Causal Nexus between Commodity Derivatives Market Reforms and Economic Growth – Evidence from Indian Agricultural Sector

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Abstract
This paper attempts to study the growth in agricultural commodity derivatives market and its impact on economic growth in India. Commodity forward market has witnessed radical changes since independence. Government of India formed many committees to review working of forward trading in the country. Prof. A D Shroff Committee was constituted to propose a bill on forward contracts and finally in December 1952 Forward Contracts (Regulation) Act, was enacted. Dantwalla committee was appointed in 1966 to assess the working of co-operative marketing system. The Khusro Committee in June 1980 gave recommendations to reintroduce commodity futures trading in most of the major commodities. In 1994 Prof K N Kabra committee gave recommendations for reopening of futures trading in major commodities. The committee also suggested the pepper and castor seed trading exchanges to upgrade their operations to the level of international futures markets. The impact of growth in agricultural commodity futures on agricultural GDP is test by taking last ten years quarterly data of aggregate traded agricultural commodity futures across major exchanges and economic growth as measured by the sectoral quarterly GDP has been taken for study. The time series stationarity of commodity trade volume and GDP quarterly data has been tested using Augmented Dickey Fuller (ADF) and Phillip Perron (PP) tests and confirmed that the data is stationary. Linear regression results confirm significant influence of agricultural commodity futures trading on agricultural GDP in India.
Keywords: Forward market, Economic growth, Committees, stationarity test, linear regression
JEL category: G23, G21

1. Introduction
Indian economy has changed dramatically in last few decades. Since ages agriculture is the prime source of livelihood. During the pre-independence period more than 65 percent of the workforce was directly dependent on agriculture and its contribution to gross domestic product was 54 per cent. This scenario was not much different until 90's. However, there is a paradigm shift in the Indian economy in the last two decades. As per the 2013 data of GDP, contribution of Agriculture to GDP is only 14.62% whereas Industry sector contribution is 20.16%. Services sector has highest contribution of 65.22%. Nevertheless, agriculture is the crucial sector and has direct or indirect linkage with all other sectors. This sector though ensures supply of food grains and other inputs for agriculture based industries, suffers from various risks pertaining to production and supply. They are exposed to risk of crop failures, due to climatic changes and monsoon failures or flood kind of situations. There is no guarantee that they get their expected price once they harvest. Getting seed and fertilizers is still a challenge for a farmer and overall not enough attention given for improving their well being. Hedging price risk through forward or future contracts protects them from losses. To regulate the trading in forward and futures and to provide platform for price discovery and hedging Forward Contracts (Regulation) Act was passed in 1952 and since then forward trading has grown manifold. After nearly four decades of prohibition, trading was finally resumed in 2002. Today, there are more than 110 commodities permitted to trade and apart from numerous regional exchanges, we have six national level commodity exchanges. Multi Commodity Exchange (MCX) has trade volume and constitutes 85% of the total volumes of the country. One of the major concerns of the regulators and exchanges is that, there is no significant participation from genuine hedgers in the market. The turnover is mainly coming from people who are no way concerned about the commodity. Their presences are very uncertain and have only speculative motives. The commodity futures market is at a decisive juncture and of the five national electronic commodity futures exchanges recognized by the Government of India, three have been operational since 2003. In just seven years, the commodity futures market turnover has increased manifold and the expectations in the market are mounting on day by day. But the crux of the issue is that the volumes are built through speculative transactions and not from real hedging. Some of the national level exchanges have initiated steps to bridge the disconnection between markets spot and futures prices by disseminating both the segments' price information. Ancillary institutions such as warehouses, banks, clearing and settlement agencies have joined the bandwagon, providing value added services and solidity to the institutional framework, making a sustainable and robust futures market. These steps have considerably increased the hedger's participation in the market especially from the corporate in the last 2-3 years, indicating greater interest from genuine hedgers. With merging of FMC with SEBI has created many hopes and

this move may facilitate the introduction of new instruments in India's commodity derivative markets, such as options and index-based trading, which may expand the market through wider participation of entities such as banks, mutual funds and FIIs.

2. Review of literature

Commodity market has witnessed radical changes since independence. Government of India formed many committees to review working of forward trading in the country. Prof. A D Shroff Committee was constituted to propose a bill on forward contracts and finally in December 1952 Forward Contracts (Regulation) Act, 1952, was enacted. Dantwalla committee was appointed in 1966 to assess the working of co-operative marketing system in the country and provide recommendations to bring in effective market structure, for development of agricultural marketing on co-operative basis. The Khusro Committee in June 1980 gave recommendations to the Government of India to reintroduce commodity futures trading in most of the major commodities. Commodities such as Cotton, Kapas, Raw jute and Jute products were recommended to open for trading and also suggested to take appropriate steps to introduce contacts in potatoes, onions. The government, accordingly initiated futures trading in Potato during the latter half of 1980, in a few markets in Punjab and Uttar Pradesh. Futures trading were also resumed in castorseed, and gur (jaggery), and in 1992, extended to Hessian (Jute). Consequent to liberalization of Indian economy in 1991, a series of steps were suggested to open up the commodity forward markets trading in India with a different structure and regulatory changes. The GoI appointed in June 1993 a committee on Forward Markets under the chairmanship of Prof K N Kabra and the committee submitted report in September 1994 recommending for reopening futures trading in commodities such as Basmati Rice, Cotton and Kapas, Raw Jute and Jute Goods, Groundnut, rapeseed/mustard seed, cottonseed, sesame seed, sunflower seed, safflower seed, copra and soybean, and oils and oilcakes. It also recommended allowing trading in Rice bran oil, Castor oil and its oilcake, Linseed, Silver, and Onions. The committee also suggested the pepper and castor seed trading exchanges to upgrade their operations to the level of international futures markets. One of the landmark developments in the commodities forward trading was establishment of National exchanges in the year 2002. NCDEX and MCX started its operations with nationwide presence and today MCX is world's fifth largest market for futures trading. Empirically researches also have been conducted to study the growth and impact of commodities future trading India. Lokare S (2007) tested the efficacy and performance of commodity derivatives in steering the price risk management and confirms that almost all the commodities throw an evidence of co-integration in both spot and future prices, presaging that these markets are marching in the right direction of achieving improved operational efficiency, although, at a slower pace. Ahuja (2006) studied the evaluation, need and growth of organized commodity derivatives in India. It attempts to answer questions such as: how did India pull it off in such a short time since 2002? Is this progress sustainable and what are the obstacles that need urgent attention if the market is to realize its full potential? Why are commodity derivatives important and what could other emerging economies learn from the Indian mistakes and experience? The study is conceptual and has mapped the growth path of commodity market data since independence and concludes that the sustainable market growth is a real challenge for developing economies like India. Kapil, S., & Kapil, K. N, (2010) reviews and discusses the various issues related to Commodity trading advisors (CTAs) applicability in India. The study finds that the recent expansion of Indian commodity market has not been very structured. Ali, J., & Gupta, K. B, (2011) find that the co integration exists significantly in futures and spot prices for all the selected agricultural commodities except for wheat and rice. Ghosh, M, 2011examined the impact of agricultural policy reforms on spatial integration of rice and wheat markets using the maximum likelihood method of co-integration. Their results indicate that the extent of intra- and inter-state spatial integration of these markets has improved during the post-reform period relative to the pre-reform one. The regional markets, which were either segmented or poorly integrated during the pre-reform period, are found to be strongly integrated, and in most cases to such an extent that satisfies the relative LOP during the post-reform period. The agricultural policy reforms since the early-1990s seem to have contributed towards improving the extent of spatial integration of food grain markets, lending support to the argument for market liberalization and minimization of government interventions in the food grain economy. They conclude that the further liberalization would strengthen spatial integration of markets in India. Athma, P., & Sagarika, M, (2012) attempts to analyze the trends and progress of Commodity Derivative Trading in NCDEX and MCX and evaluate the performance of these two Commodity Exchanges. The parameters chosen for analyzing the trends in the performance of commodity exchanges are number of commodities traded, volume of commodities traded, and the value of these traded commodities over a period of time and the awareness programs conducted. The study finds that MCX out beats NCDEX in terms of value of contracts traded whereas it is vice-versa in the number of contracts traded.

3. Methodology

Available literatures on commodity derivatives market shows that, academicians and researchers have addressed the issues related to causal relationship between future and spot market volatility, evolution and adoption of

technology in trading and settlement, market cycles and information efficiency, future trading price nexus, price discovery and role of commodity market in price risk management. However, linkages between commodity derivatives market reforms, growth of commodity derivatives trading and economic growth is a research concern still to be addressed. Hence the study is proposed to fill this research gap. In this study an attempt has been made to identify significant trade segments of recognized commodity derivatives markets in the post economic reforms period as per the trade volume and regulatory reforms that have taken place in commodity futures market and also the impact of changes in segment wise commodity futures trading volume taking agriculture aggregate trading volume on agricultural sectoral contribution to GDP. The data used for the study comprises of quarterly closing trading volume of futures of agricultural commodities and agricultural sectoral GDP growth rate. The trading volume data has been obtained from NCDEX, NMCEX, and MCX from the date of inception of the contracts on agriculture commodities. However, thou some future contracts are commenced later, for most of the contract the data is taken from April 2004 to March 2013. Economic growth as measured by GDP growth rate on quarterly basis has been obtained from RBI and Government websites.

4. Empirical Findings and discussions

As per the data of forward market commission there are 21 recognized commodity exchanges. Out of these recognized exchanges, Multi Commodity Exchange (MCX), leads in terms of trade volume, which accounts for 84.95% of total trades in commodities. National Commodity and Derivatives Exchange (NCDEX), has share of 10.56%. These two exchanges collectively control the Indian market with a market share of 95%. The rest of the market shares come from National Multi Commodities Exchange,(NMCE), 1.67%, Indian Commodity Exchange, (ICEX) 1.58% ACE Derivatives and Commodity Exchange (ACE) .80% and National Board of Trade (NBOT) which has only less than 1% share in the market. This clearly indicates that MCX and NCDEX jointly control the entire commodity derivatives trading in India.

Table 01

Percentage share of commodity exchanges trade volume to the total value of the commodities traded in last five financial years.

Name of the Exchanges	2009-10	2010-11	2011-12	2012-13	2013-14	Mean
MCX	82.34	82.36	86.05	86.8	87.2	84.95
NCDEX, Mumbai	11.82	11.81	9.99	10	9.2	10.56
NMCE, Ahmedabad	2.94	1.83	1.48	1	1.1	1.67
ICEX, Mumbai	1.76	3.16	1.42	1	0.6	1.58
ACE, Ahmedabad	-	0.25	0.76	1	1.2	0.80
NBOT, Indore	0.78	0.43	-	-	-	0.60
Total	99.64	99.84	99.7	99.8	99.3	99.65
Others	0.36	0.16	0.3	0.2	0.7	0.34
Grand Total	100	100	100	100	100	100

Over the years, the types of commodities that are traded in the recognized exchanges have changed dramatically. Forward market commission has grouped the major commodities that are traded in India under the following major headings.

1. Bullion
2. Metals other than Bullion
3. Agricultural commodities
4. Energy
5. Other

From the available trade data we can infer that the single largest traded commodity underlying segment in India is bullion. More than 50% of the trade volume in both MCX and NCDEX exchanges are on gold. The collective trade value in bullion segment is more than a trillion dollars each year. In the year 2012-13 the bullion trade had accounted for 78 lak crores. Thou the commodity exchanges were established with an objective of providing trade platform for agricultural produces, it never became a preferred underlying for traders. The second largest commodity segment is energy. Crude oil is the most active segment of trade in MCX and NCDEX. If we look at the history of commodity trading in India, prior to the World War II, many commodity exchanges were trading in futures contracts in various underlings. Trade on commodities such as cotton, groundnut, groundnut oil, raw jute, jute goods, castor seed, wheat, rice, sugar, precious metals like gold and silver were booming throughout the country. In view of the fragile supply situation of major commodities in the backdrop of war efforts mobilization, futures trading became prohibited under the Defence of India Act. In post independence period during 1950's to 1960's the commodity futures trading were again restored and there were booming commodity markets. But again, in mid-1960s, commodity futures trading in most of the commodities were banned except two minor commodities, viz, pepper and turmeric. However, during 80s, the futures trading in some commodities like potato, Castor seed,

and gur (jaggery) were permitted. Today more than agricultural commodities, bullion and other metals are dominating the trade in the organized exchanges. Bullion account for 46% of trade whereas agricultural commodities is only 13%. The major agricultural commodities are Chana/Gram, Soy Oil, Guar seed, Guar Gum, and Potato. The share of energy is 22% and base metals are 19%. The Objective of price discovery is not completely yet possible for all commodities especially agro based commodities due to poor trade volumes.

Table 02
Some of the key initiatives taken by the forward market commission since liberalization of the commodity derivatives market are.

Trade Ban Lifted	Prohibition on futures trading lifted in all the commodities on 1st April 2003.
Recognition as National Exchanges	Three Multi-Commodity electronic Exchanges were recognized as national commodity exchanges of India. There are National Multi Commodity Exchange, Ahmadabad recognized on 10.1.2003, Multi Commodity Exchange, Mumbai recognized on 26.9.2003 and National Commodity and Derivative Exchange, Mumbai recognized on 20.11.2003
Setting up of NMCE	FMC issued guidelines for setting up of new National level Multi Commodity Exchanges in 2008. It released the framework for share holding pattern of a new National Multi Commodity Exchange.
Setting up of ICE	Indian Commodity Exchange (ICE), NCR, Gurgaon, was declared as the 4th National level commodity exchange of India on 09.10.2009.
Allowed for Trading in Gold and Silver Future Contracts	After a prohibition of trading in Gold and Silver contracts for nearly four decades, it was reintroduced for the first time in 2003 at NMCE, MCX and NCDEX.
Regulatory Reforms	• Improvement of regulatory system and Re-structuring of Forward Markets Commission. • To bring the Forward Market commission on par with SEBI and other international regulatory bodies and also to restructure and strengthen the system to meet the regulatory challenges, it was refurbished for quite some time. With regard to this a Bill proposing amendments to FCR Act was approved by the Cabinet which, inter alia, provides for – •Defining forward contract so as to include other commodity derivatives, definition of intermediaries, etc. •Composition and functioning of FMC. •Financial and administrative autonomy of the Commission so as to provide for recruitment of its officers and its employees, management of the affairs to vest with the Chairman, accounts and audits, and creation of an 'FMC General Fund' to which all receivables except penalties will be credited. The FMC General Fund shall be used for the management of the affairs of the Commission and to inflict the provisions of the FC(R) Act, 1952. •Impose of fees on intermediaries to finance the Commission activities. •Permitting trading of options and other derivatives in commodity underlying. •Provide for corporatization and demutualization of commodity exchanges. •Strengthening the penal provisions. •Constitution of Forward Markets Appellate Tribunal. Provision for grant by the Central Government to meet transitional financial needs of FMC.

Commodities futures contact trading in the last decade witnessed remarkable growth in the initial year of launching of contracts, and thereafter growth fluxed and in the last few years it has declined drastically. Poor mansoon causing for fall in agricultural production contributed largely for thin trade in the segment fueled by regulatory intervention with ban on selected agro based commodities. Across all other underlyings the quantity traded was extraordinary until 2012. Commodity market witnessed biggest ever scam in the spot exchange which dispirited the traders and volume declined thereafter significantly. Since 2012, volume have declined more than 75% . Government intervened and abolished the regulator forward market commission and merged with SEBI to boost investor's confidence and bring in transparency in commodity trading.

Table 03

Traded Contracts (in Lots) in Agricultural commodities futures

Year	Traded Contracts (in Lots)	YOY change in Traded Contracts (in Lots)	% Growth
2003	1,252		
2004	305,790	304,538	24324.12
2005	5,620,984	5,315,194	1738.184
2006	8,286,804	2,665,820	47.42622
2007	4,937,643	(3,349,161)	-40.4156
2008	1,819,250	(3,118,393)	-63.1555
2009	2,464,405	645,155	35.46269
2010	3,529,055	1,064,650	43.2011
2011	4,655,125	1,126,070	31.90854
2012	8,090,946	3,435,821	73.80728
2013	6,581,964	(1,508,982)	-18.6503
2014	1,168,807	(5,413,157)	-82.2423

Table 04

Traded Contracts (in Lots) in Metal segment of commodities futures

Year	Precious Metal Products	Non-Precious Metal Products	Ferrous Metal	Total	%Growth
2003	3,924	-	-	3,924	
2004	2,307,968	7,261	-	2,315,229	58901.76
2005	9,254,830	236,510	-	9,491,340	309.9525
2006	24,485,747	6,183,019	-	30,668,766	223.1237
2007	25,808,354	22,527,998	-	48,336,352	57.60775
2008	49,891,138	21,299,838	-	71,190,976	47.28248
2009	58,946,792	47,430,828	-	106,377,620	49.42571
2010	69,347,700	71,612,333	-	140,960,033	32.50911
2011	197,458,770	79,382,142	3,574	276,844,486	96.39928
2012	180,855,068	113,872,666	29,569	294,757,303	6.470354
2013	113,095,183	81,397,188	55,200	194,547,571	-33.9974
2014	12,379,803	8,546,645	28	20,926,476	-89.2435

Table 05

Traded Contracts (in Lots) in Energy segment of commodities futures

Year	Traded Contracts (in Lots)	YOY change	% Growth
2005	5237651		
2006	6679964	1442313	27.5374
2007	15671930	8991966	134.611
2008	21261700	5589770	35.6674
2009	52324264	31062564	146.0963
2010	52717713	393449	0.751944
2011	64638345	11920632	22.61219
2012	85807441	21169096	32.75006
2013	63444751	-22362690	-26.0615
2014	9159234	-54285517	-85.5634

Linkages between macro economic variables always established in economic theories. In this study it is attempted to study the impact of agro based commodities futures trading volume on quarterly agricultural GDP. Before proceeding with the time series data analysis, it is imperative to check for the econometric properties of the data. The time series stationarity of commodity trade volume and GDP quarterly data has been tested using Augmented Dickey Fuller (ADF), Phillip Perron (PP) tests. The ADF test is performed to check whether there is an existence of a unit root or not. Also Phillips and Perron (1988) test of stationarity has been performed to cross verify the results. The null hypothesis is taken as there is unit root. The results of the unit root statistics are shown in Table 05. It is found that the data series of agricultural commodities aggregate trading volume and agricultural GDP are having unit root at first difference under both the test statistics and thereby confirm the stationarity of the data.

Table 06
Table showing stationarity test results

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
Agricultural Commodity Futures Trade Volume	At level	-6.918903 (0.0000)	-6.879238 (0.0000)	-6.873575 (0.0000)	-7.161627 (0.0000)	-7.100694 (0.0000)	-7.130164 (0.0000)
	At First Difference	-5.396168 (0.0000)	-5.397059 (0.0001)	-5.321627 (0.0008)	-15.86545 (0.0000)	-20.98090 (0.0001)	-21.12665 (0.0001)
Agricultural GDP	At level	-1.592720 (0.1035)*	-2.735644 (0.0792)*	-2.759612 (0.2215)*	-17.17104 (0.0000)	-18.48309 (0.0001)	-18.25359 (0.0001)
	At First Difference	-114.6858 (0.0000)	-112.6905 (0.0001)	-110.3701 (0.0000)	-26.29358 (0.0000)	-25.98517 (0.0000)	-25.51322 (0.0000)

Table 07
Table showing the regressions results of agricultural commodity futures trade volume and agricultural GDP

Model Summary					
Model	R	R^2	Adj R^2	Std. Error of the Estimate	Durbin-Watson
1	.668[a]	.5186	.5111	31863.27066	2.414

A. Predictors: (Constant), Trade Volume Of Agricultural Commodity Futures
B. Dependent Variable: Agricultural GDP

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5577097672.091	1	5577097672.091	5.493	.025
	Residual	35534380600.936	35	1015268017.170		
	Total	41111478273.027	36			

A. Dependent Variable: Agricultural GDP
B. Predictors: (Constant), Trade Volume Of Agricultural Commodity Futures

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	148250.797	9181.051		16.147	.000
Trade Volume Of Agricultural Commodity Futures	.006	.002	.368	2.344	.025

A. Dependent Variable: Agricultural GDP

It is inferred that there is a relationship between total agricultural commodities derivatives traded and agricultural GDP. When agricultural derivatives trade value is higher than the agricultural production it indicates high liquidity.

It means that there is more trade than production. It is equally important to know the impact of trade volume of agricultural commodity futures on agricultural GDP. Estimate equation in this case would be agricultural GDP is X_1 and agricultural commodity trade volume is X_2 and estimate equation is

$$X_1 = \beta_1 + \beta_2 X_2 + e$$

Linear regression results indicate that there is 51.1% explanation of variance in dependent variable. i.e the agricultural GDP is significantly explained by the agricultural derivatives trading volume in India. Adjusted R-square indicates the percentage of change in dependent variable (agricultural sector contribution to GDP) that was explained by change in the independent variable. In this case, the Adjusted R Square depicts that 51% variance in dependent variable i.e agricultural sector contribution to GDP is explained by Trading volume of Agricultural Commodity Futures. ANOVA table shows the significance of the model fitness and explains the deviations in the dependent variable. In this case significance should be less than .05 and lower the number, the better is the fit. If Significance is greater than 0.05, it is concluded that model could not fit the data. The total agricultural trade value

and agricultural GDP estimate model fits, with significance level of .025 which is less than 0.05.

Ratio between agricultural GDP and aggregate Agricultural commodity Futures Turnover
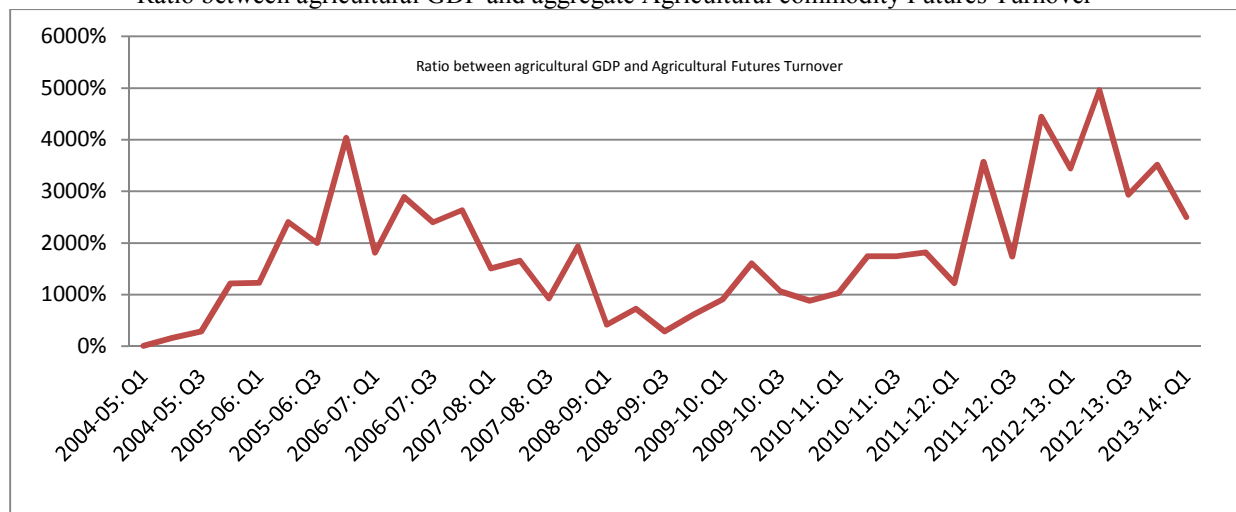
5. **Conclusions and Discussions**

The landmark development in the Indian commodity market space is the restoration of commodity futures trading in organized exchanges. The three national online commodity exchanges i.e MCX, NCDEX and NMCE together have made a revolutionary change by bringing in spatial integration and temporal price discovery of commodities at national level. The revival of trading in a large number of commodities, and the setting up of modern, online exchanges by the Government of India are the key factors that are changing the market system in terms of both participation and practices, and thereby striving towards the financial Inclusion and market Inclusive growth. Nevertheless, still there are number of impediments fully exploiting the opportunities available to the commodity eco-system. This study attempts to outline the various policy reforms that have taken place in Indian economy and commodity market in the pre and post economic reform period. Notably, it was found that thou markets were established in the early 1950's, there was no significant trade developments in the commodity forward markets until 2000, due to rigid trade policies and trade bans every now and then. It was predominantly an agricultural based market with fewer commodities permitted to trade in the select regional exchanges. There were no national level exchanges, and price discovery was weak and markets failed in its fundamental objectives of risk management. After decades of obstacles in the market system and prohibitions, India's organized commodity futures industry was revived in 2003. In the post 2000 period, based on the Prof. Kabra committee report nationwide exchanges were permitted to trade on select commodities. Exchanges like NCDEX and MCX have emerged as market leaders and have contributed significantly to the development of commodity markets in India. In last twelve years, markets have matured with large trade volumes and its backward and forward linkages has reinforced, resulting in widening and deepening of the market through augmented participation by various players. At present 110 commodities are permitted to trade in these exchanges. Each of the national level exchanges has established a niche segment of trading. NCDEX primarily focuses on agricultural based commodities and MCX is on Metal and Energy. These developments in turn have changed the way producers make their cropping decisions. It has enabled them to forecast the underlying demand and prices through future contract prices and base their harvesting activities accordingly. Similarly, it has changed the way in which traders trade their products, and banks lend against commodities or those with exposure to commodity price risk. For developing nation like India, development every segment of financial market is imperative and commodity market will be the next revolution that India can see in future. As it is observed above that there are linkages between commodity future trade volume and GDP segment wise, governments should look at these markets for reforms and thereby contribute for economic development. Over the period agricultural productions and commodity futures trading is declining which needs immediate attention of the government to support. In 1990-91 the Agricultural GDP was 17.09%, which has declined to 12.02% in 2012. The growth trajectory has shifted to service sector which has GDP contribution of 59%. There is declining trend in the number of contracts traded and commodity trade volume since 2012, due to various issues like National spot exchange scam, settlement mismatch, warehouse issues, lack of public confidence on trade and regulatory system and commodity transaction taxes.

References

Abrol, I. P., & Sangar, S. (2006). Sustaining Indian agriculture–conservation agriculture the way forward. *Current*

Science, *91*(8), 1020–1025. Retrieved from http://www.ias.ac.in/currsci/oct252006/1020.pdf

Ahuja, N. (2006). Commodity derivatives market in India: Development, regulation and future prospects. *International Research Journal of Finance and ...*, *2*(2), 1–15. Retrieved from http://aryanhellas.com/107/na.pdf

Ali, J., & Gupta, K. B. (2011). Efficiency in agricultural commodity futures markets in India: Evidence from cointegration and causality tests. *Agricultural Finance Review*, *71*(2), 162–178. http://doi.org/10.1108/00021461111152555

Ali, Jabir and Gupta, Kriti Bardhan (2007), "Agricultural Price Volatility and Effectiveness of Commodity Futures Markets in India", Indian Journal of Agricultural Economics. Vol. 62, No.3, pp. 537.

Athma, P., & Sagarika, M. (2012). Commodity Derivatives Exchanges in India : A Study of Select Exchanges. *SUMEDHA Journal of Management*, *1*(3), 84–101.

Barua, N. A., & Mahanta, D. (2012). Indian commodity derivatives market and price inflation. *IOSR Journal of Business and Management (IOSRJBM)*, *1*(6), 45–59.

Bhagwat, D. S., Maravi, A. S., More, R., & Chand, D. (2015). Commodity Futures Market in India: Development, Regulation and Current Scenario. *Journal Of Business Management & Social Sciences Research*, *4*(2), 215–231. Retrieved from http://borjournals.com/a/index.php/jbmssr/article/view/1973

Board, E. (2006). Handbook of Statistics on the Indian Securities Market 2005 Securities and Exchange Board of India, (January).

Bose, S. (2008). A Study of Trends in the Notional Multi-Commodity Indices. *Money & Finance, ICRA Bulletin*, *May*, 125–158.

Brajesh Kumar, Ajay Pandey, (2013) "Market efficiency in Indian commodity futures markets", Journal of Indian Business Research, Vol. 5 Iss: 2, pp.101 – 121

Chand, R., & Parappurathu, S. (2011). *Historical and Spatial Trends in Agriculture : Growth Analysis at National and State Level in India*.

Chauhan, A. K. (2013). Market Efficiency and Volatility Spillovers in Futures and Spot Commodity Market : The Agricultural Sector Perspective, *VI*(2), 61–84.

Clarke, R. J. (2005). Research Models and Methodologies. *HDR Seminar Series Faculty of Commerce, University of Wollongong*, 1–65.

Cole, S., Hunt, S., & O, J. E. L. C. (2010). Information , Expectations , and Agricultural Investment : Evidence from a Field Experiment in India. *Business*.

'Commodity markets will be drivers of economic growth' (2013, April 3). Retrieved October 12, 2015.

Dedong, F., & Yan, D. (2011). The Development Tactics of China Carbon Finance Against Low Carbon Economy Circumstances. *Proceedings of the 2011 International Symposium - Technical Innovation of Industrial Transformation and Structural Adjustment*, *04*, 61–65.

Difference between Spot Market and Forward Market |Foreign Exchange. (2014, February 15). Retrieved October 12, 2015.

Dummu, T. R. (2009). Commodity futures market in India: Its impact on production and Prices. *Indian Journal of Agricultural Economics*, *64*(3), 1–24.

FMC. (2011). *Government of India forward markets commission, ministry of consumer affairs food and public distribution department of consumer affairs annual report 2009-10*.

FMC. (2011). *Government of India forward markets commission, ministry of consumer affairs food and public distribution department of consumer affairs annual report 2010-11*.

FMC. (2011). *Government of India forward markets commission, ministry of consumer affairs food and public distribution department of consumer affairs annual report 2011-12*.

FMC. (2012). *Government of India forward markets commission ministry of consumer affairs, department of consumer affairs annual report 2012-13*.

Kira, A. R. (2013). The Factors Affecting Gross Domestic Product (GDP) in Developing Countries : The Case of Tanzania, *5*(4), 148–158.

Kumar, N., & Arora, S. (n.d.). Price Discovery in Precious Metals Market : A Study of Gold. *International Journal of Financial Management*, 49–58.

Kumar, S., & Lagesh, M. a. (2011). Spot Return Volatility and Hedging with Futures Contract : Empirical Evidence from the Notional Commodity Futures Indices of India. *The IUP Jounral of Behavioral Finance*, *VIII*(2), 71–85.

Thomas, S. (2007). Agricultural commodities derivatives markets in India The development of Indian agricultural derivatives markets.

What is a Commodity Market? | Learning Center| www.commodityonline.com. (n.d.). Retrieved October 12, 2015.

Williams, J., Peck, A., Park, A., & Rozelle, S. (1998). the Emergence of a Futures Market:

Mungbeans on the China Zhengzhou Commodity Exchange. *Journal of Futures Markets*, *18*(4), 427–448. http://doi.org/10.1002/(SICI)1096 9934(199806)18:4<427::AID-FUT4>3.0.CO;2-0