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EVOLUTION OF INDIAN AGRICULTURAL COMMODITY EXCHANGES AND PRICE DISCOVERY

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ABSTRACT

A lot of research has been done on the process and nature of information transactions between spatially or temporally separated markets and their level of integration. Relationships between markets can be used as an input for policy-making. This study briefly delineates evolution of the Indian commodity markets, both spot and futures. Ever since establishment of exchange-traded electronic futures market in the country, its convergence with spot market has been under researchers' scanner. Futures market is supposed to take the lead in price-discovery and provide a platform for downside risk transfer or sharing. But, the current level of farmers' participation does not establish that. This invites a careful analysis, more so because erstwhile commodity-market regulator Forward Markets Commission is now merged with Securities and Exchange Board of India.

INTRODUCTION

Wholesale markets for agricultural commodities – 'mandi' as it is called in some parts of the country – have been in India for centuries. Futures in the context of commodities – *satta* as they were known in some parts of the country - have been referred to in Kautilya's epic treatise, *The Arthashastra* (Rangarajan 1992: 207), which is believed to be dated between third century BC and second century AD. Bhattacharya (2007), who chronicled the evolution of commodity-derivative market in India, gave the following account.

"The Cotton Trade Association began futures trading in 1875 in Bombay. Derivatives in oilseeds started in Bombay in 1900, raw jute and jute products in Calcutta in 1912, wheat in Hapur (Uttar Pradesh) in 1913 and bullion in Bombay in 1920. Before the second world war, a large number of commodity exchanges and trading futures contracts in several commodities like cotton, groundnut, groundnut oil, raw jute, jute goods, castor seed, wheat, rice, sugar, precious metals, like gold and silver flourished throughout the country."

Shortly after India adopted its constitution in 1950, Forward Contracts (Regulation) Act 1952 was brought into force. It put restrictions on trading of spot contracts and derivatives on commodities. It was later extended to cover more asset classes. It was only in the beginning of the current century that commodity futures found favor with the central government. So, the ban was lifted in 2003. Based on the recommendations of Kabra Committee (1994) and Expert Committee on National Agricultural Policy (2000), organized exchange like National Multi-commodity Exchange of India (NMCE) came in 2002 at Ahmedabad. It was followed by National Commodity and Derivative Exchange (NCDEX) and Multi Commodity Exchange (MCX) at Mumbai in 2003. By 2013, there were more than twenty commodity exchanges, with above three being the main ones. Among the national exchanges, MCX and NCDEX jointly contribute around 98% of market share in futures trade; MCX alone accounts for of 85%. Thus, other national and regional exchanges together contribute a paltry share. Over the last decade, MCX has concentrated more on non-agricultural commodities. But, NCDEX still focuses more on agricultural commodities.

These institutions are operating in their respective fields for over a decade. Now, it needs to be analyzed how far they have become successful in their vision and mission. NCDEX, the technology-driven electronic trading exchange has tried, since its inception, to provide a platform for the market participants, especially farmers, to reap the benefits of a professional, liquid, and transparent commodity derivative market with the best possible risk transfer mechanism - primarily through its futures market. Yet, even after so many years, farmers' participation is still quite low. Out of 1,63,000 registered farmers, who are primarily members of various farmer producer organizations, only 33,000 farmers have traded in various commodities (Financial Express, 2017). That is quite dismal. To boost farmers' participation, options have been introduced; they are expected to augment liquidity in the system.

COMMODITY DERIVATIVES

In a futures contract, the buyer and the seller (say the farmer) agree to transact at a fixed price –the futures price - on a pre-specified later date, the maturity date. On the maturity date, if the agreed-upon futures price turns out to be lower than the open-market spot price, the farmer feels sad for committing to sell at a lower price; the reverse happens if futures price turns out to be higher. In this contract, no payment is made by either side at the time of contracting. But, in an option contract, the farmer pays a premium while entering into the contract, because she buys only the right to sell at a pre-specified price – the exercise or strike price - without any obligation whatsoever. Thus, if the open-market price is higher, the farmer gains by selling in the open market; but, if the open-market price is lower, she sells at the higher strike price. Thus, by paying a

premium, the farmer gets the right to upside gain, while having protection against downside risk. This feature should help farmers hedge their commodity price exposures; they can reap benefit of price insurance provided by options in case the open-market price falls below their cost of production.

Supplementing to the efforts of bringing in price stability in commodities, forwards were also introduced in 2014. In this instrument, quality and quantity of the commodity traded gets mutually decided by the buyer and seller while exchange guarantees for delivery. These over the counter (OTC) contracts are non-standardized but customized in nature and does not need any initial cash outflow. Having that advantage, it was expected to raise farmers' participation. However, to curb the consequential volatility in the commodities derivative market, Securities and exchange Board of India (SEBI) banned fresh forward contracts in January 2016. Currently, Option and Futures together are thought to be the expected game changers.

NSEL FRAUD

Despite being there for more than a century, commodity derivatives are yet to endear them to farmers. Initially, it was perhaps lack of familiarity. More recently, it has been a lack of trust in the derivatives. Government has often intervened to bring out modifications and desired reforms following different scams of different degrees. One such case was the 5,600-crore rupee money laundering scam at National Spot Exchange Limited (NSEL). NSEL, a company that provided electronic spot trading platform, allowed members to increase exposures without adequate collateral. So, it was found recently that it had only 15% of what it claimed to have as stock in its warehouses. This led to default in payment to about 13,000 investors. Shockingly, it was operating with more than 100% of its revenue blocked in receivables, and that did not get revealed in its audit report! This shattered investors' confidence to the core. As a remedial measure, in September 2013, Forward Markets Commission (FMC), the commodity market regulator, was brought from under Ministry of Consumer Affairs to under the Department of Economic Affairs of the Ministry of Finance. FMC got merged with SEBI after two years that is in September 2015. This led to a unified exchange regulator. It has somewhat restored market participants' confidence in the regulatory framework and rule.

FUTURES MARKET TRENDS

An analysis of commodity futures and their economic benefits have always been a topic of interest for producers, commercial entities, and researchers. Between January 2003 and January 2017, agricultural commodity futures markets trade value has increased 97-fold, whereas trade volume has become 6.8 times. In the last decade, commodity derivatives volume has gone through different

growth phases. We have taken data from 2004-05, the first year for which data was available for the whole year. Table 1 presents futures trade-value in different exchanges. As we see, total trade-value shoots up in 2005-06, but it falls in the next two consecutive years. From 2008-09 to 2011-12, a steady growth is noticed in the futures market. But then again it witnesses a continuous fall in the next three years, that is, up to 2014-15. That could be explained as the joint result of a) NSEL's fraud, which gives enough signals to the market participants and attenuates investors' confidence in futures market, and b) the Commodity Transaction Tax (CTT) imposition, which directly increased transaction cost of futures trade. In 2015-16, which includes period after SEBI becomes the commodities regulator, futures trade again witnessed growth. But after November 2016 demonetization and the resultant cash crunch, futures trade value fell by 45% at NCDEX, but increased by 4% for MCX.

Table 1: Futures Trade-Value in Indian Commodity Exchanges

Trade Value (Rs Lakh Crores)								
Year	MCX	Growth (%)	NCDEX	Growth (%)	Others	Growth (%)	Total	Growth (%)
2004-05	1.7	-	2.7	-	1.4	-	5.7	-
2005-06	9.5	472.7	10.9	309.7	1.2	-14.6	21.6	278.9
2006-07	22.9	141.0	11.6	6.8	2.2	88.4	36.8	70.4
2007-08	31.6	37.8	7.7	-33.7	1.4	-38.8	40.7	10.6
2008-09	45.9	45.1	5.3	-30.8	1.3	-5.2	52.5	29.0
2009-10	64.0	39.5	9.2	71.9	4.5	253.0	77.7	48.0
2010-11	98.6	54.0	14.1	53.7	6.8	50.8	119.5	53.8
2011-12	156.2	58.4	18.1	28.3	7.0	3.0	181.3	51.7
2012-13	149.1	-4.5	16.0	-11.7	5.5	-22.5	170.5	-6.0
2013-14	89.1	-40.2	11.5	-28.3	0.8	-84.6	101.4	-40.5
2014-15	53.2	-40.3	9.0	-21.1	-0.9	-207.4	61.3	-39.5
2015-16	56.7	6.7	10.2	12.8	1.0	-215.6	67.96	10.9

Source: SEBI and FMC

AGRICULTURAL - COMMODITY FUTURES MARKET TRENDS

Between 2004 and 2014, the share of agricultural commodities has sharply fallen from more than 50% to around 12% of total trade value, while the share of non-agricultural commodities has gone up from around 30% to more than 80% (Lingareddy 2015). Table: 2 shows exchange-wise contribution in all the four categories of commodities being traded in futures market. The three main national exchanges account for around 99% of the total futures trade. Agricultural commodities are predominantly being traded in NCDEX and NMCE. But, if we look at the trade value, NMCE's contribution has hardly been around 4% of NCDEX. The share of agricultural commodities had started rising in 2015-16, but witnessed a 30% fall in 2016-17. Similarly MCX, the biggest player in non-agricultural commodities market, contributes around 98% of total non-agricultural futures trade. After 2006-07, bullion market has continued to have the highest share among all other commodities traded in futures market; currently, in 2016-2017, it stands at 31% of the total trade.

Table 2: Futures Turnover in Indian Commodity Exchanges

Turnover (in Rs. lakh crore)					
Year	Exchange	Agriculture	Metals	Bullion	Energy
2010-11	MCX	1.14 (1.2)	25.09 (25.5)	51.69 (52.5)	20.49 (20.8)
2011-12	MCX	1.98 (1.3)	27.1 (17.4)	99.64 (63.9)	27.26 (17.5)
2012-13	MCX	2.7 (1.8)	31.4 (21.1)	78.07 (52.5)	36.64 (24.6)
2013-14	MCX	1.71 (2)	17.26 (20)	42.63 (49.5)	24.51 (28.5)
2014-15	MCX	1.1 (2.1)	12.74 (24.6)	21.53 (41.5)	16.46 (31.7)
2015-16	MCX	1.22 (2.2)	15.05 (26.7)	20.7 (36.7)	19.37 (34.4)
2016-17	MCX	1.39 (2.4)	17.54 (29.9)	20.4 (34.8)	19.32 (32.9)
2010-11	NCDEX	11.1 (78.7)	0.37 (2.6)	0.71 (5)	1.93 (13.7)
2011-12	NCDEX	16.64 (91.9)	0.3 (1.7)	0.29 (1.6)	0.86 (4.8)
2012-13	NCDEX	15.57 (97.4)	0.08 (0.5)	0.01 (0.1)	0.32 (2)
2013-14	NCDEX	11.39 (99.3)	0.0	0.06 (0.5)	0.01 (0.1)
2014-15	NCDEX	8.71 (96.3)	0.0	0.33 (3.6)	0 (0.1)
2015-16	NCDEX	9.99 (98)	0.0	0.21 (2)	0.0
2016-17	NCDEX	5.97 (99.9)	0.0	0 (0.1)	0.0
2010-11	NMCE	1.29 (59.3)	0.72 (33.1)	0.17 (7.6)	0.0
2011-12	NMCE	1.34 (49.8)	1.11 (41.5)	0.23 (8.7)	0.0

2012-13	NMCE	1.07 (60.4)	0.64 (36.1)	0.06 (3.5)	0.0
2013-14	NMCE	1.32 (86.7)	0.14 (9.1)	0.06 (4.2)	0.0
2014-15	NMCE	0.36 (100)	0.0	0.0	0.0
2015-16	NMCE	0.29 (100)	0.0	0.0	0.0
2016-17	NMCE	0.28 (100)	0.0	0.0	0.0
Year- wise Sectoral Share (%) in Total Futures Trade					
2010-11		11.8	22.8	45.8	19.5
2011-12		11.3	16.1	56.7	15.9
2012-13		11.6	19.3	46.9	22.2
2013-14		14.6	17.6	43.1	24.7
2014-15		16.6	20.8	35.7	26.9
2015-16		17.2	22.5	31.3	29.0
2016-17		11.8	27.0	31.4	29.8

Source: SEBI Bulletin (*Figures in the brackets refer to percentage share in total of all three national exchanges*.)

ROLE OF FUTURES MARKET IN PRICE DISCOVERY

Informationally efficient markets are those where price of each asset reflects, as soon as possible if not immediately, all available material information regarding the asset. Market Microstructure studies "how specific trading mechanisms affect the price formation process" (O'Hara 1995). Price is determined by demand and supply. But how the buyer (or the demand) and seller (or supply) meet – or what the 'exchange' or the 'market' looks like - can vary drastically: from one-to-one face-to-face meeting on one extreme to program-trading on the other. Thus, when new material information about an asset arrives in the market, it gets incorporated in the asset's price very 'fast', how fast depending on the degree of the market's efficiency. When multiple markets are there, like spot and futures, differences in the degree of efficiency in reflecting the new information can arise. So, one of the markets may be the most efficient in incorporating the new information; this market is where the 'price formation' – or the *initial* 'price formation' - takes place. Another market may be the least efficient. But, there is more. If the markets are all independent, 'price formation' processes in them are all independent. If they are integrated, however, then information flows from one market to another. In one extreme, price may form in one market and other markets just follow suit ('borrow the prices'); here, the former is the 'dominant' market and the latter 'satellites' (Garbade and Silber 1979).

Futures price for a commodity is given as follows: $f = S (1 + r + i – q - y)^T$, where f is the futures-price of the contract maturing at the end of T periods, S is the current spot price, r is the risk-free interest rate per period, i is the per-period inventory cost (like that for storage and insurance, expressed as a function of the value of the asset put in the inventory), q the return on the underlying asset, and y its convenience yield. The period can be a day, week, month, year, or something else. The above basic structure elaborates the mutual inclusiveness of both the markets, spot and futures. Given a specific commodity and type of commodity, the spot and futures prices are essentially derived from the same basic information about the current and prospective demand and supply. Ideally these two markets should reflect parallel prices (Pavaskar 2015) on the basis of identical fundamentals.

DID FUTURES BENEFIT FARMERS?

One of the most important objectives of a commodity derivative market is to bring in price stability or price risk management opportunity. Most often, it is argued and believed by the local farmers that futures market is dominated by speculative interest, which drives prices away from the underlying reality assessed with all available information. The prices in spot and futures market at times present contrasting fundamentals which erodes investors' confidence to the core.

In an earlier study of mentha producing districts, Sahadevan (2008) has depicted his observations regarding farmers shying away from futures; that gets reflected in abysmally low futures market participation. From the farmers' perspective, futures trading have been observed to be under the cloud of skepticism. To bring in efficient market functioning, he suggested for a balanced existence of an active spot market along with genuine hedgers as well as speculators. Similarly, through ethnographic interviews involving soybean traders, it has been shown that these traders, who form a significant part in soybean supply chain, think online futures market - or dabba in local parlance - as nothing but a game of speculation/*satta* (Kumar 2010). When a great chunk of farmers refrain from entering the market, free flow of information regarding demand and supply gets obstructed, thus providing wrong signals. As we know, information flow plays the most important role in efficient price-discovery mechanism.

ROLE OF REGULATION TO BRING IN FARMER PARTICIPATION

Agricultural commodities supply is mostly seasonal and not uniform in characteristics. This leads to variation in prices across locations. This sector also envelops many small and medium traders who buy at harvest, stock them, and sell in lean period in open market. They hesitate to go to futures markets, since taking futures position requires quality or grade assessment of their product, which is a relatively difficult task for them. Indian commodity regulator faces many complex challenges

which are being generated by fragmented and dispersed characteristics of underlying markets; the fundamentals are beyond the regulator's purview.

An exchange should ideally provide participants with different well-priced instruments among which they would be free to choose their desired one in a customized way. The exchange itself should safeguard the interest of investors. As agricultural production is seasonal and the quantum of produce is fixed during a given time-period, too much of volatility should obviously be not expected in futures prices – given the way future prices are ideally set. Volatility futures price would show nothing but the regulator's inability to control the noise. Sufficient number of warehouses needs to be built and protection measures to be taken so that the crop in the inventory remains intact in its size and quality. A recent NCDEX audit finds 12% coriander stock in Kota and Ramganj warehouses completely damaged and another 25 % showing moisture exceeding permissible level of nine percent (Economic Times 2016). That automatically triggers questions on forward delivery of the goods in conformity with contract specifications. Encouraging famers to participate would also need providing them with the best possible financial services at reasonable interest rate so that financial concerns are completely taken care of. Future markets volatility has often influenced commodity spot market (Srinivasan, 2012). So, the regulator's emerging role becomes effective monitoring of the system. Finally, conducting awareness programs for farmers in these fields would certainly accelerate the move.

With a vision to evolve new products, SEBI has initiated commodity options, which would perform better if the underlying spot market becomes active. The regulator also targets to bring in new category of participants and desired liquidity in this market. To take care of policy issues, a separate department called CDMRD (Commodity Derivatives Market Regulation Department) has been created. "In this regard, the recent initiative of Government in setting up the National Agricultural Market (NAM) - a pan India electronic trading portal networking the existing Agricultural Produce Market Committee (APMC) markets, so as to create a unified national market for agricultural commodities will go a long way in streamlining the underlying market and enabling uniform spot prices" (SEBI 2016)

CONCLUSION

National and regional commodity exchanges in India were created with an objective to provide economic utility to the farmers and other participants. Unfortunately, this has not been achieved so far; barely few of them are exchange literate. We feel the necessity of providing training through a commodity derivatives simulator that would provide direct practical exposure and thus push people to participate in this process after they understand market fundamentals. Even if they do not

participate, they would at least become aware about the role of hedgers, speculators, etc. along with derivative market nuances. With a vision to evolve new products, SEBI's options initiation is expected to work out, provided the underlying spot market actively responds to all available information.

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