A STUDY ON MARKET EFFICIENCY OF SELECTED COMMODITY DERIVATIVES TRADED ON NCDEX DURING 2011

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ABSTRACT

The study aims at testing the weak form of Efficient Market Hypothesis in the context of an emerging commodity market - National Commodity Derivatives Exchange (NCDEX), which is considered as the prime commodity derivatives market in India. The study considered daily spot and futures prices of five selected commodities traded on NCDEX over 12 month period (the futures contracts originating and expiring during the period January 2011 to December 2011) The five commodities chosen are Pepper, Crude palm Oil, steel silver and Chana as they account for almost two-thirds of the value of agricultural commodity derivatives traded on NCDEX. The results of Run test indicate that both spot and futures prices are weak form efficient

Keywords: Commodity Market, Market Efficiency

1. INTRODUCTION

India has a long history of Future Trading in Commodities. In India, trading in Commodity Futures has been in existence from the 19th century with organized trading in cotton, through the establishment of Bombay Cotton Association Ltd. In 1875 Over a period of time, other commodities were permitted to be traded in future Exchanges. Spot trading in India occurs mostly in regional mantis and unorganized

market, which are fragmented and isolated. The 100 unorganized exchanges were conducting forward trade in various commodities. The securities market was a poor competitor of this market as there were not many papers to be traded at that time.

India, commodity based economy where two-third of the one billion population depend on agricultural, commodities, surprisingly has an under developed commodity market. Unlike the physical market futures markets trades in commodity are largely used as risk management (hedging) mechanism on either physical commodity itself or open positions in commodity stock.

Since commodity "futures" trading was permitted in 2003, the commodity derivative market in India has witnessed phenomenal growth. Trading of commodity derivatives on exchange platforms helps to achieve price discovery. Price risk management besides helping economy with better resource allocation. Though   the volume of commodity future trade increased exponentially since its launch in 2003, the functioning of the futures market came under scrutiny during 20008-2009 due to price rise.

However, the success of these markets in performing the stabilizing function critically depends on whether they are "efficient". Moreover the "dual price system" under which different prices for same commodities exist, the administration of a part of market for the commodity by the government is expected to give rise to inefficiency . In an emerging market context like India, the growth of commodity future market would depend on efficiency of the future market.

Commodity

A commodity may be defined as an article, a product or material that is bought and sold. It can be classified as every kind of movable property, except Actionable Claims, Money & Securities. Commodities actually offer immense potential to become a separate asset class for market-savvy investors, arbitrageurs and speculators. Retail investors, who claim to understand the equity markets, may find commodities an unfathomable market. But commodities are easy to understand as far as fundamentals of demand and supply are concerned. Retail investors should understand the risks and advantages of

trading in commodities futures before taking a leap. Historically, pricing in commodities futures has been less volatile compared with equity and bonds, thus providing an efficient portfolio diversification option.

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Commodity Derivatives Market

Derivative Market can broadly be classified as commodity derivative market and financial derivative market. As the name suggest, commodity derivatives trade contracts for which the underlying assets is a commodity like, wheat, soya bean, cotton etc or precious metal like Gold and Silver. Financial derivatives markets trade contract

that have a financial assets or variable as the underlying. The most financial derivatives are those, which have equity, interest rate and exchange rate as the underlying. Financial derivatives are used to hedge the exposure to market risk. The commodity derivatives differ from the financial derivatives mainly in the following two aspects: Firstly, due to the bulky nature of the Underlying assets, physical settlement in commodity derivatives creates the need for warehousing. Secondly, in the case of commodities, the quality of the asset underlying a contract can vary largely.

National Commodity Derivatives Exchange Ltd (NCDEX)

The National Commodity and Derivatives Exchange Ltd , is a national level, technology driven demutualized online commodity exchange with an independent Board of Directors and professional management. NCDEX is a public limited company incorporated on April 23,2003 under the companies act 1956.It obtained its certificate for commencement of business on May 9,2003.It commenced its operations on December 15,2003,NCDEX is located Mumbai

MARKET EFFICIENCY

There are different types of market efficiency that are defined in terms of the available information. Fama (1970) has categorized market efficiency into three forms.

(1) Weak form efficiency

(2) Semi –strong form efficiency

(3) Strong form efficiency

Weak form efficiency

Prices reflect all information found in the record of past prices and volumes market is called weak form efficient if the current price fully reflects all available information in the historic series of price, it is also known as the " test of return predictability".

Semi – strong form efficiency

Prices reflect not only all information found in the record of prices and volumes but also all other publicly available information.

Strong form efficiency

Prices reflect all available information public as well as private.

2. Objectives of the study

1. To analyze market efficiency of selected commodities (Chana, Pepper, Steel, Silver, Crude oil).

2. To study the market efficiency of NCDEX in India by considering all commodity indices in future and spot markets

3. RESEARCH METHODOLOGY OF THE STUDY

Selection of the Sample

While selecting the sample indices, all the NCDEX indices, the sample indices consist of Futures and Spot Prices

Sources and Collection of Data

The present study was mainly based on secondary data which were collected from the NCDEX websitewww.ncdex.com. Further, the available secondary data were collected from the various published books, Articles, Journals.

Period of the Study

This study was mainly intended to examine Market Efficiency of Futures and Spot market indices of National Commodity Derivatives Exchange (NCDEX) in India.

All the indices which were under NCDEX, from January 1th 2011 to December 31st 2011, were considered as the sample indices

4. REVIEW OF LETERATURE

"Market Efficiency in agricultural future markets" By Andrew M.Mckenzie and Mathew .F.Hold (2002).This study examined in four agricultural commodity futures (Livecattle, hogs, corn, soybean).Results indicate that livecattle,hogs, corn and soy bean meal futures markets are both efficient, and biased in the long run, also suggest short run time varying risk premium in cattle and hogs futures markets.

"Efficiency Test of agricultural commodity futures markets in China"By Wang Hong and Bingfanke (2005).This result suggest a long term equilibrium relationship between the future price and cash price for soybean and weak short term efficiency in the soy bean market .The study also highlighted in efficient future market wheat an suggested that it may have been

caused by over speculation and government intervention.

"Efficiency and Future Trading- Price Nexus in Indian Commodity Future Market" By Pravakar Sahoo(2009).The examined and future trading price Nexus for five selected commodities (gold, copper, petroleum, soyaoil, and chana). Results suggested that the market is efficient for all five commodities.

In India, NCDEX is considered as prime national level commodity exchange for agricultural and non agricultural commodities and hence selected for the study and the time frame chosen for the study is the future contracts originating and expiring during the period January 1th 2011 to December 31st 2011. Five selected commodities namely – Pepper, Steel,Silver,Chana , and Crude palm oil have been selected for this study.The future Open and Close and Spot Close prices on all trading days during the period were obtained from home page of NCDEX (www.ncdex.com).

5.Results and Discussions

Run Test

The Run test is a non parametric test that is designed to examine whether successive price changes are independent. The test based on the premise that if a series of a data is random, the observed number of runs in the series should be close to the expected number of runs.

$$\mu = \frac{2\,N_+\,N_-}{N} + 1\,,$$

$$\sigma^2 = \frac{2\,N_+\,N_-\,(2\,N_+\,N_- - N)}{N^2\,(N-1)} = \frac{(\mu-1)(\mu}{N-1}$$

Table 1: Results of Run Test for Chana

Period	Total No. of Observations	Test Value	No. of Observations less than Test Value	No. of Observations Equal to or Greater than Test Value	No. of Runs	Z-Statistics
January						
F(O)	25	2609.12	14	11	4	-3.659
F(C)	25	2611.64	13	12	4	-3.670
S(C)	73	2556.64	42	31	4	-7.883
February						
F(O)	24	2822.75	9	15	3	-3.908
F(C)	24	2816.04	9	15	3	-3.908
S(C)	68	2628.25	37	31	4	-7.570
March						
F(O)	27	2583.25	4	23	4	-2.685
F(C)	27	2681.18	12	15	6	-3.115
S(C)	74	2456.77	29	45	2	-8.422
April						
F(O)	24	2400.33	1	23	3	0.0
F(C)	24	2505.00	11	13	2	-4.380
S(C)	65	2240.58	39	26	8	-6.307
May						
F(O)	26	2440.42	1	25	3	0.0
F(C)	26	2545.03	13	13	4	-3.803
S(C)	71	2337.60	35	36	4	-7.770
June						

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F(O)	26	2654.61	18	8	2	-4.532
F(C)	26	2660.38	17	9	2	-4.561
S(C)	74	2535.55	51	23	2	-8.408
July						
F(O)	26	3148.92	8	18	2	-4.532
F(C)	26	3159.30	8	18	2	-4.532
S(C)	79	2841.38	43	36	4	-7.877
August						
F(O)	26	3257.15	1	25	2	-1.588
F(C)	26	3389.96	13	13	5	-3.403
S(C)	71	3036.30	46	25	5	-7.449
September						
F(O)	26	3508.65	2	24	2	-3.477
F(C)	26	3639.69	15	11	3	-4.183
S(C)	71	3460.44	34	37	3	-8.008
October						
F(O)	26	3249.03	5	21	9	0.00
F(C)	26	3371.92	14	12	4	-3.796
S(C)	62	3274.74	37	25	4	-7.146
November						
F(O)	26	3475.92	10	16	6	-2.885
F(C)	26	3459.46	11	15	6	-2.952
S(C)	68	3462.01	25	43	8	-6.476
December						
F(O)	17	3153.94	9	8	6	-1.494
F(C)	17	3162.47	9	8	4	-2.499
S(C)	29	34865.10	15	14	5	-3.780

Table 2: Results of Run Test for Crude Palm Oil

Period	Total No.of Observations	Test Value	No.of Observations less than Test Value	No.of Observations Equal to or Greater than Test Value	No.Of Runs	Z-Statistics
January						
F(O)	25	89.03	21	4	6	-0.264
F(C)	25	557.31	9	16	3	-4.014

S(C)	43	557.15	17	26	5	-5.190
February						
F(O)	24	0	0	24	1	0
F(C)	24	569.42	10	14	4	-3.511
S(C)	44	567.74	18	26	2	-6.24
March						
F(O)	27	0	0	0	1	0
F(C)	27	526.75	15	12	4	-3.910
S(C)	48	524.01	28	20	4	-5.956
April						
F(O)	0	0	0	0	0	0
F(C)	0	0	0	0	0	0
S(C)	48	516.92	19	29	7	-5.025
May						
F(O)	0	0	0	0	0	0
F(C)	0	0	0	0	0	0
S(C)	46	525.25	24	22	2	-6.411
June						
F(O)	26	0	0	26	1	0
F(C)	26	504.78	13	13	2	-4.604
S(C)	48	503.25	24	24	2	-6.565
July						
F(O)	10	0	0	10	1	0
F(C)	10	490.66	5	5	6	0
S(C)	47	479.48	22	25	4	-5.898
August						
F(O)	25	0	0	25	1	0
F(C)	25	490.51	11	14	6	-2.829
S(C)	45	489.09	14	31	5	-5.223
September						
F(O)	20	0	0	20	1	0
F(C)	20	505.06	7	13	3	-3.350
S(C)	46	497.55	23	23	3	-6.113
October						
F(O)	26	0	0	26	1	0
F(C)	26	474.04	14	12	5	-3.393
S(C)	41	468.07	22	19	5	-5.054
November						
F(O)	26	0	0	26	1	0

F(C)	26	474.04	14	12	5	-3.393
S(C)	44	500.70	18	26	2	-6.244
December						
F(O)	0	0	0	0	0	0
F(C)	0	0	0	0	0	0
S(C)	49	519.69	35	14	2	-6.575

Table 3:   Results of Run Test for Pepper

Period	Total No.of Observations	Test Value	No.of Observations less than Test Value	No.of Observations Equal to or Greater than Test Value	No.Of Runs	Z-Statistics
January						
F(O)	25	23790.04	10	15	9	-1.492
F(C)	25	23778.84	10	15	8	-1.919
S(C)	25	23778.84	10	15	8	-1.919
February						
F(O)	24	9934.42	14	10	6	-2.651
F(C)	24	24477.5	14	10	3	-3.966
S(C)	24	29533.17	14	10	7	-2.221
March						
F(O)	27	12824.33	13	14	27	-0.000
F(C)	27	24424.04	16	11	4	-3.882
S(C)	27	20723.04	13	14	11	-1.172
April						
F(O)	24	26259.79	3	21	6	0.00
F(C)	24	28786.5	13	11	4	-3.539
S(C)	24	36651.08	14	10	12	-0.072
May						
F(O)	26	29599.96	4	22	6	-1.016
F(C)	26	30827.19	11	15	6	-2.952
S(C)	26	36113.15	14	12	11	-0.976
June						
F(O)	26	24893.84	4	22	7	-0.215
F(C)	26	29372.92	12	14	9	-1.782
S(C)	26	25510.77	14	12	13	-0.170

July						
F(O)	26	27382.08	2	24	2	-3.477
F(C)	26	29602.31	13	13	4	-3.803
S(C)	26	20024.35	14	12	13	-0.170
August						
F(O)	26	30890.08	10	16	3	-4.157
F(C)	26	32317.96	12	14	2	-4.601
S(C)	26	26539.42	13	13	10	-1.401
September						
F(O)	26	34550.85	7	19	4	-3.463
F(C)	26	35976.42	14	12	4	-3.796
S(C)	26	24663.00	12	14	11	-0.976
October						
F(O)	26	35101.35	7	19	4	-3.463
F(C)	26	36414.04	13	13	3	-4.203
S(C)	26	19729.5	14	12	12	-0.573
November						
F(O)	26	31927.69	2	24	5	0
F(C)	26	34528.65	9	17	5	-3.228
S(C)	26	14471.00	11	15	13	-0.019
December						
F(O)	17	36111.47	17	6	2	-3.458
F(C)	17	36249.71	10	7	2	-3.490
S(C)	27	16535.67	15	12	17	0.862

Table 4:   Results of Run Test for Silver

Period	Total No.of Observations	Test Value	No.of Observations less than Test Value	No.of Observations Equal to or Greater than Test Value	No.Of Runs	Z-Statistics
January						
F(O)	25	5128.00	22	3	6	0.00
F(C)	25	44899.92	10	15	4	-3.624
S(C)	46	44211.29	22	24	6	-5.216
February						
F(O)	23	2959.08	9	14	6	-2.450
F(C)	23	47498.73	13	10	2	-4.261

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S(C)	44	46767.74	28	16	2	-6.229
March						
F(O)	27	53696.74	12	15	6	-3.115
F(C)	27	53765.51	11	16	6	-3.068
S(C)	47	54040.98	18	29	8	-4.597
April						
F(O)	24	24142.79	14	10	2	-4.371
F(C)	24	64664.29	11	13	2	-4.380
S(C)	40	63896.95	21	19	4	-5.284
May						
F(O)	25	000	0	25	1	0
F(C)	25	57477.12	15	10	5	-3.198
S(C)	46	56691.73	25	21	7	-4.907
June						
F(O)	26	8328.07	22	4	6	-1.016
F(C)	26	55457.15	11	25	4	-3.773
S(C)	48	54014.05	25	23	8	-4.811
July						
F(O)	26	38600.46	9	17	7	-2.430
F(C)	26	57880.96	10	16	2	-4.581
S(C)	47	56170.17	20	27	2	-6.482
August						
F(O)	26	45548.78	7	19	9	-0.891
F(C)	26	62168.46	15	11	4	-3.773
S(C)	41	60858.10	24	17	4	-5.348
September						
F(O)	27	61478.89	7	20	2	-4.586
F(C)	27	60864.40	8	19	2	-4.630
S(C)	46	61520.23	13	33	2	-6.341
October						
F(O)	26	53353.73	16	10	8	-2.038
F(C)	26	53521.26	19	7	4	-3.463
S(C)	39	53204.93	19	20	12	-2.594
November						
F(O)	26	56130.42	12	14	6	-2.990
F(C)	26	56184.88	13	13	5	-3.403
S(C)	44	56469.46	26	18	3	-5.928
December						
F(O)	4	41528.25	1	3	3	0

F(C)	4	55156.25	2	2	2	-0.612
S(C)	46	53787.05	26	20	2	-6.406

Table 5: Results of Run Test for Steel

Period	Total No. of Observations	Test Value	No. of Observations less than Test Value	No. of Observations Equal to or Greater than Test Value	No. of Runs	Z-Statistics
January						
F(O)	17	28310.00	8	9	6	-1.494
F(C)	17	28030.58	6	11	4	-2.354
S(C)	45	30028.00	19	26	5	-5.398
February						
F(O)	16	27627.50	8	8	2	-3.364
F(C)	16	27510.62	9	7	2	-3.356
S(C)	44	29220.68	21	23	5	-5.336
March						
F(O)	16	27206.25	8	8	2	-3.364
F(C)	16	27195.62	9	7	2	-3.356
S(C)	48	29750.00	30	18	2	-6.546
April						
F(O)	16	28290.00	8	8	8	-0.259
F(C)	16	28270.62	7	9	4	-2.303
S(C)	38	30452.63	11	27	3	-5.282
May						
F(O)	17	28710.58	9	8	5	-1.997
F(C)	17	28758.82	9	8	4	-2.499
S(C)	47	30791.48	21	26	8	-4.695
June						

F(O)	17	30595.88	7	10	4	-2.454
F(C)	17	30734.70	7	10	4	-2.454
S(C)	48	30792.91	19	29	9	-4.415
July						
F(O)	17	30284.17	6	11	3	-2.906
F(C)	17	30267.64	5	12	6	-0.953
S(C)	47	30759.57	23	24	10	-4.128
August						
F(O)	16	29980.00	8	8	4	-2.329
F(C)	16	29846.25	7	9	2	-3.356
S(C)	42	30830.95	24	18	6	-4.810
September						
F(O)	17	29508.23	7	10	7	-0.899
F(C)	17	29522.35	8	9	7	-0.991
S(C)	43	31459.30	17	26	2	-6.160
October						
F(O)	17	29662.35	5	12	3	-2.788
F(C)	17	29576.47	3	14	2	-3.119
S(C)	39	33364.10	19	20	6	-4.543
November						
F(O)	16	32656.87	5	11	2	-3.276
F(C)	16	32720.00	4	12	2	-3.182
S(C)	43	32670.93	31	12	2	-6.098
December						
F(O)	17	31706.47	9	8	6	-1.494
F(C)	17	31706.47	9	8	6	-1.494
S(C)	49	33689.79	19	30	2	-6.625

Run Test Analysis

The result of run test indicates that both future and spot price for all select selected commodities are weak form efficient. The total numbers of runs indicate dependence between observations. Number of observations less than test value denotes the number of observations below mean, while number of observations equal to or greater than the test value indicates the number greater than or equal to the mean. The information regarding the yesterday prices are effectively absorbed by today's price. The significant negative Z value for prices

indicate that the actual number of runs fall short of the expected number of runs.

6.Conclusions

Theoretical basis of the weak-form efficient hypothesis states that the successive prices are independent and past prices have no predictive content to forecast commodity price. The non parametric run test for the full sample period indicated that both future and spot price for all selected commodities are efficient in weak form.

Bibliography

I. Books

Commodity and Financial Derivatives – S.Kevin

Finanmcial Management – Prasanna Chandra

Statistics For Management –Chand

II. Articles

"Market Efficiency in agricultural future markets" By Andrew M.Mckenzie and Mathew .F.Hold (2002).

"Efficiency Test of agricultural commodity futures markets in China"By Wang Hong and Bingfanke (2005).

"Efficiency and Future Trading- Price Nexus in Indian Commodity Future Market" By PravakarSahoo(2009).

III. Website

- www.googlefinance.com

- www.ncdex.com

- www.wikipedia.com

- www.ssrn.com