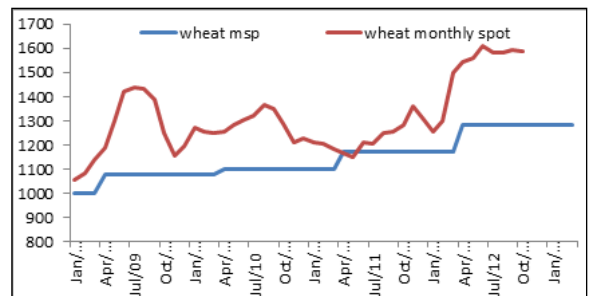


TABLE 5; SHOWING MSP AND MONTHLY AVERAGE SPOT PRICE FOR WHEAT IN RUPEES/ QUINTAL [JAN-09 TO MARCH-13]



A graphical comparison between MSP's of wheat and cotton with their corresponding monthly spot shows that on an average the latter has been higher than the former while the case has been opposite for cotton (long variety for cotton is taken here). Previously, it was shown that the causality result did not hold for cotton while wheat had the causality direction as per expectations. Perhaps, this could explain the reason why cotton future prices does not cause spot price because if MSP prices are higher than spot market price then it is implied government policies influences pricing decisions in future.

CONCLUSION

The aim of the paper was to identify if any causal linkages were present between the spot and future price and

whether the future market in India is successful in mitigating price risk by comparing volatility. The paper also attempts to compare the MSP prices and spot prices and the result are in reason with the theoretical analysis carried out for the selected crops. This paper also leaves a future scope for estimating international price spill over on Indian commodity prices.

Post 2001, Indian agriculture opened up in the global scenario and variety of factors have played a role in determining commodity prices apart from the physical fundamentals of demand and supply like growth in demand for commodities from emerging countries, alternative use of agricultural commodities for bio-fuels, weather related supply shocks etc. Along with these developments, increasing presence of financial investors was also observed in commodity future market. The case for India has been judged here on the basis of whether the participants of the future markets used it to hedge against the price fluctuations or the speculators hope to take advantage of changes in the future prices and make profit by accepting price risk in exchange for providing liquidity by actively trading in futures market and such markets lead to efficient price discovery.

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