

Profile and growth of agricultural commodity futures in India

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Introduction

Agricultural commodity markets date back to yesteryears. It is believed that Kautilya's 'Arthashastra' refer market operations similar to futures markets in India for thousands of years (Srinivasan, 2008). However, organised trading in commodity futures commenced in the later part of the 19th century with the establishment of Bombay Cotton Trade Association, 1875. Some of the important markets established during the pre-independence era were: Gujarati Vyapari Mandali in 1900 (oilseeds), Calcutta Hessian Exchange Limited in 1919 (raw jute), East India Jute Association Limited in 1927 (raw jute), East India Cotton Association, Mumbai in 1921 (cotton) and Hapur, Muzaffarnagar, Bhatinda Exchanges in 1942 (wheat). All these markets traded only a single commodity that is specific to a particular region or locale. So there existed a need for the multi-commodity trade exchange. The number of commodity markets in the pre-independence era was limited, and there were no uniform guidelines or regulations: trade was basically done on mutual trust and social control (Srinivasan, 2008).

In 1947, the Bombay Forward Contracts Control Act was enacted by the Bombay state. The legal framework for organising forward trading and the recognition of exchanges was only provided after the adoption of the constitution by a central legislation called Forward Contracts (Regulation) Act 1952. Subsequently, Indian Pepper and Spice Trade Association (IPSTA) was started at Cochin in 1957.

Despite the issue of rising food prices due to supply shock, futures trade was altogether banned in 1966. Consequent to this, Khusro Committee (1980) appointed to review the ban on futures trade, recommended reintroduction of futures in cotton, jute and potatoes. In 1994, the Kabra Committee recommended the opening up of futures trading in 17 commodities, excluding wheat, pulses, non-basmati rice, tea, coffee, dry chilli, maize, vanaspati and sugar. There were a number of other expert committees, including the Shroff Committee, Dantwalla Committee and the Khusro Committee, which laid the foundation for the revival of futures trading.

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Many reports, notably a UNCTAD and World Bank joint mission report (1996) highlighted the role of futures markets as market based instruments for managing risks. The report suggested strengthening the institutional capacity of the regulator and commodity exchanges for efficient performance. The report also noted that government intervention is pervasive in some sensitive commodities like wheat, rice and sugar and was of the view that futures markets in these commodities were unlikely to be viable because of its sensitive role in economy.

Another major policy statement, the National Agricultural Policy, 2000, also expressed support for commodity futures. The Guru committee (2001) on "Strengthening and Developing Agricultural Marketing" emphasized the need for and role of futures trading in price risk management and in marketing of agricultural produce as it essentially helps in the process of price discovery and risk transfer. It recommended that it should be left to interested exchanges to decide the appropriateness/usefulness of commencing futures trading in products (not necessarily of just commodities) based on concrete studies of feasibility on a case-to-case basis.

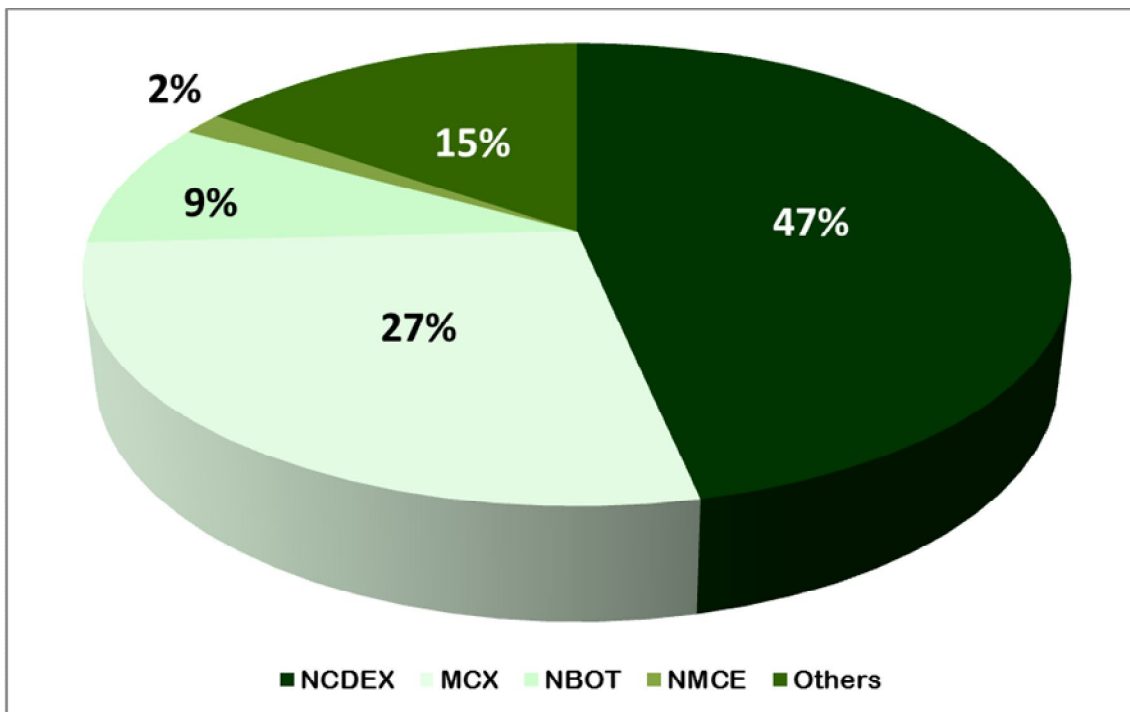
National Multi Commodity Exchange (NMCE) was the first exchange to be granted permanent recognition by the government, where futures trading started from 26th November, 2002 in 24 commodities. Subsequently, Multi Commodity Exchange of India (MCX), National Commodity and Derivatives Exchange Limited (NCDEX), Indian Commodity Exchange (ICEX) and Ace Commodity Exchange (ACE) commenced their operations, respectively, from November 2003, December 2003, November 2009 and October 2010. Apart from these, there are about 16 recognised futures exchanges in India with more than 3000 registered members. Trading platforms can be accessed through 20000 terminals spread across 800 towns/cities across the country. Forward Markets Commission (FMC) under the Ministry of Consumer Affairs is the chief regulator of futures trading in India.

Futures trading achieved an impressive growth in terms of number of products offered, participants, spatial distribution and volume of trade since the establishment of the organised commodity exchanges in the country. In this milieu, the present study aims to bring out the profile and growth of selected agricultural commodities that are traded in futures market.

Data and methodology

Among the commodity exchange platforms operating in India, NCDEX was purposively chosen as it holds the major share (47 %) in agricultural commodity trading (Figure 1). Top 20 agricultural commodities in the trade value of NCDEX for the agricultural year 2009-10 were selected for the present study. Time series monthly data on quantity traded and its value, lot size and date of

commencement of trading were collected from the NCDEX portal for 2009-10 and for the whole period (right from commencement date of futures trading) for comparison purposes. Compound growth rate and Cuddy-Della Valle instability index (Cuddy and Della Valle, 1978) were computed to examine the growth and instability in selected commodities.



Source: Forward Markets Commission

Figure 1. Share of agricultural commodities trade in exchanges (2009-10)

Research Findings

Agricultural commodities led the initial spurt, and constituted the largest proportion of the total value of trade till 2005-06. But in 2006-07 agricultural commodities contributed only a small fraction. This was partly due to the stringent regulations imposed on agricultural commodities trading and the dampening of sentiments due to suspension of trade in few commodities (Sen, 2008). After 2008, there has been a great revival of commodities futures trading in India, both in terms of number of commodities as well as the trade value. Agricultural commodities trade on NCDEX platform showed a positive trend in terms of value (Figure 2 and 3). The business reached its peak in 2006 with an impressive growth of 497 per cent between 2004 and 2005, then declined till 2008 and revived thereafter.

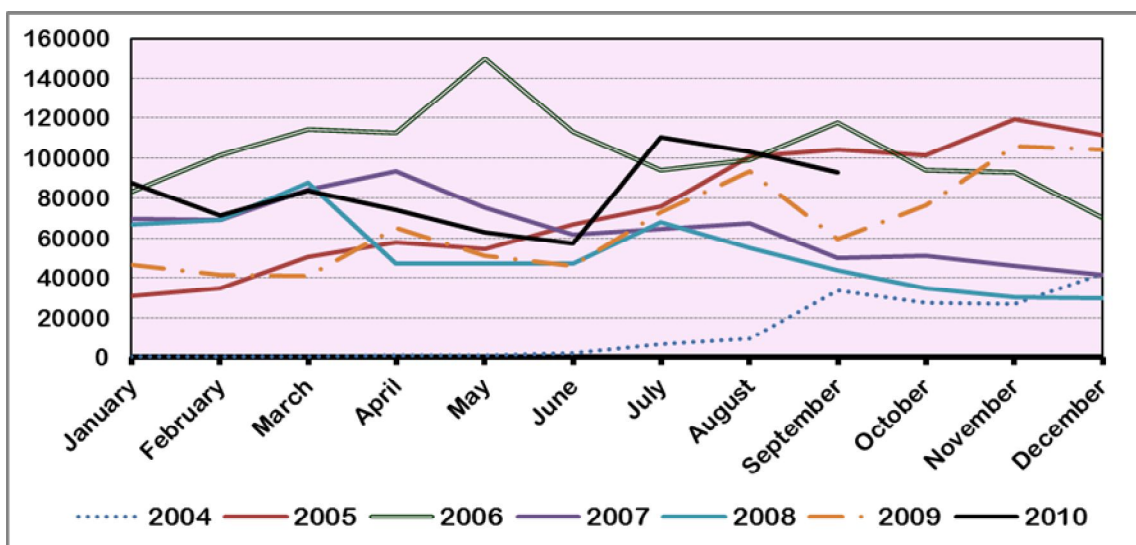


Figure 2. Month wise trade value (` crore) of agricultural commodity futures in NCDEX

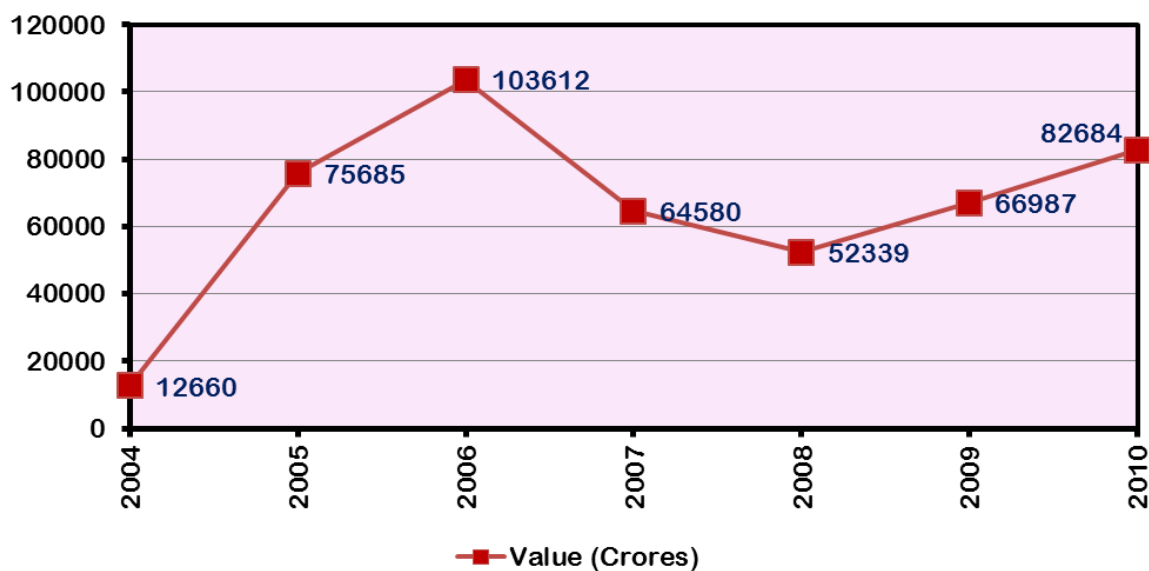


Figure 3. Year wise trade value of agricultural commodity futures in NCDEX

Table 1 furnish the basic information on selected commodities viz., trading symbol of the commodity in Indian commodity exchanges, inception date of futures trading, contract size along with the trade value for the agricultural year, 2009-2010. Among these commodities; refined soya oil, soybean, mustard seed and crude palm oil were the first to be traded. Guar seed ranked first in futures trade with a turnover of ` 280991 crore, followed by refined soya oil and chickpea. Traders speculate guar with the motive of earning high profit owing to its growing demand for the preparation of capsule covers and an additive for smooth oil mining.

The estimated parameters for trade quantity and trade value of selected commodities both for 2009-2010 and from the date of inception are presented in Table 2 to 5. Growth rate could not be calculated from the date of inception for some of the commodities due to lot of missing observations directed by the absence of trade i.e., natural logarithm of zero is indeterminate.

Table 1. Profile of the selected agricultural commodities traded in NCDEX

S.No.	Commodity (Scientific name)	Trade symbol	Futures trading started from (DD.MM.YY)	Lot size (tonnes)	Trade value in `crore (July'09- June'10)
A. Foodgrains and vegetables (5)					
1.	Chickpea or Chana (<i>Cicer arietinum</i>)	CHARJDEL	12.04.2004	10	116770.90
2.	Wheat (<i>Triticum aestivum</i>)	WHTSMQDELI	10.06.2005	10	4027.55
3.	Maize (<i>Zea mays</i>)	MAIZYRNZM	05.01.2005	10	995.13
4.	Potato (<i>Solanum tuberosum</i>)	POTFAQDEL	07.07.2006	15	935.46
5.	Barley (<i>Hordeum vulgare</i>)	BARLEYJPR	11.12.2006	10	819.01
B. Oilseeds (6)					
6.	Refined soya oil (<i>Glycine max</i>)	SYOREFIDR	15.12.2003	10	127545.73
7.	Soybean (<i>Glycine max</i>)	SYBEANIDR	15.12.2003	10	95102.29
8.	Mustard Seed (<i>Brassica nigra</i>)	RMSEEDJPR	15.12.2003	10	80157.31
9.	Cotton seed oilcake (<i>Gossypium spp</i>)	COCUDCKDI	05.04.2005	10	17383.29
10.	Castor seed (<i>Ricinus communis</i>)	CASTORDSA	23.07.2004	10	367.91
11.	Crude palm oil (<i>Elaeis guineensis</i>)	CRDPOLKDL	15.12.2003	10	161.66
C. Spices (4)					
12.	Turmeric (<i>Curcuma longa</i>)	TMCFGRNZM	27.07.2004	5	78323.40
13.	Cumin or Jeera (<i>Cuminum cyminum</i>)	JEERAUNJHA	03.02.2005	3	38278.98
14.	Pepper (<i>Piper nigrum</i>)	PPRMLGKOC	12.04.2004	1	35210.69
15.	Chilli (<i>Capsicum annum</i>)	CHLL334GTR	10.11.2005	5	2237.56
D. Other commodities (5)					
16.	Guar seed (<i>Cyamopsis tetragonoloba</i>)	GARSEDJDR	12.04.2004	10	280990.63
17.	Guar gum (<i>Cyamopsis tetragonoloba</i>)	GARGUMJDR	26.07.2004	5	33557.30

18.	Gur or Jaggery (<i>Saccharum officinarum</i>)	GURCHKMZR	05.01.2005	10	10716.57
19.	Kapas (<i>Gossypium spp.</i>)	KAPASSRNR	07.08.2006	4	5276.70
20.	Sugar (<i>Saccharum officinarum</i>)	SUGARMMZR	27.07.2004	10	78.24

Foodgrains and vegetables

Wheat and maize exhibited a significant positive growth both in trade quantity and trade value during 2010 (Table 2). Positive growth in wheat is attributed to the surplus production and in maize due to its rising demand as a feed for poultry. Significant decline in trade value was noticed in chickpea (-3.43), a pulse crop owing to its declining domestic production and the policy dilemma whether to ban the crop from trading because of inflationary issue.

The instability in futures trading as measured by the coefficient of variation for no-time trend series and Cuddy-Della Valle instability index for time trend series showed that variation in trading is high in potato both in quantity (123.71%) and value (112.60%) for the year 2009-2010 followed by barley and maize. Instability from the date of inception of trading was highest in the case of potato (172.12%) and maize (160.25%) in trade volume and value respectively. The instability analysis highlighted the stable performance of futures trading in India during 2009-2010 compared to the whole period. Positive skew distribution was observed in commodities bearing wheat and maize in 2009-2010. All the commodities showed a platykurtic (fat or short tailed) probability distribution function in 2009-2010; whereas, leptokurtic (slim or long tailed) pattern of distribution is noticed for the whole period.

Oilseeds

Significant and positive growth pattern was observed in cotton seed oil cake in both periods (2009-10 and whole period); whereas castor and refined soya oil exhibited a negative growth in 2009-10 (Table 3). Instability analysis indicated that variation in trade quantity and value was more for the whole period compared to 2009-10. It was highest for the crude palm oil for both quantity (395.04%) and value (383.23%) right from the date of inception. The reason behind this is its low domestic production and meagre share in global production (Appendix 1). India has to depend on rest of the world, particularly Malaysia for its domestic need.

Spices

Excluding chilli, rest of the spices showed a positive growth right from the date of inception of trading (Table 4) owing to the increasing demand for spices at global market. Interestingly the observed positive growth was more in trade value compared to trade volume. All spices exhibited a positive growth with the exception of turmeric in 2009-10. This indicated the demand for spice commodities among the stakeholders of the market. It also reflects the dominance of our country in total world production (Appendix 1). Instability index indicated that variation in trade quantity and value was more for the whole period compared to 2009-10. Chilli had the highest variation in both quantity (132.15%) and value (142.33%) of trade for the whole period. The reason is partly attributed to the speculation motive prevailing among the traders, who usually seeks profit out of futures trading.

Table 2. Growth, instability and descriptive statistics for agricultural commodity futures

Commodity	Parameter	2009-10		From inception	
		Quantity	Value	Quantity	Value
Foodgrains and vegetables					
Chickpea	CGR (%)	-2.33	-3.43*	--	--
	S.D	874072.67	2471.17	4158934.27	9421.62
	Mean	4060953.33	9730.90	4379117.04	9778.46
	Instability (%)	21.52^	25.40^	92.86^	94.32^
	Skewness	0.26	0.30	1.35	1.35
	Kurtosis	-1.55	-1.38	1.34	1.67
Wheat	CGR (%)	10.02**	10.15**	--	--
	S.D	114439.97	156.01	1148789.81	1033.76
	Mean	263709.17	335.63	623455.67	587.12
	Instability (%)	43.40^	46.48^	159.68^	155.80^
	Skewness	-0.31	-0.15	2.81	2.87
	Kurtosis	-1.59	-1.55	8.40	9.28
Maize	CGR (%)	20.32***	20.59***	--	--
	S.D	49250.21	47.24	315254.08	249.87
	Mean	87640.83	82.93	199802.50	154.05
	Instability (%)	56.20^	56.97^	154.03^	160.25^
	Skewness	-0.59	-0.51	4.16	4.42
	Kurtosis	-1.39	-1.42	22.83	25.52
Potato	CGR (%)	--	--	--	--
	S.D	177635.28	87.78	353604.87	146.91
	Mean	143585.00	77.96	191071.85	99.50
	Instability (%)	123.71^	112.60^	172.12^	138.27^
	Skewness	1.05	1.05	3.44	2.38
	Kurtosis	-0.22	0.22	13.42	5.85
Barley	CGR (%)	7.98	9.72	--	--
	S.D	58371.93	64.49	65920.38	70.52
	Mean	66472.50	68.25	60231.02	62.04
	Instability (%)	87.81^	94.49^	108.29^	113.48^
	Skewness	1.04	1.15	2.04	2.33
	Kurtosis	-0.23	0.00	5.42	7.40

Note: Quantity traded in tonnes and trade value in ` crore

***, ** and * indicate the significance respectively at 1, 5 and 10 per cent level of probability

^ indicates the coefficient of variation and ^ indicates the Cuddy-Della Valle instability index

Table 3. Growth, instability and descriptive statistics for agricultural commodity futures

Commodity	Parameter	2009-10		From inception	
		Quantity	Value	Quantity	Value
Oilseeds					
Refined soya oil	CGR (%)	-5.71**	-5.87**	--	--
	S.D	711593.43	3598.38	1240592.70	6732.95
	Mean	2294216.67	10628.61	1269036.41	6159.23
	Instability (%)	31.02^	33.85^	97.76^^	109.31^^
	Skewness	0.51	0.69	1.59	2.00
	Kurtosis	-0.21	0.04	2.68	4.72
Soybean	CGR (%)	-2.00	-3.42	7.49***	8.27***
	S.D	1263423.06	3113.79	1569872.32	3647.27
	Mean	3642861.67	7925.19	2127977.74	4166.99
	Instability (%)	34.68^	39.29^	73.77^^	87.53^^
	Skewness	0.08	0.23	0.50	0.74
	Kurtosis	-1.58	-1.39	-0.80	-0.61
Mustard	CGR (%)	1.35	0.45	6.15***	6.86***
	S.D	549650.63	1530.79	1249695.58	3632.51
	Mean	2484517.50	6679.78	1537298.99	3986.64
	Instability (%)	22.12^	22.92^	81.29^^	91.12^^
	Skewness	0.16	0.17	0.21	0.50
	Kurtosis	-1.53	-1.77	-1.33	-0.94
Cotton seed oil cake	CGR (%)	12.55***	11.42***	0.74***	1.90***
	S.D	549033.03	622.52	432217.62	506.49
	Mean	1288124.17	1448.61	1002528.55	891.53
	Instability (%)	42.62^	42.97^	43.11^^	56.81^^
	Skewness	-0.58	-0.46	0.49	1.04
	Kurtosis	-1.57	-1.34	-0.99	0.17
Castor	CGR (%)	-12.81***	-10.87**	-2.52***	-1.45***
	S.D	7569.36	19.77	53739.62	107.23
	Mean	11605.83	32.75	72214.62	150.18
	Instability (%)	65.22^	60.37^	74.42^^	71.40^^
	Skewness	1.31	1.12	1.59	1.70
	Kurtosis	1.70	1.31	4.35	4.49
Crude palm oil	CGR (%)	-85.68**	-85.52	--	--
	S.D	11352.15	41.41	6041.46	21.44
	Mean	3693.33	13.47	1529.34	5.59
	Instability (%)	307.37^	307.42^	395.04^^	383.23^^
	Skewness	3.39	3.39	5.58	5.44
	Kurtosis	11.62	11.62	32.30	31.19

Note: Quantity traded in tonnes and trade value in ` crore

***, ** and * indicate the significance respectively at 1, 5 and 10 per cent level of probability

^ indicates the coefficient of variation and ^^ indicates the Cuddy-Della Valle instability index

Table 4. Growth, instability and descriptive statistics for agricultural commodity futures

Commodity	Parameter	2009-10		From inception	
		Quantity	Value	Quantity	Value
Spices					
Turmeric	CGR (%)	-9.98***	-3.54	3.74***	6.10***
	S.D	391025.86	2805.04	528648.17	2724.68
	Mean	735752.50	6526.95	619460.51	2789.97
	Instability (%)	53.15 [^]	42.98 [^]	85.34 ^{^^}	97.66 ^{^^}
	Skewness	0.80	-0.03	0.76	1.10
	Kurtosis	-0.55	-1.63	-0.36	0.36
Cumin	CGR (%)	5.97**	6.32*	0.65	1.72***
	S.D	83886.98	1334.64	282138.21	3589.23
	Mean	250068.25	3189.92	323982.76	3645.78
	Instability (%)	33.55 [^]	41.84 [^]	87.08 ^{^^}	98.45 ^{^^}
	Skewness	0.47	0.98	2.46	2.41
	Kurtosis	0.17	1.49	7.12	6.79
Pepper	CGR (%)	7.68**	9.23**	3.24***	4.62***
	S.D	78073.87	35210.69	267770.08	4044.72
	Mean	193260.42	1383.16	256742.48	3596.03
	Instability (%)	40.40 [^]	47.14 [^]	104.30 ^{^^}	112.48 ^{^^}
	Skewness	0.06	0.25	1.73	1.77
	Kurtosis	-1.62	-1.33	3.39	3.85
Chilli	CGR (%)	4.39	2.32	-4.94***	-4.61***
	S.D	14358.34	88.21	272000.75	1478.62
	Mean	35151.25	186.46	205828.23	1038.89
	Instability (%)	40.85 [^]	47.31 [^]	132.15 ^{^^}	142.33 ^{^^}
	Skewness	-0.11	0.49	1.56	1.95
	Kurtosis	-0.64	-0.23	1.50	3.69

Note: Quantity traded in tonnes and trade value in ` crore

***, ** and * indicate the significance respectively at 1, 5 and 10 per cent level of probability

[^] indicates the coefficient of variation and ^{^^} indicates the Cuddy-Della Valle instability index

Table 5. Growth, instability and descriptive statistics for agricultural commodity futures

Commodity	Parameter	2009-10		From inception	
		Quantity	Value	Quantity	Value
Other commodities					
Guar seed	CGR (%)	-4.27***	-3.59*	1.00*	1.50**
	S.D	2139023.16	5772.82	5444110.35	10923.20
	Mean	9806649.17	23415.89	8671677.53	16916.46
	Instability (%)	21.81 [^]	24.65 [^]	62.78 ^{^^}	64.57 ^{^^}
	Skewness	0.44	0.34	1.21	1.00
	Kurtosis	0.47	-0.89	1.88	1.15
Guar gum	CGR (%)	-2.49	-2.19	0.08	0.15
	S.D	117507.31	758.34	282967.35	1456.71
	Mean	551834.17	2796.44	330692.37	1613.58
	Instability (%)	21.29 [^]	27.12 [^]	85.57 ^{^^}	90.28 ^{^^}
	Skewness	0.95	0.83	0.95	0.99
	Kurtosis	0.58	-0.70	0.05	0.03

Gur	CGR (%)	-0.86	-1.92	0.30	1.40***
	S.D	79952.32	256.00	281422.12	492.02
	Mean	337010.83	893.05	320273.89	575.88
	Instability (%)	23.72 [^]	28.67 [^]	87.87 ^{^^}	85.44 ^{^^}
	Skewness	-0.10	0.27	4.15	3.02
	Kurtosis	-1.13	-0.54	23.50	14.69
Kapas	CGR (%)	13.15	14.65	--	--
	S.D	34197.36	441.47	29722.78	380.55
	Mean	34831.75	439.73	32000.77	355.50
	Instability (%)	98.18 [^]	100.40 [^]	92.88 ^{^^}	107.05 ^{^^}
	Skewness	0.32	0.38	0.80	1.18
	Kurtosis	-1.83	-1.72	-0.48	0.21
Sugar	CGR (%)	--	--	--	--
	S.D	7304.79	17.47	721056.93	1308.51
	Mean	2649.17	6.52	745589.87	1309.38
	Instability (%)	275.74 [^]	267.97 [^]	94.11 ^{^^}	97.45 ^{^^}
	Skewness	3.29	3.25	0.85	0.93
	Kurtosis	11.08	10.83	0.01	-0.05

Note: Quantity traded in tonnes and trade value in ` crore

***, ** and * indicate the significance respectively at 1, 5 and 10 per cent level of probability

[^] indicates the coefficient of variation and ^{^^} indicates the Cuddy-Della Valle instability index

Other commodities

Guar seed is the most tradable commodity in commodity futures because of its demand in the country. The growth and instability analysis indicated that guar seed had significant positive growth right from the start of trade in NCDEX but negative growth during 2009-10 (Table 5). This is due to the supply shock in the domestic market particularly in Rajasthan, the major guar growing state. Excluding sugar, a sensitive commodity in futures, instability in trade volume and value was higher for the whole period compared to 2009-10. The reason owing to the ban imposed on sugar trading on May 27, 2009 following a shortage and the associated increase in its price. This created skepticism in sugar trading among the stakeholders of market.

Conclusion

After the establishment of organised commodity exchanges in 2003, growth in volume and value of traded agricultural commodities picked momentum and was more pronounced till 2006. Later it declined sharply due to the ban imposed on few commodities owing to the fear of inflation and other market sentiments. Finally, the growth regained its momentum till now due to strong economic fundamentals in the commodity sector. This increased the variability in the trade volume and value, and is reflected explicitly in the instability index. The present study revealed

positive growth in wheat, maize, barley, mustard, cotton seed oil cake, cumin, pepper, chilli and kapas during 2009-10 owing to the surplus production (2009-10) and rising market demand of these commodities. On the contrary, soya oil, soybean, castor, crude palm oil and guar seed registered negative growth for trade quantity and value during the same period. From inception of trade, positive growth was noticed in soybean, mustard, cotton seed oil cake, turmeric, cumin, pepper, guar seed and guar gum. Significant negative growth was observed in castor and chilli right from the date of inception. Instability analysis indicated that variation is higher for the whole period compared to 2009-10 with the exception of pepper and sugar. This is due to the price fluctuations in the global and domestic markets that have a carryover effect on the commodity futures. Analysis on the nature of distribution showed that barring wheat, maize, cotton seed oil cake, chilly (quantity), turmeric (value) and gur (quantity) rest of the commodities showed a positive skewed distribution in 2009-10. From inception of trade, all the commodities showed a positive skewed distribution indicating that most of the observations concentrated on left of the mean, with extreme values to the right. Leptokurtic (>3 , values concentrated around mean) distribution was noticed in wheat, maize, potato, barley, castor, palm oil, pepper and gur. Rest of the commodities exhibited platykurtic (<3 , probability of extreme value is less and wider spread around the mean). The overall analyses indicated that futures trading exhibited significant positive growth coupled with instability in agricultural commodity trade.

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Appendix - 1

India's production and its share to global production (2009-10)

Crop	India's production	World production	India's position in production	Leading state
Barley	1500	150000	--	Rajasthan
	(1)	(100)		
Castor	8.40	16.01	First	Gujarat
	(52.48)	(100)		
Chickpea	7060	10461.22	First	Rajasthan
	(67.49)	(100)		
Chilly	1350	2960	First	Andhra Pradesh
	(45.61)	(100)		
Cotton	25000	105952	Third	Maharashtra
	(23.6)	(100)		
Palm oil	50	44953	--	--
	(0.11)	(100)		
Guar seed	350	--	First	Rajasthan
	--	--		
Jeera or Cumin	156.33	--	First	Gujarat
	--	--		
Maize	18500	789833	--	Andhra Pradesh
	(2.34)	(100)		
Mustard	6.40	--	Third	Rajasthan
	--	--		
Pepper	55	282.27	Second	Kerala
	(19.48)	(100)		
Potato	34391.00	329581.31	Third	Uttar Pradesh
	(10.43)	(100)		
Soya oil	1552	37295	Fourth	Madhya Pradesh
	(4.16)	(100)		
Soyabean	9.10	210.90	Fourth	Madhya Pradesh
	(4.31)	(100)		
Sugar	20750	159924	Second	Uttar Pradesh
	(12.97)	(100)		
Turmeric	66.43	--	First	Andhra Pradesh
	--	--		
Wheat	77500	656062	Second	Haryana
	(11.81)	(100)		

Source: Food and Agricultural Organization (FAO), indiastat portals.

Note: Production in '000 tonnes and figures in the parentheses indicate per cent share to the world total.