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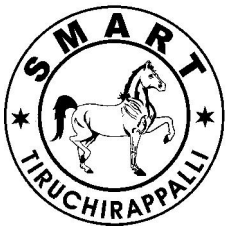

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TESTING THE WEAK FORM EFFICIENCY IN INDIAN COMMODITIES MARKET

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Abstract

This Paper aims to Test the Weak Form Efficiency in Indian Commodities Market. There are various studies relating to testing the Efficiency of Capital Markets at National and Global Level. An attempt has been made in this Paper to test the Weak Form Efficiency in Multi Commodity Exchange India Ltd, using Runs Test and Johansen Co-Integration Test. The Study Period was from 01.04.2008 to 31.03.2011. A Sample of 8 Commodities based on the total turnover during the study period was selected. The results of the study provide evidence against weak form of Efficient Market Hypothesis for majority of the select sample commodities during the study period.

Keywords: Efficient Market Hypothesis, Runs Test, Johansen Co-Integration Test.

Introduction

Since Commodity Futures Trading was permitted in 2003, the Commodities Market in India has witnessed phenomenal growth. Indian Commodity Market expanded almost by 50 times in a span of 5 years from Rs 665.30 billion in 2002 to Rs 33,753.36 billion in 2007, registering a Compounded Annual Growth Rate (CAGR) of over 119.3. Though the volume of Commodity Futures Trade increased exponentially since its launch in 2003, the functioning of the Futures Market came under scrutiny during 2008-2009 due to recession. Trading of commodity derivatives on exchange platforms helps to achieve price discovery, price risk management, besides helping economy with better resource allocation. The success of these markets lies in performing the stabilizing function which critically depends on whether they are "efficient" .Moreover, the dual price system under which different prices for the 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 Futures Market would depend on efficiency of the Futures Market. An efficient market is one in which the spot market "fully reflects" the available information. It provides reliable forecasts of spot prices in future. Fundamentally, it is said that the Commodities Market is efficient if: a) all security prices fully reflect all known market information, and b) no traders in the market have monopoly control of information.

There are three possibilities of efficient market: 1) a strong form, which encompasses all information, including that possessed by insiders; 2) a semi-strong form, which includes all public information; and 3) a weak form, which includes only that information which can be traced from an examination of a historical series of security prices. Specifically, the futures prices reflect the action of producers, consumers and speculators about the price of a commodity at a later date. To be of value to hedgers, the futures prices must respond quickly and accurately to relevant new information. There are various studies which have examined the Capital Markets at National and Global level. However, the concept of efficiency referred in this paper, concerns Testing the Weak Form of Efficiency in Indian Commodities Markets.

Review of the Literature

A study entitled , **"Efficiency of Foreign Exchange Markets: A Developing Country Perspective",** by Guneratne. B.Wickremasinghe, examined the weak and semi strong form efficiency of FOREX market in Srilanka during the float , using six bilateral exchange rates (JPY, USD, INR, FRF, GBP, DM) . The study found that the Srilankan Forex Market was consistent with weak form of EMH and the results provided evidence against the semi strong version of EMH. The study concluded that the Government of Srilanka should make informed decisions on exchange rates, so that the volatility in exchange rate gets reduced.

"Commodity Futures Market Efficiency on India and the Effect on Inflation" , a paper by Gaurav Raizanda and Gurpreet Singh Sahi ,studied the efficiency of commodity markets in India and analyzed its effect on social welfare and inflation in the economy. The wheat futures prices of NCDEX were studied. The study found that the Commodity Futures Market was not efficient even in the short run. The growth in Commodities Futures Market Volume also has a significant impact on the inflation of the economy. The trade volume and money supply also have significant impact on inflation.

A paper entitled, **"Testing the Weak Form Market Efficiency of Indian Capital Market: A case of NSE AND BSE",** by Khan A.Q, Sana Ikram and Mariyam Mehtab, examined the market efficiency of Indian Capital Market in its weak form ,based on the indices in BSE and NSE. The selected sample indices included BSE SENSEX and S&P Nifty. The daily closing prices of BSE and NSE from 1st April 2000 to 31st March 2010, were obtained from bseindia.com and nseindia.com. Runs Test was used to test the efficiency of capital market. The study concluded that Indian Capital Market is not efficient in the weak form.

Wing-Keung Wong, Aman Agarwal and Jun Du, in their research paper, **"Financial Integration for Indian Stock Market, a Fractional Co-Integration Approach",** empirically investigated the long-run equilibrium relationship and short run dynamic linkage between the Indian Stock Market and Stock Markets in major developed countries (United States, United Kingdom and Japan). The sample indices included BSE 200(India), S&P 500(US), FTSE 100(U.K) and Nikkei 225 Stock Average

(Japan). The sample period was from January 1, 1991 to December 31, 2003. Co Integration was examined by using the simple regression and Johansen Co Integration was examined by using Johansen Co Integration and Granger Causality. The results of the study indicates that in the short run, both US and Japan Granger causes the Indian Stock Market and in the case of long run Indian Stock Index and other sample indices formed their co-integration relationship.

An article entitled, **"Efficiency in Agricultural Commodity Futures Market in India: Evidence from Co-Integration and Causality Tests",** analyzed the efficiency of the futures market for agricultural commodities traded at National Commodities and Derivative Exchange India Ltd(NCDEX). The sample commodities included Maize, Chick Pea, Black lentil, Pepper, Castor seed, Wheat, Soy Bean, Rice and Sugar. The data related to daily spot and futures prices were collected from NCDEX website. The results of the study indicated that Co Integration exists significantly in spot and futures prices for all the sample agricultural commodities except for wheat and rice. The analysis of short term relationship through Causality Test showed that futures market have a strong ability to predict subsequent spot prices. i.e. there existed bi-directional relationship in the short run.

Methodology of the Study

Statement of the Problem

Investors are generally risk averse. The awareness of Commodities Investment among the investors tends to be low in India despite several advantages of Commodities Derivatives. Moreover, Volatility in Commodities Markets affects not only the investors but also the common man. Every market has fluctuations due to various factors like demand, supply etc., and risk plays an important role in determining the returns. The peculiar characteristics of Commodities Derivatives Markets are 'unlimited loss and unlimited profits'. The knowledge of market situation is the need of the hour as it enables the investors to fetch more profits at less risk. Lack of knowledge in the price movements of the markets may force the investors to incur a loss. Further, relationship between Spot and Futures prices determines the efficiency in any market. There are various studies which have examined the Efficiency of Capital Markets, FOREX Markets in different countries like Kenyan FOREX Market, Indian Capital Market, European Markets etc., and some studies related to analyzing the co-integration relationship between spot and futures prices are available. The studies related to testing the Efficiency of National Level Commodity Exchanges in India are less in number. Hence the paper entitled, "Testing the Efficiency in Indian Commodities Market", is an attempt to evaluate the pricing behaviour prevailing in Indian Commodities Markets.

Need for the Study

Commodities investment tends to be safer than equity investments as it involves less risk. The trading volume of equity is higher than the commodities. The present study will be helpful for the investors to decide the timing of investment in the market. Further, this would

help them to perceive the movements of the markets in a better manner so as to gain more returns at less risk. Knowledge of Market Efficiency and Co-Integration will be helpful for the Investment Community to plan their investments in a better manner. The first part of this study aims at testing the stationary of sample commodities listed in Multi Commodity Exchange India Ltd. The second part examines the randomness in the movements of commodity prices returns during the sample period. The final part of this study aims at evaluating the relationship between spot and futures price returns of select sample commodities traded in MCX. Thus, this paper attempts to analyse Commodities Markets Efficiency and tries to find out the relationship between spot and futures price returns in Indian Commodities Markets.

Objectives of the Study

The objectives of the study are

1. To examine the Stationary for Spot and Futures Price Returns of select sample commodities in Multi Commodity Exchange India Ltd.
2. To analyze the randomness in the movements of Daily Spot and Futures Price Returns of the sample commodities.
3. To test the Co-Integration between Spot and Futures Price Returns in Indian Commodities Markets.
4. To summarize the findings and offer suggestions and conclusion.

Null Hypotheses of the Study

H01: The Spot and Futures Price Returns of select sample commodities are non-stationary.

H02: The Daily Spot and Futures Price Returns movements of the select sample commodities are not random.

H03: There is no Co-Integration between the Spot and Futures Price Returns of select sample commodities.

Sample Selection

For the purpose of the analysis, eight commodities from different categories listed in the multi commodity exchange were selected. The reason for selecting Multi Commodity Exchange India Ltd was that, more than 83% of commodities trading are done in MCX. Out of 103 commodities traded in MCX, only eight samples were chosen based on total turnover of the commodities during the study period. Availability of data was also taken into consideration. The list of sample commodities selected and their turnover during the study period are given in **Table- 1.**

Period of the study

To test the Efficiency of Spot and Futures Price Returns of select sample commodities in Multi Commodity Exchange India Ltd, a sample period from 01.04.2008 to 31.03.2011 was chosen.

Sources of the Data

The present study was mainly based on secondary data. The information related to Spot and Futures prices of Commodities were collected from mcxindia.com. In addition to this, the other information relating to this study were collected from various books, journals, websites, magazines and MCX Publications.

Tools used for Analysis

The following tools were used to Test the Weak Form Efficiency of Spot and Futures Price Returns of select sample commodities in Multi Commodity Exchange India Ltd.

a) Descriptive Statistics.

b) Augmented Dickey Fuller Test.

c) Runs Test.

d) Johansen Co-Integration Test.

a)Descriptive Statistics

i) Mean refers to the arithmetic mean, which is simply the sum of given values divided by the number of such values (that were included in the summation)

ii) Median is a value in the middle of the distribution, dividing the distribution in such a way that there are an equal number of values above and below the median. Median is non-algebraic, as its calculation requires that the values be ordered, which requires comparison of logical nature.

iii) Standard Deviation of a statistical population, a data set, or a probability distribution is the square root of its variance. Standard Deviation is a widely used measure of the variability or dispersion, being algebraically more traceable though practically less robust than the expected deviation or average absolute deviation. It shows how much variation is there from the average (mean). A low standard deviation indicates that the data point tend to be very close to the mean, whereas high standard deviation indicates that the data are spread out over a large range of values.

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}.$$

iv) Skewness

Skewness is a measure of the degree of asymmetry of a distribution. If the left tail (tail at small end of the distribution) is more pronounced than the right tail (tail is the large end of distribution), the function is said to have negative skewness. If the reverse is true, it has positive skewness. If the two are equal, it has zero skewness.

v) Kurtosis

Measure of kurtosis indicates the degree to which a curve of a frequency distribution is peaked or flat-topped. Kurtosis measures the peakedness of a normal curve. A normal curve which is symmetrical and bell-shaped is designed as Mesokurtic, because it is kurtic in the centre. If a curve is relatively narrower and peaked at the top, it is designated as Leptokurtic. If the frequency curve is more flat than normal curve, it is designated as Platykurtic

b) Augmented Dickey-Fuller (ADF) Test is used to determine if a variable is stationary. To overcome the problem of autocorrelation in the basic DF Test, the test can be augmented by adding various lagged dependent variables.

Common criticisms of these tests include sensitivity to the way the test is conducted (size of test), such that the wrong version of the ADF test is used. The power of the test may depend on:

- The span of the data, rather than the sample size. (This is particularly important for financial data)
- These tests assume a single unit root I(1), but there may be more than one present I(2).
- If the time series contains a structural break, the test may produce the wrong result.

c) Runs Test

The runs test is a non-parametric statistical test that checks a randomness hypothesis for a two-valued data sequence. More precisely, it can be used to test the hypothesis that the elements of the sequence are mutually independent. Runs Test ignores the absolute values of the numbers in the series and observe only their sign. The researchers then merely count the number of runs – consecutive sequences of signs- in the same direction. Next the actual number of runs observed is compared with the number that is to be expected from a series of randomly generated price changes. While doing this , when no significant differences are observed, the results strengthen the random-walk hypothesis.

A "run" of a sequence is a maximal non-empty segment of the sequence consisting of adjacent equal elements. For example, the sequence "+ + + + - - - + + + - - + + + + + + -- - -" consists of six runs, three of which consist of +'s and the others of -'s. If +s and -s alternate randomly, the number of runs in the sequence N for which it is given that there are $N+$ occurrences of + and $N-$ occurrences of – (so $N = N+ + N-$) is a random variable whose conditional distribution – given the observation of $N+$ positive runs and $N-$ negative runs – is approximately normal.

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

VARIANCE

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

These parameters do not depend on the "fairness" of the process generating the elements of the sequence in the sense that +'s and -'s must have equal probabilities, but only on the assumption that the elements are independent and identically distributed. If there are too many runs more or less than expected, the hypothesis of statistical independence of the elements may be rejected.

Runs Tests can be used to test the followings: 1) The randomness of a distribution, by taking the data in the given order and marking with + the data greater than the median, and with – the data less than the median; (Numbers equaling the median are omitted.)

2) Whether a function fits well to a data set, by marking the data exceeding the function value with + and the other data with -. For this use, the Runs Test, which takes into account the signs but not the distances, is complementary to the chi square test, which takes into account the distances but not the signs.

d) Johansen –Juselius (JJ) Co- Integration Test

Johansen test is a test to analyze the co-integration between spot and futures price of time series. This test does not require all variables to be in the same order of integration. The **Johansen Trace** and M**aximum Eigen Value** Statistics have the same null (Rank (Pi) =r) but different alternatives. The alternative for the trace test is Rank (Pi) > r. The alternative for the Maximum Eigen value Test is rank (Pi) = r+1. It is defined as

$$\Delta X_t = \mu + \Phi D_t - \Gamma_{p-1}\Delta X_{t-p+1} - \cdots - \Gamma_1 \Delta X_{t-1} + \Pi X_{t-1} + \varepsilon_t, \quad t = 1, \cdots, T$$

Where,

$$\Gamma_i = \left(\Pi_{i+1} + \cdots + \Pi_p\right), \quad i = 1, \ldots, p-1.$$

Limitations of the Study

- The study made use of only one Commodity Exchange in India- Multi Commodity Exchange Ltd. Hence the results are not applicable to other commodity exchanges.
- The study is limited to weak form of efficient market hypothesis.
- The results are based on secondary data and so all the limitations of secondary data are applicable to the study.
- The results of the study may vary when different periods are taken into account.
- The limitations of tools like ADF, Runs Test, Johansen Co Integration Test are also applicable to this study.

Results and Discussions

Table - 2 explains the summary of results of Descriptive Statistics for the Select Sample Commodities Spot and Futures Price Returns during the study period from 01.04.2008 to 31.03.2011. It can be observed from the Table that among the sample commodities, Zinc, Crude Oil and Natural Gas recorded negative mean returns. This reveals that investors incurred losses in these commodities. Copper gave superior returns for the investors as its mean value was the highest at 5.25 for spot and 9.87 for futures. The Standard Deviation of all the select sample commodities was positive. Skewness was positive for Gold, Crude Oil, Natural Gas and Mentha Oil, which was skewed to the left. The Kurtosis value was greater than 3 for all commodities and it indicates that the distribution was Leptokurtic.

A summary of the results of Augmented Dickey Fuller Test is presented in **Table-3.** The Augmented Dickey Fuller Test was used to examine the stationary in the Spot and Futures Price Returns of sample commodities. It is evident from the Table that the ADF t-Statistic value of Spot and Futures Price Returns of all the sample commodities were lower than the Critical Values at 1%, 5% and 10% significance level. Hence it is a clear indication to reject the null hypothesis HO1: 'The Daily Spot and Futures Price Returns of the select sample commodities are non-stationary'. Therefore it becomes clear that all the select sample commodities attained stationary in the level difference itself.

Table - 4 summarizes the Runs Test Results for the sample commodities from 01.04.2008 to 31.03.2011. It could be traced from the Table that for commodities Gold, Silver,

Copper, Natural Gas and Cardamom, the test Statistic (Z) Value falls outside the Critical Value of ± 1.96 at 5% level of significance and as such the null hypothesis - HO2: 'The Daily Spot and Future Price Returns movements of the select commodities are not random', is rejected for the above five commodities, which indicates that the price movements are independent of each other. i.e Past Prices and Volumes cannot be used to predict futures price movements in the market. For Zinc and Mentha Oil , in the futures price returns, the calculated value was closer to ± 1.96 and so it can be concluded that H02: 'The Daily Spot and Futures Price Returns movements of the commodities are not random' can be partially rejected for these commodities. Crude Oil was the only commodity in which the calculated value of both the Spot and Future Price Returns were in the region of ± 1.96 and hence the HO2 is accepted for Crude Oil.

Table - 5 presents the results of Johansen Co Integration Test which was conducted to check the long run equilibrium relationship between Spot and Futures Price Returns of the select sample commodities. The co integration between Spot and Futures Price Returns was tested with unrestricted Co-Integration Trace Statistic and Max -Eigen Value. It becomes clear from the Table that the Trace Value and Max-Eigen Values were lower than the Critical Values at 5% level of significance for all the select sample commodities. Hence it is a clear indication to accept the null hypothesis H03: 'There is no Co Integration in the Spot and Futures Price Returns of the select sample commodities' for None and Atmost 1. The results clearly denote that there is no long term relationship between Spot and Futures Price Returns of the select sample commodities.

Findings of the Study

Major findings of the study are summarized below.

1. Among the selected sample commodities, Zinc, Crude Oil, and Natural Gas recorded negative mean value for both spot and futures prices returns during the study period.
2. Copper recorded the highest positive mean value of 5.25 and 9.87 for spot and futures prices returns respectively.
3. The Standard Deviation, which is a measure of Volatility, was positive for all the select sample commodities.
4. Natural Gas recorded a higher Standard Deviation of 0.33272 and 0.026890 for spot and futures periods respectively, which indicates that among all the sample commodities, Natural Gas prices returns were significantly volatile during the study period.
5. The Standard Deviation of Gold recorded the least value of 0.007901 and 0.010711 for spot and futures periods.
6. The skewness was negatively skewed towards left for Copper, Zinc and Cardamom and for other commodities skewness was positive.
7. The value of kurtosis was greater for Zinc Spot which was 42.364 followed by Mentha Oil Spot at 23.38. For futures prices, the value of kurtosis was greater for Cardamom at 13.377 followed by Crude Oil.

8. Augmented Dickey Fuller Test Results reveal that all sample commodities attained stationary in the level difference itself.

9. Runs Test results show that the statistical values were lesser than the test critical values for Gold, Silver, Copper, Natural Gas and Cardamom. The price movements of all these commodities were independent of each other. Hence the past prices returns of all these commodities cannot be used to predict futures prices.

10. Johansen Co Integration analysis reveals that the spot and futures price movements of the select sample commodities prices returns did not have any relationship with each other for all the sample commodities

SUGGESTIONS OF THE STUDY

1. Investors should have a basic knowledge of factors affecting the Commodities Markets. This can help them to perceive the movements of the markets in a better manner.

2. Awareness of publicly available information plays a vital role in determining the market efficiency, which in turn has its effects on the returns of Investors.

3. Using Econometric Models, investor can measure the risk of the investment and then decide to invest to fetch better returns at less cost.

4. Investors are advised to invest in Gold, Silver, Copper and Mentha Oil as these commodities gave better returns than other sample commodities.

5. A close monitoring of spot prices of commodities will be helpful in planning the investments, as in some commodities ,the spot prices had their reflection in the futures.

Conclusion

The present paper made an attempt to evaluate the Weak Form Efficiency and to find the relationship between Spot and Futures Prices in Indian Commodities Markets. The daily data consisted of closing spot and futures prices which were collected from mcxindia.com. The commodities, namely, Gold, Silver, Copper, Zinc, Crude Oil, Natural Gas, Mentha Oil and Cardamom were used as samples. Descriptive Statistics, Augmented Dickey Fuller Test, Runs Test and Johansen Co Integration Test were the primary test for examining the Weak form Efficiency. The Unit Root Test revealed that all the sample commodities returns attained stationary in the level. Runs Test show that futures price movements cannot be predicted using past prices for majority of commodities. Further, Johansen Trace Statistic and Max-Eigen Value indicate that there was no long term relationship between the spot and futures prices returns in the Multi Commodity Exchange India Ltd.

Scope For Further Research

1. The same title and area of study can be done in Indian as well as International Stock Markets, FOREX Markets and Commodities Markets with the help of advanced tools.

2. The sample commodities and the sample period chosen can also be extended to know the results in the long run.

3. Tests for semi-strong and strong form efficiency in Indian Commodities Markets are left for further study.

4. A similar study, with the help of Primary Data, can also be undertaken in order to know the reaction of investors towards market price movements.

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Table -1
List of Sample Commodities Selected and their turnover during the sample period

COMMODITIES	TURNOVER (Rs in Lakhs)
Gold	696,459,344.1
Silver	493,711,755.5
Crude oil	411,049,397.2
Copper	256,583,224.5
Zinc	86,596,929.54
Natural Gas	65,092,861.25
Mentha Oil	8,357,742.86
Cardamom	1,416,315.61

Table-2 : Results of Descriptive Statistics of the Sample Commodities

Particulars	Gold		Silver		Copper		Zinc		Crude Oil		Natural Gas		M .Oil		Cardamom	
	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F
Minimum	-0.05	-0.04	-0.11	-0.08	-0.12	-0.11	-0.28	-0.08	-0.13	-0.10	-0.20	-0.10	-0.08	-0.11	-0.11	-0.21
Maximum	0.09	0.05	0.07	0.077	0.095	0.076	0.25	0.08	0.16	0.17	0.17	0.21	0.108	0.10	0.07	0.05
Mean	0.00	0.00	0.01	0.00	5.25	9.87	-0.00	-7.42	-0.00	-5.95	-0.00	-0.00	0.00	0.00	0.00	0.00
S.D	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.02
Skewness	0.61	0.09	-0.79	-0.38	-0.37	-0.37	-0.10	-0.27	0.18	0.57	0.14	0.94	0.98	0.19	-1.40	-1.43
Kurtosis	19.50	6.95	15.22	6.56	6.98	6.98	42.36	4.75	9.43	9.96	8.39	9.93	23.39	7.74	18.00	13.38

Table - 3 : Summary of Results of Augmented Dickey Fuller Test for the Sample Commodities from 01.04.2008 to 31.03.2011

S.No	Commodity	ADF t-Statistic Level Difference		Significance		
		Spot	Future	1%	5%	10%
1	Gold	-37.3460	-28.4426	-3.434	-2.863	-2.567
2	Silver	-39.3125	-30.3797	-3.434	-2.863	-2.567
3	Copper	-31.4610	-30.3699	-3.434	-2.863	-2.567
4	Zinc	-54.6258	-29.3346	-3.434	-2.863	-2.567
5	Crude Oil	-42.0859	-27.3660	-3.434	-2.863	-2.567
6	Natural Gas	-35.4519	-29.8651	-3.434	-2.863	-2.567
7	Mentha Oil	-40.3566	-28.5195	-3.434	-2.863	-2.567
8	Cardamom	-26.7952	-27.03152	-3.434	-2.863	-2.567

Source: Computed from E-Views 5.0

Table-4 : Summary of Runs Test Results for the Sample Commodities from 01.04.2008 to 31.03.2011

COMMODITY	MEDIAN BASE Z Value		MEAN BASE Z Value	
	Spot	Future	Spot	Future
Gold	-4.757	-2.378	-4.214	-2.060
Silver	-2.960	-1.088	-2.780	-0.809
Copper	-2.068	-0.231	-3.630	0.245
Zinc	4.793	0.628	4.793	-0.658
Crude Oil	1.121	-2.044	1.121	-1.735
Natural Gas	0.941	-2.041	0.874	-2.635
Mentha Oil	-9.195	-0.929	-8.814	-1.287
Cardamom	-17.62	-1.829	-17.41	-2.226

Source: Computed from SPSS 16.0

Table 5 Summary of Results of Johansen Co-Integration Test for the select sample Commodities from 01.04.2008 to 31.03.2011

Commodity	Criteria	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
Gold	None Atmost 1	329.0224 141.6099	15.49471 3.841466	187.4125 141.6099	14.26460 3.841466
Silver	None Atmost 1	360.5125 165.3042	15.49471 3.841466	195.2082 165.3042	14.2646 3.841466
Copper	None Atmost 1	330.7858 123.0651	15.49471 3.841466	207.7207 123.0651	14.26460 3.841466
Zinc	None Atmost 1	383.7710 164.6432	15.49471 3.841466	219.1279 164.6432	14.26460 3.841466
Crude Oil	None Atmost 1	319.8120 133.1490	15.49471 3.841466	186.6629 133.1490	14.26460 3.841466
Natural Gas	None Atmost 1	364.2224 164.4149	15.49471 3.841466	199.8074 164.4149	14.26460 3.841466
Mentha Oil	None Atmost 1	291.5242 133.0341	15.49471 3.841466	158.4901 133.0341	14.26460 3.841466
Cardamom	None Atmost 1	279.9528 124.4088	15.49471 3.841466	155.5440 124.4088	14.26460 3.841466

Source: Computed from E-Views 5.0