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Performance of Commodity Derivatives Market in India

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Abstract

Derivatives are innovative financial instruments in the 21st century to help the market participants in mitigating the risk. Commodity derivatives are not new to the world, but reentered with new face into the fray. In India, derivatives are introduced at first on index and followed by securities and commodities phase-wise for the betterment of the markets and the price discovery. Aftermath of the derivatives introduction on commodities, the market of commodities derivatives started moving with colours and helped a lot the economy. Indian commodity derivatives market has been rationalized in 2003 and futures contracts trading has seen upturn in terms of volume and value surge with very swift growth during that decade. It raised itself to compete in the global market with international giants, such as NYMEX, CBOT, LME, etc., and became the top fifth exchange in terms of number of contracts in gold, second in silver, copper and natural gas. It is found that the trading in commodity derivatives is about three times more than in physical market, whereas, it is more than ten times in advanced economies. In spite of reaching global standards, the market is facing the challenges due to lack of infrastructure, warehousing, inadequate risk mitigating instruments, etc. If the regulators take cognizance of these issues, Indian commodity derivatives market will become definitely an icon among the world commodity derivatives market. At present 21 commodity futures exchanges are working in the country, out of which, six are at national level and fifteen at regional level. All these exchanges are under the regulatory system of Forward Market Commission (FMC), Government of India. By and large, the market has staged a spectacular growth of trading in terms of volume and value of commodity trading. It is very clear through the statistics that 53 commodities notified and permitted for futures trading in 2003 by Forward Market Commission moved to 113 in agricultural and non-agricultural commodities futures contracts. On the other hand, the market has registered a significant growth in terms of value, which was Rs.12.9364 billion in 2003-04 and augmented to Rs. 1812.6104, 1704.6840 and 1014.4795 billion during the last three years, i.e., 2010-11, 2012-2013 and 2013-14 respectively. This paper examines the performance of Indian commodity derivatives market by evaluating the growth of the market in terms of number of commodities permitted for trading, volume and value of the commodity derivatives traded. The performance of the commodity market found through the volume and value of market has been growing at average compounded growth by 15 and 29 percent respectively and it is found that the growth between

volume and value is non-linear as far as their estimated and actual growth is concerned. On the other hand, the variance between the volume and value of the market followed a reciprocal trend and the trend projection of market over a period of next ten years analysis depicts linear growth.

Keywords: Commodity Futures, Growth, Trend, Derivatives, Commodity Exchange, Agriculture and Non-agriculture Commodities. CBO, Value, Volume

JEL Classification: C13, C8, G12, G13

Paper Classification: Research Paper

Prelude

Commodity derivatives market in India seems like old wine in new bottle. In reality, forward trading in commodities existed in India from ancient times (period of Kautilya's Arthashastra) and the first modern futures market was established in 1875 for cotton contracts by the Bombay Cotton Trade Association, just a decade after CBOT entered the focus and traded its first future. The separate association Bombay Cotton Exchange Ltd was established over widespread discontent amongst leading cotton mill owners and merchants over the functioning of the Bombay Cotton Trade Association. The movement continued by setting up "Gujarath Vyapar Mandali" in 1900 for futures trading in oil seeds, ground nut, castor seed and cotton seeds etc. The chamber of commerce at Harpur established the futures exchange for wheat trading in 1913, the first futures exchange for bullion futures in Mumbai in 1920 and similar exchanges come up in Rajkot, Jamnagar, Kanpur, Delhi and Calcutta. In Calcutta Hessain Exchange Ltd in 1919 and East Indian Jute Association Ltd in 1927 were established further and these two exchanges merged in 1945 as East India Jute and Hessin Ltd to conduct the organized trading of futures contracts in raw jute and related goods, meanwhile, many other exchanges started in country to trade in diversified commodities.

After independence, Government of India commissioned a committee headed by A D Shroff in 1950 to introduce Forward Contract bill in Parliament, under the regulation of Ministry of Consumer Affairs and Public Distribution. The FMC was powered to regulate, licensing and control of trading of forward and option contracts all over India. The smooth functioning of market continued till 1966, but due to various regulations, the market lost its vivacious and finally the forward trading was completely banned. The Government of India reintroduced forward trading in select commodities like Cotton, Jute, Potato, etc., as per the recommendation of Khusro committee in 1980. Subsequently, the liberalization of Indian economy in 1991 gave a new lease of life for commodity trading. The Government setup a new committee under the chairmanship of Prof. K. N. Kabra in 1993, the committee recommended to start the futures trading in agriculture commodities in basmati rice, cotton seed, oilseeds, etc. Further in 1996, the World Bank in association with United Nations Conference on Trade and Development (UNTCAD) conducted a feasibility study and found that there is tremendous scope in revitalizing futures trading. In 2000, National Agricultural policy envisioned the reforms in agricultural commodities trading, that has brought a new wave in trading of commodity futures and paved the path for hedging and risk management by removal of control and regulation in agricultural market. In the aftermath of the second generation reforms, based on the recommendations of Kabra committee, World Bank Report and Guru Committee (2001) brought a dimension futures trading in Indian commodity market.

Indian commodity derivatives market has been rationalized in 2003 and futures contracts trading has seen upturn in terms of volume and value surge with very swift growth during that

decade. It raised itself to compete in the global market with international giants, such as NYMEX, CBOT, LME, etc., and became the top fifth exchange in terms of number of contracts in gold, second in silver, copper and natural gas. It is found that the trading in commodity derivatives is about three times more than in physical market, whereas, it is more than ten times in advanced economies. In spite of reaching global standards, the market is facing the challenges due to lack of infrastructure, warehousing, inadequate risk mitigating instruments, etc. If the regulators take cognizance of these issues, Indian commodity derivatives market will become definitely an icon among the world commodity derivatives market.

At present 21 commodity futures exchanges are working in the country, out of which, six are at national level and fifteen at regional level. All these exchanges are under the regulatory system of Forward Market Commission (FMC), Government of India. By and large, the market has staged a spectacular growth of trading in terms of volume and value of commodity trading. It is very clear through the statistics that 53 commodities notified and permitted for futures trading in 2003 by forward market commission that moved to 113 in agricultural, and non-agricultural commodities futures contracts. On the other hand, the market has registered a significant growth in terms of value, which was Rs.12.9364 billion in 2003-04 and augmented to Rs. 1812.6104, 1704.6840 and 1014.4795 billion during the last three years, i.e., 2010-11, 2012-2013 and 2013-14 respectively (see Table I).

Review of Literature

There is plethora of studies in the field since the existence of trading took place on commodities at India and the world. The important studies are reviewed and presented in a chronological order and examined the performance of trading, growth, role of price discovery, hedging, regulation future prospects to assess the performance of Indian commodity derivatives market specifically.

Shroff (1950) referred the Government of India draft bill on introduction of forward trading in India and recommended the introduction of forward trading helps in hedging, price stabilization, reducing the speculation. The study further advised to establish the trading rules and regulations, approved and managed by Government. Kamara (1982) analyzed the impact of introduction of commodity futures by comparing the spot market volatility before and after introduction of commodity futures and found no significant change. Kabra Committee Report (1993) advised to strengthen the Forward Market Commission (FMC) and Forward Contract Act, 1952 by means of improving infrastructure, telecommunication, functioning of the exchanges, adequate norms, automation of trading in exchanges, regulation to designing and trading of futures contracts, and establishing strong vigilance committee.

UNCTAD and World Bank Joint Mission Report (1996) highlighted the role of futures markets as market based instruments for managing risks and suggested the strengthening of institutional capacity of the regulator and the exchanges for efficient performance of these markets. Further noted that Government intervention was pervasive in some sensitive major commodities like wheat, rice and sugar and was of the view that future markets in these commodities were unlikely to be viable.

The National Agricultural Policy , (2000) recommended to liberalize the agriculture and allied sector, enhance the infrastructure and information technology, the commodity exchanges has to launch futures contract on liquid commodities in the market. Singh (2000) analyzed efficiency of Indian commodity futures, advised optimizing the futures markets to discover the prices and minimize risk. According to him, exchanges should be self-regulated to curb speculation. The

Government should minimize the intervention in pricing mechanism and should initiate private participation. Sahadevan (2002) surveyed the recognized exchanges and their organizational, trading and the regulatory set up for futures trading in commodities and revealed that many of the commodity futures exchanges fail to provide an efficient hedge against the risk emerging from volatile prices of many farm products in which they carry out futures trading. Habibullah Committee (2003) advised the Government of India that the development of commodity derivatives market must be upheld by removal of obstruction on convergence between securities and commodity derivatives market on account of policies relating to cash market, which will impact demand and supply forces. The Government follows common policy applicable to all over India. It further advised on removal of restrictions on participation of banking institutions at least for hedging purpose. The new policy framework should permit the introduction of the commodity futures indices contracts, spreads, weather, electricity and freight. It also recommended modifying the SEBI regulation to permit participation of mutual funds, Foreign Institutional Investor.

Chen and Firth (2004) analyzed the relationship between return and trading volume of four commodity futures in China, by using correlation and Granger causality test. They found no correlation between return and volume, but signify the causality from trading volume and return, vice versa. They, however, found a correlation between absolute return and trading volume. Bir (2004) investigated hedging performance of agricultural commodity futures market in terms of price discovery and risk management. The factors responsible for inefficient hedging in commodities were found as low volume, low participation, inadequate warehouse facility and deficient information system of commodity exchanges. Wang and Ke (2005) analyzed the efficiency of the futures market for agricultural commodities in China found that long term equilibrium exists between futures and cash prices for Soybean. On the other hand, the comparison of wheat and soya bean futures reveals short term efficiency of Soybean futures market. Zapata (2005) analyzed the unidirectional Granger causality from futures prices for world sugar on the New York Exchange and world spot price of sugar and found the futures market helps in price discovery in spot, and the flow of information is from futures to spot market but not vice versa. Gorton and Rouwenhorst (2004, 2005) analyzed the long term characteristics of investment in collateralized commodity futures contracts by creating a commodity futures weighted index covering period of July 1959 to December 2004. The results showed that there was higher historical index and spot market return during the sample period. Further the study was found that the commodity futures risk premium was higher than debt market return and equal to equity market return. Ahuja (2006) analyzed the commodity derivatives market in India. And found that the commodity futures market in India has recorded spectacular growth to reach a one trillion mark in 2006. However, several challenges have to be overcome for further stability and persistent growth and development of the market. Karande (2007) studied the castor seed futures traded in with Mumbai and Ahmadabad and evaluated three features of commodity futures market in India, viz, basis risk, price discovery and spot price volatility. The result found that the price discovery was achieved and beneficial in spot price volatility market. Liu and Zhang (2006) analyzed the Price discovery of Spot and Futures price in Chinese Copper, Aluminum, Rubber, Soybean and Wheat markets and found that lead lags relationship between spot and futures market is quite limited. Abhijit Sen (2007) revealed that there is no significant proof for price acceleration of agricultural commodity prices in post futures period, the period of study being very short to discriminate enough between the futures trading and the cyclical adjustments. Lokare (2007) revealed significant co integration between futures and spot prices of selected commodities and had shown the slower operational efficiency. On the other hand, there was inefficient exploitation of available information to capture in the prices of futures contract. Ram and Ashis (2007) concluded that agricultural commodity derivatives provide an efficient

protection against the price volatility risk in terms of commodity prices, commodity exchanges offer a broad based platform for trading of agricultural and non-agricultural commodities over time and space so the commodity exchanges need to be developed at national level. IIM Bangalore (2008) study found post futures period volatility increased, in spite of negative results of futures market, suggested to integrate the geographical separated markets, remove the incompetence is arising among the futures prices and futures spot prices, which was due to immature nature of the market, there are many obstruction in nature of the institutional and policy level constraints.

Kedarnath and Mukharjee (2008) investigated the impact of futures trading on agricultural commodity market and found there is no significant change in spot prices post futures period in essential commodities, but a comparative advantage found through causality analysis proves that bidirectional relation exists between futures and spot market through flow of information. Bose (2008) found that information flow between the market helps in price determination. In spite of lesser degree of association in spot and futures indices, the agriculture commodity indices shows weak performance in price dissemination for predicting the futures prices than non-agriculture commodity futures indices. Nath and Lingareddy (2008) concluded that futures trading in the selected commodities escort to increase volatile in case of urad, in case of gram and wheat prices moderately rise in post futures period not proved statistically significant. Bhawna et al. (2009) found the removal ban on commodities achieved the spectacular growth, achieved its objective as price risk management and price discovery and high untapped potential market growth in agriculture commodities. IIT Bombay (2009) conducted a research study on behalf of Forward Market Commission (FMC) of India and found that seventy percent of population depends on agriculture commodities, and there is a need to liberalize the to manage the price risk through commodity futures. Sabnavis and Gurbandani (2010) analyzed global commodity markets. These markets have proved to be efficient price discovery mechanism in India and worldwide. Further, Gurbandani (2010) found that both spot and future prices for selected agricultural commodities are efficient in weak form. Future prices are independent and past prices have no role in the contribution of future price prediction.

Basu and Gavin (2010) concluded that the investors are searching for the alternatives like high risky mortgage debt and financial derivatives market to mitigate the risk. The study also found that there is negative correlation between equity market to commodity futures return and it gives scope of bringing the arbitrage to exit hedging profits. Shanmugam and Dey (2011) showed that the commodity market have performed better for all the stakeholders. There is an urgent need for new instruments in the commodity markets. In addition, the regulator has to develop stringent policies that can allow financial intermediaries like institutional investors, banks and mutual funds to benefit at gross root level. Swati and Shukla (2011) concluded there is a need to convergence of all types of market like equity, commodity, forex and debt, which should be developed and regulated properly to provide wide-ranging risk management solutions to Indian stakeholders. Gupta and Ravi (2012) investigated the relationship in price discovery which proved that futures markets are more responsive in dissemination information and price discovery to correct spot market. Mahanta (2012) analyzed price trends in the international market and concluded that gold price movements in international market is positively correlated with Indian gold price movements, so proper considerations to international markets should be given while designing policies of derivatives market in India. Barua and Mahanta (2012) investigated the high inflationary pressure due to commodity derivatives. Few futures contracts like red gram, black gram, chickpeas, wheat, rice, potato, refined soybean oil and rubber have been canceled, but analysis proved that the ban on these commodity futures contract didn't bring price stability.

Popli and Singh (2012) revealed that commodity futures market was volatile in USA, U.K. and India. The comparison between US, U.K and Indian futures markets reveals the policy makers have to follow the clue from U.S and U.K regulation to promote and encourage investments in commodity derivatives market. Kaur and Anjum (2013) carried out the study on agricultural commodity futures in India and found that in spite of development of commodity futures market, farmers could not gain leverage from the market, as there is no integration between spot and futures market. They further found that due to lack of infrastructure and warehousing, regional exchanges could not penetrate to rural India

Research Gap and Contribution of the Study

The systematic review of literature revealed that the majority of studies covered the feasibility of futures trading, institutional and policy level constraints, strengthening of regulations, liberalizing the exchanges, institutional building, need for new instruments in the market and International market linkages. In the aftermath of reintroduction, most of the studies conducted by many researchers focused on impact of futures on volatility, risk management, price discovery, hedging, and market efficiency, relation between return and trading volume, lead-lag relationship between trading activity and cash price volatility before and after introduction of futures market, but no study was found with regard to assessing the growth, development and future prospects on long term performance of the market. Hence, the present paper is undertaken as a modest attempt to dwell on such untapped aspects.

Objective of the Study

The main objective of the study is to analyze the growth, trends and prospects of commodity derivative market in India and test the significance in performance of the market.

Hypothesis of the Study

To ascertain the objective of the study the following hypotheses are undertaken and tested:

1. *The difference between estimated volume and actual volume of commodity futures market not equal to zero ($\mu e \neq \mu a$)*
2. *The difference between the estimated value and actual value of commodity futures market not equal to zero. ($\mu EV \neq \mu AV$).*
3. *The ratio between the variances of estimated and actual volume of commodity futures market is equal to 1.*
4. *The ratio between the variance of estimated and actual value of commodity futures market are equal to 1.*

Data Sources and Methodology of the Study

The study is analytical and explorative in nature and data is collected through secondary source to the possible extent. Forward Market Commission annual reports and website of the Ministry of Consumer Affairs were used to collect the data on total commodity market in terms of volume and value of trading for the period of 2004-05 to 2013-14.

Further the data showing the contribution of the six national commodity exchanges, namely, MCX, NCDEX, NMCE, ICE, ACE and UCX was collected for a period of 2005-06 to 2012-13. Besides, data was also collected from UNCTAD reports, Research Works, Research papers, RBI, working papers, articles published in national and international journals, magazines and other library sources.

The data analysis is done by using the relevant statistical tools. To estimate the trend, least square method is applied; t-test is employed to examine the significance in the means of estimated and actual trend; F-test test applied to find the significance in the variance between estimated and actual values in series and chi square test is employed to examine dependency of the performance growth of the market on the Indian commodities market.

Analysis, Discussion and Findings

The Indian commodity markets dimension is changing as participants in market metamorphically moved from being price takers to price makers. It ensures the market generates effective information that flows among the stakeholders through organized market. FMC has been making the policy measures for better regulation and increase in transparency in effective functioning of the exchanges, such as clubbing of open positions across the exchanges, requirement of exposure, minimum capital adequacy norms, guidelines on algorithmic trading, warehousing facilities, impart the physical settlement focus for long run efficiency of the market. The actively trading commodity futures contracts' (notified under sec (15), F.C.R Act 1952), volume and value of trading is presented through Table 1.

Table 1: Types of Commodities Traded in Derivatives Market

I) Agricultural Commodities	35 Turmeric
1 Almond	36 Urad
2 Barley	37 Wheat
3 Bajra	
4 Cardamom	
5 Castor seed	
6 Chana/Gram	
7 Chillis	**II) Non Agricultural Commodities**
8 Coconut oil	**(A) BULLION**
9 Coffee Rep Bulk	1 Gold
10 Copra	2 Silver
11 Coriander/Dhaniya	3 Platinum
12 Cotton	**B) METALS**
13 Cotton seed Oilcake / Kapasia Khali	1 Aluminium
14 Crude Palm Oil	2 Copper
15 Guar Gum	3 Lead
16 Guar seed	4 Nickel
17 Gur	5 Sponge iron
18 Isabgul Seed	6 Steel
19 Jeera (Cumin seed)	7 Tin
20 Kapas	8 Zinc
21 Maize	9 Iron10

(Continued)

22 Mentha Oil	10 Iron ore
23 Mustard Seed	**III) ENERGY**
24 Pepper	1.
25 Potato	2.
26 RBD palmolein	**IV) PLASTICS**
27 Raw jute	
28 Rice	
29 Rubber	
30 Sacking	
31 Soy Oil	**V) OTHER COMMODITIES**
32 Soy seed	
33 Sugar	
34 Tur	

Source: Forward Market Commission (FMC)

Table 1 presents actively traded futures contracts, which are 36 agricultural commodities as segmenting into food grain and pulses, oil seed and oils, spices. Similarly, in non agricultural segment 3 precious metals (bullion), industrial metals 10, fibers and manufactures, energy, plastic and other futures contracts are included. It can be realized that over of one decade about 54 commodities to 113 commodities are permitted for the futures trading, hence, one can expect the potentiality of demand for mitigating price risk and discovery in future.

Trend of Agriculture and Non-agriculture Commodities traded in the Futures Market

The Indian futures market performance analysis from 2004-05 to 2013-14 in each segment of commodities, viz, agricultural and non-agricultural commodities, energy, plastic and other commodities futures, in terms of volume and value of trading in the market is presented through Table 2.

Table 2 shows the trend in volume of commodity futures market and the growth for the period of 2004-05 to 2013-14. The market growth was measured by taking the index value of 2004-05 as base (100). The growth in market under different segments, namely, agricultural, non-agricultural, energy, plastic and other commodities were measured by trend percentages and growth percentages. It can be observed that the agricultural commodities growth has showed a mixed trend and the compounded average growth rate was found at 6 percent, whereas in non-agriculture commodities growth rate was observed as a continuous one and high except in current year. The average compounded growth rate in this segment was found at 59 percent during the period. Hence, the overall growth rate was positive during the study period except in last two years, which is caused by the recession and international trade imbalance. However, the overall average compounded growth in volume of futures market was increasing at 15 percent. This can be a good sign as far as market performance is concerned.

Table 2: Trend analysis of Agriculture and Non-agriculture Commodities traded in Indian Commodity Futures Market

(Volume in million tonnes)

Year	Agriculture Commodities(I)		Non Agriculture Commodities (II)						Energy (III)		Plastics and Other (IV)		Grand Total (I+II+III+IV)	
			Bullion		Metals		Total							
	volume	Trend (growth)	Volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)
2004-05	193.9	100	NA	NA	NA	NA	.3	100	0		0	NA	194.2	100
2005-06	581.9	300 (110)	NA	NA	NA	NA	5.8	2149 (307)	90.9	100	.3	100	678.9	350 (125)
2006-07	502.4	259 (-15)	NA	NA	NA	NA	19.1	7018 (118)	91.4	101 (1)	0	NA	612.9	316 (-10)
2007-08	314.5	162 (-47)	NA	NA	NA	NA	45.2	16616 (86)	197.6	217 (76)	0	NA	557.3	287 (-10)
2008-09	210.7	109 (-40)	NA	NA	NA	NA	78.9	28995 (56)	232.8	256 (17)	.8	272	719.5	371 (26)
2009-10	399.1	206 (64)	.5	100	98.2	100	98.7	36277 (22)	516.3	567 (80)	.2	71 (134)	1014.3	522 (34)
2010-11	416.8	215 (4)	.7	156 (44)	141.0	144 (36)	141.7	52103 (36)	722.0	794 (34)	0	NA	1280.6	660 (23)
2011-12	494.2	255 (17)	1	217 (33)	138.8	141 (-2)	139.8	51405 (-1)	768.6	844 (6)	0	NA	1402.6	722 (9)
2012-13	439.8	227 (-12)	.7	154 (-34)	173.0	176 (22)	173.7	63860 (22)	836.2	920 (9)	0	NA	1451.0	748 (4)
2013-14	361.2	186 (-20)	.4	83 (-62)	97.8	100 (-57)	98.2	36120 (-57)	423.8	465 (-68)	0	NA	883.3	455 (-50)
AGV G		6						59						15.15

*Source: FMC, * percentages without parenthesis are trend percentages and ** percentages with parenthesis are trend growth percentages*

Similarly, it is evident from Table 3 that trend in value of commodity futures market growth during the same period, which is measured by way of volume growth rate measured by taking the index values of 2004-05 as base (100). The growth in market under different segments, viz., agricultural, non agricultural, energy, plastic and other commodities reveals that the agricultural commodities growth moved along a mixed trend, whereas, the compounded average growth rate was found around 14 percent. On the other hand, in non-agriculture commodities growth has reported a continuous trend with high rate except in last 3 years. Hence, the average compounded growth rate was found at 35 percent during the study period. Interestingly, the overall growth rate was very positive during the study period except in last two years, which infers that the situation was due to recession and international trade imbalances. Besides, the overall average compounded growth in value of futures market was found to increasing at 29 percent, which is an admirable sign with regard to commodity futures market in India.

Table 3: Trend Analysis of Agriculture and Non-agriculture Commodities traded in Indian Commodity Futures Market

(Value in Rs. Billion)

Year	Agriculture Commodities(I)		Non Agriculture Commodities (II)						Energy (III)		Plastics and Other (IV)		Grand Total (I+II+III+IV)	
			Bullion		Metals		Total							
	volume	Trend (growth)	Volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)	volume	Trend (growth)
2004-05	3901.88	100	NA	NA	NA	NA	1796.71	100	19	100	0	NA	5717.6	100
2005-06	11922.27	306 (112)	NA	NA	NA	NA	7793.98	434 (147)	1818.83	9572 (456)	16.14	100	21551.22	377 (133)
2006-07	13171.25	338 (10)	NA	NA	NA	NA	21289.85	1185 (100)	2307.12	12142 (24)	1.04	6 (-281)	36769.27	643 (53)
2007-08	9413.61	242 (-33)	NA	NA	NA	NA	26236.67	1461 (21)	5009.42	26363 (78)	0.19	1-179	40659.89	711 (10)
2008-09	6270	161 (-41)	NA	NA	NA	NA	35920	1999 (31)	10260	53997 (72)	20	124 (482)	52470	918 (26)
2009-10	12179.49	313 (66)	31641.52	100	18016.36	100	49657.89	2764 (32)	15778.82	83039 (43)	31.34	194 (45)	77647.54	1358 (39)
2010-11	14563.9	374 (18)	54938.92	174 (55)	26876.73	149 (40)	81815.65	4554 (50)	23109.59	121623 (38)	0.29	2 (-457)	119489.4	2091 (43)
2011-12	21961.5	564 (41)	101819.6	322 (62)	28967.31	161 (8)	130786.9	7280 (47)	28512.69	150053 (21)	0.08	1 (-69)	181261	3170 (42)
2012-13	21557	554 (-2)	78626.79	249 (-26)	32570.51	181 (12)	111197.3	6189 (-16)	37684.09	198327 (28)	0.01	0	170468.4	2983 (-6)
2013-14	16024.02	412 (-30)	17952.4	57 (-147)	17613.6	98 (-61)	60702.98	3379 (-61)	24720.95	130098 (-42)	0	NA	101448	1774 (-52)
AVG G		14						35		72				29

*Source: FMC, * percentages without parenthesis are trend percentages and ** percentages with parenthesis are trend growth percentages*

Performance of commodities futures market in terms of estimated and actual trade in volume and value.

The commodity futures market trend is estimated through least square method to examine the trend of growth during the study period and compare with actual trend. It is clear from the analysis through Tables 4 and 5 that the trend of actual and estimated volume and value of commodity derivatives market. Similarly, Tables 6 and 7 depict a comparative analysis and test result of the hypothesis with chi square distribution, t-test and variance analysis through F-ratios.

Table 4: Trend of Estimated and Actual Commodities Futures Volume and Value of Trade

(Value in Rs. Billion)

	VOLUME OF TRADE				VALUE OF TRADE			
Years	**Actual Volume**	**Trend**	**Estimated Volume**	**Trend**	**Actual Value**	**Trend**	**Estimated Value**	**Trend**
2004-05	194.2	100	607.9	100	5717.6	100	22168.43	100
2005-06	678.9	350	717.1	118	21551.22	377	39672.17	179
2006-07	612.9	316	826.3	136	36769.27	643	57175.92	258
2007-08	557.3	287	935.5	154	40659.89	711	74679.67	337
2008-09	719.5	370	1044.7	172	52470	918	92183.42	416
2009-10	1014.3	522	1153.9	190	77647.54	1358	109687.2	495
2010-11	1280.6	659	1263.1	208	119489.4	2090	127190.9	574
2011-12	1402.6	722	1372.3	226	181261	3170	144694.7	653
2012-13	1451	747	1481.5	244	170468.4	2981	162198.4	732
2013-14	883.3	455	502.5	83	101448	1774	179702.2	811

Table 5: Test of significance analysis of Comparison of Actual and Estimated Commodities Futures market Trade Volume and Value

Commodities futures market Trade Volume		**Commodities futures market Trade Value**	
Estimated volume Mean	879.4600	Estimated value Mean	100935.29200
Actual volume Mean	1099.3000	Actual value Mean	80748.23300
Estimated Std. deviation	330.6194	Estimated Std. deviation	52995.22883
Actual Std. deviation	406.8411	Actual Std. deviation	61070.33288
t test		**t test**	
t (Calculated Value)	-2.933	t (Calculated Value)	-2.103
|t| (Critical value)	2.262	|t| (Critical value)	2.262
DF	9	DF	9
P-value (Two-tailed)	0.017	p-value (Two-tailed)	0.065
α	0.05	α	0.05

Table 5 presents the t-test result which reveals the analysis of trend in volume growth in futures market and comparison based on the estimated (OLS) and actual volumes presents the performance results in connection with the research hypothesis. Similarly, comparison of the trend in value growth of futures market examined through hypothesis that the difference between the estimated value and actual value of commodity futures market is not equal to zero. ($\mu EV \neq \mu AV$). It is found that the observed value of t is -2.933 and -2.103 volume and value of trend respectively,

which are less than critical value 2.262, so the null hypothesis is accepted. It means that there is a difference between estimated and actual volume and value in commodities futures market in terms of growth. It concludes that the growth in values of business follows non-linear growth.

Table 6: Comparison of Actual and Estimated Commodities Futures Trade Volume and Value

(Volume in Million tonnes & Value in Rs. Billion)

Particulars	VOLUME OF TRADE			VALUE OF TRADE		
Years	Actual Volume of Trade (O)	Estimated Volume of Trade (E)	Deviations (d) (O – E)	Actual Value of Trade (O)	Estimated Value of Trade (E)	Deviations (d) (O – E)
2004-05	194.2	607.9	-413.7	57.176	221.6843	-164.508
2005-06	678.9	717.1	-38.2	215.5122	396.7217	-181.21
2006-07	612.9	826.3	-213.4	367.6927	571.7592	-204.067
2007-08	557.3	935.5	-378.2	406.5989	746.7967	-340.198
2008-09	719.5	1044.7	-325.2	524.7	921.8342	-397.134
2009-10	1014.3	1153.9	-139.6	776.4754	1096.872	-320.396
2010-11	1280.6	1263.1	17.5	1194.8942	1271.909	-77.0149
2011-12	1402.6	1372.3	30.3	1812.6104	1446.947	365.6638
2012-13	1451	1481.5	-30.5	1704.684	1621.984	82.6999
2013-14	883.3	1590.7	-707.4	1014.4795	1797.022	-782.542
$\chi 2$ values		899.8		1139.3930		

Table 7: Variance analysis over estimated and actual volume and value of commodity derivatives market (F Test)

Volume	F test	Value	F test
Ratio	1.514	Ratio	1.328
F (Observed value)	1.514	F (Observed value)	1.328
F (Critical value)	4.026	F (Critical value)	4.026
DF1	9	DF1	9
DF2	9	DF2	9
p-value (Two-tailed)	0.546	p-value (Two-tailed)	0.679
α	0.05	α	0.05

At 95% level of confidence

The ratio between the variances of estimated and actual volume as well as value of commodity futures market has been tested through two hypotheses in terms of the ratio between the variances of estimated and actual volume of commodity futures market equal to 1 and whether the variances of estimated and actual value of commodity futures market are equal? It is found that the observed value of F is 1.328, which is lower than critical value 4.026. Therefore, the null hypothesis is accepted. It is found that the estimated and actual volume of commodities futures market follow continuous and reciprocal trend. On the other hand, with regard to value, it is found that the observed value of F is 1.514, which is lower than the critical value 4.026, so the null hypothesis is accepted. Therefore, it is concluded that the estimated and actual value of commodities futures market follows a linear trend.

Prospects of commodity futures market

It is evident from the analysis that the future of the market is very bright and prosperous, hence, the prospects of commodity futures market is estimated through Ordinary Least Square (OLS) method. Table 8 clearly presents the expected growth in volume and value of commodity futures market in next ten years that spans over 2014-15 to 2024-25. It portrays the trend and projection of the growth of market over a period of ten years and the trend depicts linear growth with a compounded volume of the business at 45.65 percent. On the other hand, value of market is an expected to grow at 58.71 percent, which is very positive for the market.

Table 8: Forecast of Commodities Derivatives Volume & Value of Trade for Next Ten Years

(Volume in Million tonnes & Value in Rs. Billion)				
Years	**VOLUME OF TRADE**		**VALUE OF TRADE**	
	Estimated Volume	**Trend**	**Estimated Value**	**Trend**
2014-15	1699.9	280	197205.9	890
2015-16	1809.1	298	214709.7	969
2016-17	1918.3	316	232213.4	10 48
2017-18	2027.5	334	249717.2	1127
2018-19	2136.7	352	267220.9	1206
2019-20	2245.9	370	284724.6	1285
2020-21	2355.1	388	302228.4	1364
2021-22	2464.3	406	319732.1	1443
2022-23	2573.5	424	337235.9	1522
2023-24	2682.7	442	354739.6	1601
Growth rate		45.65		58.71
Avg. growth rate		4.56		5.87

Proportionate traded value of national exchanges commodity futures total and growth of each exchange

The analysis of national exchange contribution of value of commodities traded in market presented in the table and their respective growth in trade is analyzed and presented through Table 9.

Table 9: Proportionate traded values of National Commodity Futures Exchanges over the total trade during 2005-06 to 2012-13

(Value in Rs. Billion)										
year	**MCX**	**NCDCX**	**NMCE**	**OTHERS**	**TOTAL**	**% Of MCX in total**	**% of NCDEX in total**	**% of NMCE in total**	**% of others in total**	**Total**
2005-06	6038.5179	9191.3165	121.07	1081.07	16373.45	36.88	56.14	0.74	6.60	100.00
2006-07	20256.63	12433.27	1114.62	1040.33	34844.85	58.13	35.68	3.20	2.99	100.00
2007-08	27304.15	7749.65	250.56	1240.51	36544.87	74.71	21.21	0.69	3.39	100.00
2008-09	42846.53	6280.74	372.72	838.85	50338.84	85.12	12.48	0.74	1.67	100.00
2009-10	63933.0217	9175.8471	2279.0148	2259.657	77647.5405	82.34	11.82	2.94	2.91	100.00
2010-11	98415.03	14106.02	2184.109	4784.26	119489.424	82.36	11.81	1.83	4.00	100.00
2011-12	155970.9547	18102.10096	2683.5095	4504.473	181261.038	86.05	9.99	1.48	2.49	100.00
20012-13	148810.5712	15984.2587	1765.7086	3907.862	170468.401	87.30	9.38	1.04	2.29	100.00

Source: FMC

Table 9 shows the performance of national exchanges in commodity markets in India over a period of last eight years i.e., from 2005-06 to 2012-13. Performance in terms of value of commodities traded can be seen of the three major exchanges, namely, MCX, NCDEX and NMCE and other three national and regional exchanges. MCX registered 36 percent of total in 2005-06 and NCDEX 56 percent and others reported 6.6 per cent. In 2006-07, MCX acquired major share of market in value of trading that continued at an average of 80 per cent, whereas, NCDEX declined between 9 and10 per cent. On the other hand, NMCE is found with 1%-2% share in value of trading, whereas the other 15 regional exchanges are found with a nominal share of 2%- 4%. It can be inferred that national exchanges are well established and located in prime location of India and majority of commodities that they trade are bullion, industrial metals and also agricultural commodities. Therefore, their movement is very progressive. However, regional exchanges have a limited access and infrastructural facilities, hence they could not be at par with the national exchanges.

Conclusion and Implications

It is found that the Indian commodity market exists since ancestral period as compared with world market. The organized market in the world started in mid of nineteen century in US establishing CBOT in 1850, whereas in India contemporarily Bombay Cotton Traders Association (BCTA) was established in 1875. The expansion of trading slowly gained momentum till 1952, because of establishment of Forward Market Commission and passing the Forward Trading Regulation Act. In 1966 due to some obstructions in regulatory and policy issues, the ban on commodity forward trading was continued till 2002. In this aftermath, Government formed some committees to study the feasibility of reintroduction of forward trading as part of second generation reforms and pressure form world economic reform regulators. Then a commodity derivative trading was reintroduced in 2003 with three major national commodity exchanges under the regulation of FMC.

The growth of new journey moved with a remarkable attention to all the stakeholders in the market. Within a short span, it reached the stage to compete with global markets in certain commodities, viz, gold, silver, platinum etc. At present the number of exchanges moved to 6 national and 15 regional exchanges with the increase of permitted commodities from 53 to 113 for trading in the market. The performance of the commodity market found through the volume and value of market has been growing at average compounded growth in volume and value of futures market by 15 and 29 percent respectively. Such growth is non-linear between estimated and actual volumes and values. On the other hand, the variance between the volume and value of the market follows a reciprocal trend. The trend projection of market over a period of next ten years is linear at a growth rate of 45.65 and 58.71 percent in volume and value of market. Hence, the performance of the market is very considerable and progressive. Hence, the policy makers should concentrate to enhance the infrastructure facilities, integration of regional exchanges to national exchanges and penetration of information flow to reach the real users of the commodity derivatives market. With these changes, the commodity derivatives market can reach a vivacious market performance in the future provided the requisite facilities are created by the Government.

Scope for Further Research

The present study found the similarity with results of different studies Bhawna et al. (2009) Ahuja (2006), Habibullah Committee (2003) in identifying growth and development in commodity futures market, the focus to enhance of infrastructure, information system and encouragement to stakeholders and further need of integration among the markets. It focused

on overall performance of the market in terms of volume and value of commodity derivatives market. However there is a lot of scope to investigate and research into macroeconomic factors that influence the market performance and study for price discovery, hedging practices by the industry, need for introduction of new instruments in the market, the trading and settlement issues related to risk management, further the integration of commodity market with financial markets etc.

Limitations of the Study

The present study is limited to analysis of the growth and projection on overall performance of the market. And does not probe into micro issues of performance. The organized data was available from year 2004-05 to 2013-14 on overall market and individual exchanges trading data was available from 2005-06 to 2012-13. So the analysis is done to such extent only. The past information may not be reflect in future with certainty

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