Commodity Market Inefficiencies and Inflationary Pressures - India's Economic Policy Dilemma

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With the current pace of growth, India would emerge as a major player in the international market in terms of commodity consumption, production and trade. Going by trade volume and also the possibly as an identifiable influence on the price making process on the essential commodities, the futures and spot markets have shown major variations. Increased volatility in asset prices has been a major reason behind the integration of domestic financial markets with the international financial sector accentuating the demand for the trading in the derivative market. Though organized commodity trading has been in from the nineteenth century in India, the commodity derivative markets in the new form with nationwide electronic trading and access have opened the gates for speculators, hedgers and other market participants to capitalize on the development. The robust growth of the commodity markets can be observed in terms of number of commodities trade volumes and growing number of both the market participants and the commodity exchanges. Liquidity booms reflected by loose monetary policy are responsible for major surge in commodity prices globally in addition to direct tangible impacts of oil prices especially in developing countries with heavy oil imports like India. Futures markets are created to fulfill genuine desires economic functions of hedging and price discovery. But, enormous futures trading observed on the commodity exchanges have raised a host of issues like inflation guided by the fuelling principle implying the direct relationship between volatility and inflation. Huge price volatility in futures segment on the commodity exchanges has therefore raised concerns relating to the market efficiencies, infrastructure and knowledge and also their consequential impact on cash markets. The demand and supply side of the commodity price mechanism is traditionally governed by numerous factors including the climatic conditions, availability of critical inputs and government policies. The consumer wholesale price index is loaded towards food prices that are primarily composed of commodity prices. Masters of the policy reforms are in a dilemma situation on various fronts – (a) to import or not? (b) What should be the interest rates reflected by the monetary policy, (c) can we or should we control monetary inflows from outside? (d) Should we support the farmers or the consumption masses? In addition, how and to what extent futures trading be allowed on the commodity exchanges and how to curb the loopholes in the commodity market.

Key Words: Inflation, Economic Policy, Volatility, Futures Trading,
JEL Code: E31, E43, G12, G13, E61

1. Introduction

The year 2003 is a watershed in the history of commodity futures market. The last group of 54 prohibited commodities was opened up for forward trading, along with establishment and recognition of three new national exchanges with online trading and professional management. India has a long history of futures trading in commodities. The origin of commodity derivative markets is as old as USA. Commodity Derivative markets started in India in Cotton trade association Ltd in 1875 and in oilseeds in 1900 at Bombay with the establishment of the Gujarati Vyapari Mandali, which carried on futures trading in groundnut, castor seed and cotton. Forward trading in raw jute and jute goods started at Calcutta in 1912. Forward Markets in Wheat had been functioning at Hapur in 1913 and in Bullion at Bombay since 1920.

In 1919, the Government of Bombay passed Bombay Contract Control (War Provision) Act and set up the Cotton Contracts Board. Bombay Options in Cotton Prohibition Act, 1939, later replaced the Ordinance. In 1943, the Defense of India Act was utilized on large scale for the purpose of prohibiting forward trading in some commodities and regulating such trading in others on all India basis. In the same year oilseeds forward contracts prohibition order was issued and forward contracts in oilseeds were banned. With a view to evolving the unified systems of Bombay enacted the Bombay Forward Contract Control Act 1947.

As a developing country like India two third of the one billion population depends on agricultural commodities. Commodity derivative market plays a vital role in the development of the Indian economy. With the introduction of online commodities trading one can carryout their trades all over the world. World over the commodities markets are 10 times bigger than the equity markets. In order to add the *glitter of gold or the sweetness of sugar* it is better to invest in commodities market. Commodity futures are fast spreading into rural India at a much faster growth than capital market operations. With increasing globalization and integration with the world markets, the commodity derivative markets have made enormous progress. The commodity derivative markets in India had a bright future and it should become an emerging global hub that overtakes the market for stock derivatives.

The three national exchanges i.e., Multi Commodity Exchange of India Limited and National Commodity Derivative Exchange Ltd had shown remarkable growth in the commodity derivative exchanges. Gold, silver and crude recorded the highest turnover in MCX while in NCDEX, soy oil, gaur seed and soybean and in NMCE pepper, rubber and raw jute were the most actively traded commodities. The dual price system under which different prices for same commodities exist in different exchanges leads to inefficiencies in the commodity derivative markets in India. After the reopening of commodity futures markets in the year 2002-03, there have been a few studies regarding macro economic impacts in the field of commodity markets. These topics being an important field of financial and economic research, not much serious research work has been conducted in the Indian commodity derivative markets. With Tremendous growth in Commodity Derivative Markets in India, it would be desirable to study macro economic impacts.

2. Literature Review

Kamara (1982) shows that introduction of commodity futures trading generally reduced or at least did not increase cash price volatility, Singh (2000) who probed Hessian cash price variability before and after the introduction of futures trading (1988-1997) concludes that the futures market has reduced the price volatility in the Hessian Spot market. Sahi (2006) suggest that the volatility had not changed with the introduction of futures in wheat, turmeric, cotton, sugar, raw jute and Soyoil. Dasgupta (2004) finds a co-movement among futures prices, inventory decisions and production decisions, Yang et al (2005) believes that an unexpected increase in futures trading volume caused an increase in spot price volatility for major agricultural commodities. Golaka C Nath and Tulsi Lingareddy (2008) show that in India future trading in agricultural commodities like urad, tur, wheat and rice had apparently lead to increase in prices of commodity. Nitesh (2005) studied the implications of Soyoil futures in Indian markets using simple volatility measures and finds that the futures trading was effective in reducing seasonal price volatilities but did not brought down daily price volatilities significantly. Mishra Alok Kumar (2008) shows that during the period 2003-08 the Indian stocks as well as commodity markets have grown considerably. The study shows the advantages of adding commodities to a portfolio of equities in the Indian context. Bose S (2007) finds that the Indian stock markets are more volatile as compared to developed markets and Indian Commodity Futures markets are going through many ups and downs. Indian Commodity market is yet to achieve minimum critical liquidity in some selected commodities (Lokare, 2007) and the selected commodities show an evidence of co-integration between spot and future prices revealing the right direction of achieving the operational efficiency, though at a slower rate. However, for a few commodities, the volatility in the future price has been lower than the spot price indicating an inefficient utilization of information. Liu and Zhang (2006) have studied the price discovery of spot and future prices in Chinese copper, aluminum, rubber, soybean and wheat markets. However, the lad lags relationship between spot and future markets in Indian Commodity Derivatives are quite limited. Karande (2006) reports that the futures price leads the spot price in price discovery between crude oil and castor seed. Slade and Thille (2004) have assessed the levels and volatilities (means and standard deviations) of the spot prices of the six commodities that were traded n the London Metal Exchange in the 1990's.The theories that they examined could be grouped into four classes. The first considered how forward market trading and product market structure jointly affect the spot market. Secondly the link between product market structure and spot price stability, thirdly whether forward trading destabilizes spot prices and the last related the arrival of new information to price volatility and volume of trade. They found a positive relationship between increased trading and price instability. Wang (2005) and Bingfanke (2005) study on efficiency test of agricultural commodity Future Market in China, found that a long term equilibrium relationship between the future price and cash price (spot price) for soy beans and weak short term efficiency in soybean futures market. Thomas (2003) found that major stumbling blocks in the development of derivative markets are the fragmented spot markets and prices of major commodities vary widely across Mandis. Garry B Gorton (2005) and Rouwenhorst (2005) find that commodity futures

are positively correlated with inflation. Bhanumurthy (2004) examines the relevance of macroeconomic models and market microstructure theory in the context of short run behavior of the Indian foreign exchange market. And find that the dealers feel speculation would increase volatility, efficiency and liquidity in the market and central bank interventions reduces volatility and market efficiency. Sahoo and Kumar (2008) examine the relationship between transaction cost, trading activity and volatility using a three equation structural model for Gold, Copper, Petroleum crude, Soya oil and Chana. Their results indicate a negative relationship between transaction cost and liquidity, and positive relation between transaction cost and volatility. We are motivated to examine the price function of commodities especially in the wake of global recession and hyper inflationary tendencies in the current scenario.

3. **Objectives** and Methodology

In this paper we examine the price discovery function of commodity future market in India and also explore the volatility spillover between commodity spot and futures market. We first test the price discovery function of the commodity market using the standard EGARCH framework and causality tests .The notion of speculation may assume two opposite forms (a) high price volatility causing higher speculation, and (b) low speculation causing low liquidity resulting in huge spreads and price volatility. We use the conventional cost of carry model to estimate the implied returns, which are useful in explaining the impact of monetary policy announcements and commodity price linkages. A close examination of the changes in the regulations by the commodity exchanges and the Forward Markets Commission is expected to provide insight into the market anomalies and unregulated distortions. Secondary data has been collected from prominent national level multi commodity derivative exchanges National Commodity Derivative Exchange Ltd (NCDEX). We have selected *Chana* and used the Future (Close) and Spot (close) prices. Since the spot prices are available only from year 2005 onwards, the data used in the paper relates to the period from January 2005 to June 2011 from the websites of the respective exchanges.

4. Results and Discussions

Exhibit 1. the trend of Daily Spot and Future Close price of Chana at NCDEX

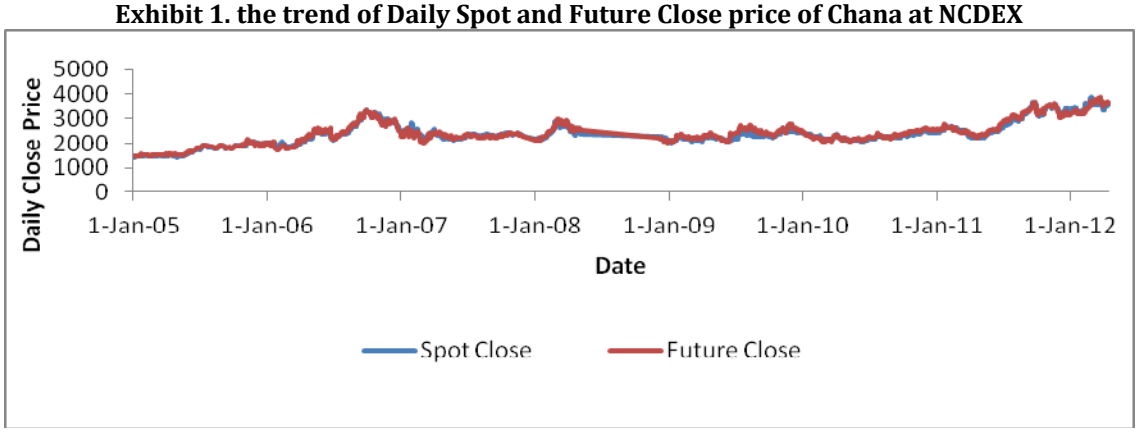
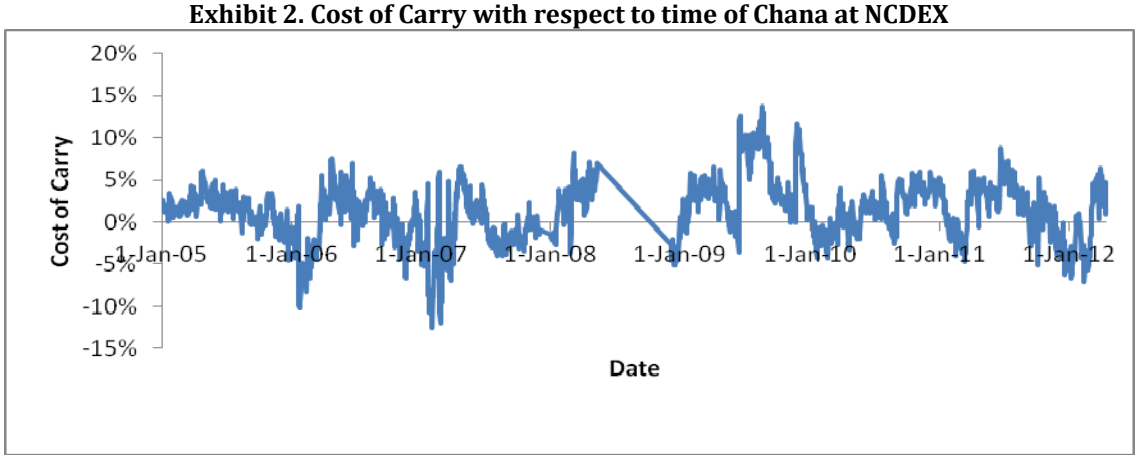


Exhibit 2. Cost of Carry with respect to time of Chana at NCDEX



Augmented Dickey Fuller (ADF), Phillip Perron (PP) tests have been used to test the stationary /nonstationary behavior of the spot and future prices of different commodities. The results of the unit root statistics of all the selected commodities are shown in Exhibit 3. Initially it is found that the price series of both spot and future market of all the selected commodities are having unit. It follows that the price series follows I(1) process. The result also indicate that in case of all the commodities in all the exchanges, the first difference series becomes stationary and the results are supported by all the test statistics (ADF, PP. The probability values in case of price series are higher than 0.05 in case of ADF and PP test indicating the presence of unit root in price series. The probability values in case of return series spot and future prices are lower than 0.05 in case of ADF and PP test indicating that the first difference series is stationary.

Exhibit 3. Unit Root test Result for Commodity Chana at NCDEX

Time Series Variable		ADF Unit Root Test Statistic			Philip Perron Test Statistic		
		None	With Intercept	With Trend and Intercept	None	With Intercept	With Trend and Intercept
Daily Spot closing price	At Level	0.826804 (0.8898*)	-1.267956 (0.6465*)	-2.349796 (0.4061*)	0.977119 (0.9135*)	-1.058871 (0.7338*)	-2.119716 (0.5339*)
	At First Difference	-41.38923 (0.0000)	-41.40773 (0.0000)	-41.40190 (0.0000)	-41.10868 (0.0000)	-41.12494 (0.0000)	-41.11890 (0.0000)
Daily Future closing price	At Level	0.849110 (0.8936*)	-1.165570 (0.6913*)	-2.387180 (0.3861*)	0.854565 (0.8945*)	-1.156285 (0.6952*)	-2.373283 (0.3935*)
	At First Difference	-47.15555 (0.0001)	-47.17295 (0.0001)	-47.16774 (0.0000)	-47.15506 (0.0001)	-47.17170 (0.0001)	-47.16656 (0.0000)

The results of Johansen Cointegration test on Spot and Future prices of Commodity Chana in Exchange NCDEX is shown in exhibit 4.

Exhibit 4. Johansen's Co-Integration Test on spot and future prices of Chana in Exchanges

Exchange	Cointegration Between	Lag length selected	Cointegration test using	No. of Cointegrating Equations (CEs)	Eigen Value	Statistic	Critical value at 5%	Probability **
NCDEX	Daily Spot Closing and Daily Future Closing of Chana	1 to 4 (in first difference of 2 series)	Trace test	H_0: r=0(None) H_1: r ≤ 1(At most 1)	0.02233 0.00044	50.3276 0.97334	15.4947 3.84146	0.0000 0.3238
			Max-Eigen Value test	H_0: r=0(None) H_1: r ≤ 1(At most 1)	0.02233 0.00044	49.3542 0.97334	14.2646 3.84146	0.0000 0.3238

Trace test indicates 1 Cointegrating equation at 5% level of significance
Max-Eigen test indicates 1 Cointegrating equation at 5% level of significance

- Denotes rejection of null hypothesis at 5% level of significance
- **Mackinnon et.al.(1999) estimated p values

Vector Error Correction Model has been used to analyze the error correction mechanism between the future market and the spot market in case of disturbance between them. The results of Vector Error Correction Model in Commodity Chana in Exchange NCDEX is shown in exhibit 5. The results indicate that the coefficient of error correction term is significant in case of both the future series and spot series.

Exhibit 5. Error Correction Model Result for Future and Spot price of Chana

Exchanges	Variables	Δ(Spot)		Δ(Future)	
		Coefficient	t value	Coefficient	t value
NCDEX	Equilibrium Error	-0.031387	**-3.82490**	0.036674	**3.54602**
	ΔSpot(-1)	-0.083794	-3.82129	0.014052	0.50845
	ΔFuture(-1)	0.392366	19.9419	0.001037	0.04181
	Constant	0.662107	0.99426	0.942979	1.12353

In case of the commodity Chana the result indicates that the short-term causality comes from future prices to spot prices in all the commodity exchanges. The chi square statistic for the causal relationship future prices to spot prices as shown in table is 397.68. Whereas the chi square statistics for testing the causality from spot prices to futures prices is 0.26. Hence it can be concluded from the results that in short run the Future price are exogenous in nature but the past prices of the future influences the spot prices of the Chana in the future. This is due to the fact in short run, the future prices respond quickly to the new information about the commodity as compared to the spot prices. Then the influence comes in the spot prices. Hence in short term the changes in the future series cause the change in spot series in future.

Exhibit 6. VEC Grangers Causality/ Block Erogeneity Wald Test for Chana

Dependent Variable	Excluded	NCDEX	
		Chi Square Statistic	P Value
Δ(Spot)	Δ(Future)	397.6787	0.0000
Δ(Future)	Δ(Spot)	0.258519	0.6111

In the commodity exchange NCDEX 98.7 percent of the variations in forecasting error of future prices can be explained by its own lagged values whereas 1.29 percent of the variation is explained by the lagged values of the spot prices. In case of the forecasting error of the spot prices 62.8 percent of the variations are explained by the lagged values of future prices and 37.7 percent of the variations are explained by the lagged values of spot prices.

Exhibit 7. Forecast Error Variance Decomposition for Chana

Lag	NCDEX			
	Variance Decomposition of FC		Variance Decomposition of SC	
	FC	SC	FC	SC
1	100	0.00	27.92	72.07
2	99.94	0.05	49.94	50.05
3	99.86	0.13	54.37	45.62
4	99.75	0.24	56.76	43.23
5	99.62	0.37	58.29	41.70
6	99.47	0.52	59.41	40.58
7	99.30	0.69	60.30	39.69
8	99.12	0.87	61.05	38.94
9	98.92	1.07	61.70	38.29
10	98.70	1.29	62.28	37.71

The results of volatility spillover estimated by EGARCH model in commodity Chana indicates that for the commodity exchange NCDEX, the previous volatility in Spot prices has a large impact on the volatility of Future prices on next day as compared to previous volatility in future price on the next day volatility in spot price.

Exhibit 8. Volatility Spillover between Future and Spot price of Commodity Chana

Variance Equation	NCDEX	
	Spot	Future
Constant	-0.407067 (-8.487736) [0.0000]	-0.186943 (-10.51453) [0.0000]
ABS(RESID(1)/@SQRT(GARCH(-1)	0.106807 (6.935395) [0.0000]	0.057949 (7.754325) [0.0000]
RESID(1)/@SQRT(GARCH(-1)	0.054307 (8.636603)	-0.003641 (-0.784876)

Variance Equation	NCDEX	
	Spot	Future
	[0.0000]	[0.4325]
LOG(GARCH(-1)	0.964898 (206.4520) [0.0000]	0.983472 (551.1557) [0.0000]
Volatility in Chana as exogenous variable	77.25030 (6.342360) [0.0000]	48.80201 (8.363909) [0.0000]

Pair wise granger causality test is used to analyze the causal relationship between the commodity prices and inflation (Exhibit 9).

Exhibit 9. Results of Granger Causality on Chana Spot Price and Chana WPI inflation

Null Hypothesis	Lag	F statistic	P value	Remarks
Chana WPI does not Granger cause Chana Spot	1	2.22220	0.13974	H_0 accepted
	2	0.21979	0.80316	H_0 accepted
	3	0.22356	0.87976	H_0 accepted
Chana Spot does not Granger cause Chana WPI	1	32.1443	1.9E-07	H_0 Rejected
	2	17.7326	4.0E-07	H_0 Rejected
	3	12.0902	1.4E-06	H_0 Rejected

The results for NCDEX, the f statistics of the null hypothesis that returns of Chana does not Granger cause WPI Chana is significantly high in all lags and the p value of f statistics is less than 5 percent level of significance. Hence it can be concluded from the results that the changes in prices in Chana have a significant impact on the Chana WPI inflation. Finally it can be concluded that there is a significant impact of changes in commodity prices on the Wholesale Price Index of the Commodity.

Exhibit 10. VAR Grangers Causality/ Block Erogeneity Wald Test for Chana

Dependent Variable	Excluded	df	Chana	
			Chi square	P value
Chana WPI	Chana Spot	2	35.46525	0.0000
Chana Spot	Chana WPI	2	0.439575	0.8027

In case of the commodity Chana in NCDEX, the result indicates that the causality comes from spot prices to WPI inflation. The chi square statistic for the causal relationship spot prices to WPI inflation as shown in table is 35.46525 and its corresponding p value 0.0000. Whereas the chi square statistics for testing the causality from WPI inflation to spot prices are 0.439575 and p value 0.8027. Hence it can be concluded from the results that the Spot Prices are exogenous in nature but the past prices of the spot influences the WPI inflation of the Chana in the future.

Remarks

Our paper shows that that the future market of the commodities is more efficient as compared to spot market. The future market also helps spot market in the process of Price Discovery. This implies that both the spot prices and future prices respond to the error in order to reach at equilibrium to maintain relationship. This may be due to the fact that the volume of trading in NCDEX in higher as compared to other exchanges. The farmer producing the commodity also resists the price of the commodity in future market. With respect to the difference between future and spot market the results indicate that when the difference is more than expected, this will offers arbitrage opportunities, which is further exploited by arbitrageurs. The Johansen co integration test applied in the study indicates that in all the selected commodities there is a co integration relationship between the spot and future market. The Error Correction Model in the study found that most of the errors in commodity Markets is corrected by the spot market. The Block Exogenity test applied our study indicates that there exists short-term causality from Future market to spot market. This means future market influence the spot market in the sport period.

Hence it can be concluded that in Commodity Market Futures Market are more efficient in terms of Price Discovery and Information Dissemination as compared to spot market.

References

1. *Ahuja L Narender (2006), "Commodity Derivative Markets in India: Development, Regulation and Future Prospects", International Research Journal of Finance and Economics, Issue 2.*
2. *Anson, M.J.P., (1998), 'Spot Returns, Roll Yield and Diversification with Commodity Futures', Journal of Alternative Investments, Winter, 1-17.*
3. *Banerjee Arindam (2006), "Indian Commodity Markets – Evolution, Growth and Challenges" Commodity Markets New invest avenues, 3-10.*
4. *Bhanumurthy, N.R (2004): "Microstructures in the Indian Foreign Exchange Markets", Working Paper, Institute of Economic Growth, Delhi.*
5. *Bopp Anthony E and George M Lady (1991),"A Comparison of Petroleum Futures versus spot Prices as predictors of Prices in the Future", Energy Economics, 13(4): 274-282.*
6. *Bose Suchismita, The role of Futures market in aggravating commodity price inflation and the future of Commodity Futures in India http://www.icra.in/Files/MoneyFinance/4.%20Suchismita%20Bose.pdf accessed on 3rd August 2012.*
7. *Bose Sushismita,'Commodity Futures Market in India –A study of trends in the National Multi commodity Indices" http://ssrn.com/abstract=1262742 accessed on 3rd August 2012.*
8. *Department of Agriculture & Cooperation (2001), 'Report of the group on Forward and Futures Markets', New Delhi.*
9. *Fama E and K Frenchin (1987), Commodity futures prices: some evidence on forecast power, Premium and the Theory of storage", Journal of Business, January.*
10. *Garry Gorton and Geert Rouwenhorst (March/April 2006), "Facts and Fantasies about Commodity Futures", Financial Analyst Journal, 62; 47-68.*
11. *Government of India (2003): Report of the Task Force on Convergence of securities and Commodity Derivatives Markets (Chairman, Wajahat Habibullah).*
12. *Kolamkar, D. S. (2003). Regulation and Policy issues for Commodity Derivatives in India. In Thomas, S., editor, Derivatives Markets in India,*
13. *Kaur Gurbandini and D.N Rao (2012), Efficiency of Indian Commodities Market: A study of Agricultural Commodity Derivatives Traded on NCDEX, http://ssrn.com/abstract=1600687 accessed on 13rd August 2012.*
14. *Kaur Gurbandini and D.N Rao (2012), Do the spot prices influence the pricing of future contracts? An empirical study of price volatility of future contracts of select agricultural commodities traded on (NCDEX) India, http://ssrn.com/abstract=1469700 accessed on 13rd August 2012.*
15. *Kamara (1982), Issues in Future Markets: A survey, Journal of Future Markets, 2; 261-94.*
16. *LummerS.L.and L.B.Siegel (1993), 'GSCI Collateralized Futures: Hedging and Diversification Tool for Institutional Investors', Journal of Investing, summer, 75-82.*
17. *Lokare, S.M (200&),"Commodity Derivatives and Price Risk Management: An Empirical Anecdote from India", Reserve Bank of India Occasional papers, Monsoon.*
18. *Margaret E. Slade and Henry Thille (2004) Commodity Spot prices: An Exploratory assessment of Market Structure and forward trading effects, Journal of Economic Literature, September.*
19. *Nair, C.K.G., (2004), 'Commodity Futures Markets in India: Ready for 'Take-off? Nsenews, July; 1-4.*
20. *Nair C.G.K (2004), National Stock Exchange News, Mumbai, India, 1-4.*
21. *Nath, G C and T. Lingareddy (2008): Commodity Derivative market and its impact on spot market, available at SSRN: http://ssrn.com/abstract=1087904*
22. *Nitesh Ranjan (2005) Role of Commodity exchanges, Futures and options-A case study On Soyoil, Occasional paper 46 Department of Economic analysis and research, NABARD.*
23. *NCDEX market data, National Commodities and Derivatives Exchange India Limited, www.ncdex.com*
24. *Pravakar Sahoo (2009), Efficiency and Futures trading-price Nexus in Indian Commodity future Market, Global Business Review, 10(2), 187-201.*
25. *Sahi, Guirpreet (2006): "Influence of Commodity Derivatives on Volatility of Underlying" available at SSRN: http://ssm.com/abstract=953594*
26. *Sahoo, P and R. Kumar (2008), "Impact of Proposed Commodity Transaction Tax on Futures trading in India: ICRIER Working Paper 216.*
27. *Satyanarayan S and P. Varangis (1996), 'Diversification Benefits of Commodity Assets in Global Portfolios', Journal of Investing, Spring, 33-50.*
28. *Sahadevan, K. G. (2002). Sagging agricultural commodity exchanges: growth constraints and revival policy options. Economic and Political Weekly, XXXVII (30).*
29. *Shah, A. and Thomas, S. (1999). Developing the Indian capital market. In Hanson, J. A. and Kathuria, S., editors, India: A financial sector for the Twenty–first century, chapter 7, 205–265. Oxford University Press.*
30. *Sahadevan K.G (2006), Forward Contract (Regulation) Act 1952 and regulation of commodity Futures Markets: Issues and priorities, The ICFAI Journal of Corporate and Securities Law, Vol III (4), Nov,8-20.*
31. *Singh Jatinder Bir (2000) Futures markets and Price Stabilization-Evidence from Indian Hessian market, http://www.sasnet.lu.se/EASASpapers/8JatinderSingh.pdf*

32. *Sanjay Kaul (2012), Commodity Futures Trading in India: Myths and Misconceptions available at http://www.nicrindia.com/wfrmRPAReport.aspx?id=72&type=Articles*
33. *Singh and Ramaswamy, Underdeveloped Spot markets and futures trading: The Soyoil Exchange of India http://ageconsearch.umn.edu/bitstream/7919/1/sp07si01.pdf*
34. *Thomas, S. (2003), 'Agricultural Commodity Markets in India: Policy Issues for Growth', Indira Gandhi Institute for Development Research, Mumbai.*
35. *Thiripalraju, M., Madhusoodan, T. P., and Mishra, G. S. (1999). Commodity futures prices in India: evidence on forecast power, price formation and inter–market feedback. Technical report, UTI–ICM.*
36. *Vohra N.D. and Bagri B.R. (2010), Futures and Options, Second edition, Tata McGraw-Hill, New Delhi.*
37. *Vyas, VS (2002): Our agrarian future: A medium term perspective on Asian agriculture? In Kapila Uma& Raj Kapila(ed): Economic Developments in India, 41:56.*
38. *Yang Jian, Brian Balyeat R and David J. Leatham (2005): "Futures trading Activity and Commodity cash price volatility", Journal f Business Finance Accounting, 32(1&2); 297-323.*
39. *Wang Hong and Bingfanke (2005), Efficiency Tests of Agricultural Commodity Futures Markets in China, Australian Journal of Agricultural and Resource Economics, 49(2); 125-141,June.*
40. *FMC, Forward markets Commission, www.fmc.gov.in*
41. *www.mcxindia.com*
42. *www.ncdex.com*