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TESTING THE WEAK FORM EFFICIENCY OF COMMODITY MARKET IN INDIA**YUVARAJ. D****LECTURER****DEPARTMENT OF MANAGEMENT STUDIES****SRI BALAJI CHOCKALINGAM ENGINEERING COLLEGE****ARNI****ABSTRACT**

The present study investigated the Weak form efficiency of Commodity Market in India with the help of efficient market hypothesis theory. The main Objective of the study is to analyze efficiency, Randomness and Stationary of Sample Commodities. The daily data consisted of closing spot rates from MCX for the period of 40 months from 19th Sep 2008 to 31st Jan 2012. Top three rank Commodities Silver, Gold, Copper, Natural Gas and Crude Oil were chosen as samples. Runs Test, Auto Correlation, Augmented Dickey Fuller test were used. It can be finally concluded According to Efficient Market Hypothesis, Past Prices cannot be used to predict the future Price. The study concludes the Commodity Market is efficient in Weak Form.

KEYWORDS

Commodity Market, Efficiency, Efficient Market Hypothesis, Spot Prices, Stationary.

INTRODUCTION**COMMODITY MARKET**

The main aim of this study is about Commodity Market in India after the Global Financial crisis 2008. The gradual evolution of commodity market in India has been of great significance for the country's economic prosperity. The commodity futures exchanges were evolved in 1800 with the sole objective of meeting the demand of exchangeable contracts for trading agricultural commodities. For example, the cotton exchange located at Cotton Green in Mumbai was the one of the first organized commodity market in the country. A commodity may be defined as a product or material or any physical substance like food grains, processed products and agro-based products, metals or currencies, which investors can trade in the commodity market. One of the characteristics of a commodity is that its price is determined as a function of its market as a whole. A commodity market is a market where various commodities and derivatives products are traded. These contracts can include spot prices, forwards, futures and options on futures. The Indian commodity market offers a variety of products like rice, wheat, coal, petroleum, kerosene, gasoline; metals like copper, gold, silver, aluminum and many more. These days, a wide range of agricultural products, energy products, perishable commodities and metals can be sold under standardized contracts on futures exchanges prevailing across the globe. Commodities have gained importance with the development of commodity futures indexes along with the mobilization of more resources in the commodity market. In this paper Efficient Market Hypothesis were used test the Weak Form Efficiency of top three commodities were taken for research.

EFFICIENT MARKET HYPOTHESIS

'A market in which prices always "fully reflect" available information is called "efficient." Fama (1970), An efficient market will always "fully reflect" available information, but in order to determine how the market should "fully reflect" this information, we need to determine investors' risk preferences. Therefore, any test of the EMH is a test of both market efficiency and investors' risk preferences. For this reason, the EMH, by itself, is not a well-defined and empirically refutable hypothesis.

In weak-form efficiency, future prices cannot be predicted by analyzing prices from the past. Excess returns cannot be earned in the long run by using investment strategies based on historical share prices or other historical data. This implies that future price movements are determined entirely by information not contained in the price series.

REVIEW OF LITERATURE

A paper entitled "Do Precious Metals Markets Influence Stock Markets? A Volatility Approach" by Morales analyzed volatility spillovers between the major financial markets represented by the G-7 economies and the precious metals markets (gold, platinum and silver) with the help of EGARCH Model. On the otherhand A study entitled, " Commodity Derivative Market and its Impact on Spot Market" ,by Golaka C Nath and Thulasamma Lingareddy, studied the impact of Futures Trading in three important commodities which were banned by the Government from trading in Futures and their impact on Spot Prices. The studies found that Futures have increased the volatilities in the Spot Market for some of the commodities. "Econometric Modeling and Forecasting of Gold Futures Prices in India" was done by Prabina Rajib and Suraj Bhuwania, in this study; they forecast the Gold Futures Prices using ARIMA model. They check the validity of the best fitted model and then they use the fitted model for short term forecasting and concluded that this model gives superior forecasting result compared to other models. Another study 'A study on the accuracy of forecasts of gold prices in Australia' was done by Selvanathan (1991) under the research found that gold prices follow a simple random walk.

The previous studies were related to the Commodity Market in India. EGARCH, AR MA, ARIMA, Augmented Dickey Fuller test, Phillips Perron test, Auto correlation test, Runs Test, was used to measure the volatility and weak form efficiency. Auto Correlation test, Runs Test and Augmented Dickey Fuller test were used to examine Weak form Efficiency of Commodity Market in India. Very few studies have been carried out in India to analyze Weak form Efficiency of Commodity Market in India.

RESEARCH METHODOLOGY

The global volume of commodities contracts traded on exchanges increased by a fifth in 2010, and a half since 2008, to around 2.5 billion million contracts. During the three years up to the end of 2010, global physical exports of commodities fell by 2%, while the outstanding value of OTC commodities derivatives declined by two-thirds as investors reduced risk following a five-fold increase in value outstanding in the previous three years. The researcher used top three (1. Silver, 2.Gold, Copper and Natural Gas & 3.Crude Oil) world ranking commodities were used to analyze the weak form efficiency of Commodity Market in India.

OBJECTIVES OF THE STUDY

- To assess the efficiency of selected Commodity Values.
- To analyze the randomness in the movements of Commodity Values.
- To examine the stationary in the sample Commodity Values.
- To summarize the findings, suggestions and conclusion.

HYPOTHESIS OF THE STUDY

H0 1: Sample Commodities are not efficient in weak form.

H0 2: Silver, Gold, Copper, Natural Gas and Crude oil are not random.
 H0 3: Closing spot prices of top three commodities are non stationary.

DATA

The daily closing spot value of commodities for this study was collected from the website "http://www.mcxindia.com/SitePages/HistoricalDataForVolume.aspx." For the present study the following three commodities are considered as samples which were in the top list of world ranking

- Rank 1. Silver,
- Rank 2. Gold, Copper and Natural Gas &
- Rank 3. Crude Oil

These Three commodities traded Volumes were taken in to consideration for analysis purpose for the period of after Global Financial crisis to till date i.e 19th Sep 2008 – 31st Jan 2012 (40 months)

TOOLS USED IN THIS STUDY

The information gathered was analyzed by using the following basic and Econometric Tools, appropriate for the purpose.

1. Auto Correlation Test used to test the randomness of commodities.
2. Runs Test were used to test the efficiency of Sample Commodities.
3. Augmented Dickey Fuller Test to decide whether the time-series is difference stationary or trend stationary, a necessary property for random walk process.

DATA ANALYSIS AND INTERPRETATION

1. Runs Test for Sample Commodities (Median & Mean Base)

Table 1A shows the analysis of Runs Test for Median and Mean Base in Commodities. All the calculated value for median base is -15.77, -8.97, -12.9, -12.9 & -12.4 and Mean Base is -20.37, -10.44, -12.37, -13.37 & -13.10 is less than the test critical value of ± 1.96 . The overall analysis clearly denotes that the runs did not follow the normal distribution. Hence, The Null Hypothesis H01 Sample Commodities are not efficient in weak form is rejected for median and Mean base of Sample Commodities. As per the theory of Efficient Market Hypothesis under the Weak form efficiency, the Price reflects all information found in the record of past prices and volumes.

2. Auto Correlation test results for Silver, Gold, Copper, Natural Gas and Crude Oil

Table 2 exhibits the autocorrelation results for world ranking top three commodities for the study period from 19th Sep 2008 to 31st Jan 2012. It is clear from the table, Silver, Gold and Natural Gas time series movements were great. The most of the lag comes under either positive significant or negative significant. But there were no continuous lower and upper movement in Commodity values. This implies that the null hypothesis H0 2: Silver, Gold, Copper, Natural Gas and Crude oil are not random was rejected. Hence it can be concluded that the past values cannot reflect the future values as per Efficient Market Hypothesis. That means the sample Commodities were efficient in weak form.

3. Auto Correlation Charts showing the movement of Commodity Market for the period of 19th Sep 2008 to 31st Jan 2012

Charts clearly show the movement of Sample commodities. Each and every sample commodity movement doesn't depend on other. The commodity values upper movements and lower movements occurred alternatively. But there were no continuous upper and lower movements in sampling period. Hence it denotes the weak form efficiency of Commodity Market follows the random walk

4. Augmented Dickey Fuller Test results for Commodities.

The results of Augmented Dickey Fuller Test for the Silver, Gold, Copper, Natural Gas and Crude Oil are displayed in Table 3. Since the Test statistical value for the Augmented Dickey-Fuller Test statistics is not more than the critical value at 1% level of significance, the null hypothesis H0 3: Closing spot prices of top three commodities are non stationary was accepted. Hence it is moved to test with first difference. The first difference of Test statistical value for the Augmented Dickey-Fuller Test is more than the critical value at 1% level of significance. The Commodity values are stationary at first differences both for intercept and intercept & trend. The Silver, Gold, Copper, Natural Gas and Crude Oil rates under non-stationary in their level and become stationary when they are first differenced.

FINDINGS & SUGGESTION

Runs Test indicates that the entire test statistical values were lesser than the test critical value. The overall Runs did not follow the normal distribution. Hence the past prices and volumes information cannot be used to predict the future price. It clearly denotes the sample commodities are efficient in weak form

The Auto Correlation test result reveals that the Silver, Gold, Copper, Natural Gas and Crude Oil rates were efficient in Weak form. It exhibits the random walk.

Augmented Dickey Fuller indicates there is non-stationary in "Silver, Gold, Copper, Natural Gas and Crude Oil rates". It can be concluded that there is a healthy presence of stationary when it is first differenced.

The investors must aware of the publically available information. It plays a vital role in examining the market efficiency. The researcher suggested to investors that Silver, Gold and Natural Gas price movements were great. If investors, invest in these commodities means they may get good returns.

CONCLUSION

The present study investigated the Weak form efficiency of Commodity Market in India with the help of efficient market hypothesis theory. The daily data consisted of closing spot rates from MCX for the period (After Global Financial Crisis from Till Date) of 40 Months from 19th Sep 2008 to 31st Jan 2012. World Ranking Top Three commodities like "1.Silver, 2.Gold, Copper & Natural Gas and 3.Crude Oil" were chosen as samples. Runs Test, Auto Correlation Test, Augmented Dickey Fuller test were the primary tests for weak form efficiency among the three Commodities. The unit root tests confirmed that all the Commodity Prices are non stationary which means that past prices and volumes cannot be used to predict Future. From The overall results conclude that the Commodity Market was more incorporated by Global financial crisis. After the crisis, Commodity Market efficiency was improved gradually. But last 16 months from study period, the commodity market movements were good and efficient in weak form. It can be finally concluded that the Commodity Market is efficient in Weak Form.

SCOPE FOR FURTHER RESEARCH

The future research can focus on the following aspects:

The future study can focus on the Semi Strong Form and Strong form Efficiency of Commodity Market in India. It can also focus on analyzing future and option market. Further researchers can examine all the Commodity variables like Bullion, Plantations, Energy, Metals, Weather, Oil & Oil Seeds, Cereals, Spices, Fiber, Pulses and others that were traded in Commodity Market in India.

TABLES AND FIGURES

RUNS TEST FOR SAMPLE COMMODITIES

Median Mode	Silver	Gold	Copper	Natural Gas	Crude Oil
Test Value(a)	410045.16	712477.74	353662.42	76902.44	518579.94
Cases < Test Value	515	515	515	515	515
Cases ≥ Test Value	515	515	515	515	515
Total Cases	1030	1030	1030	1030	1030
Number of Runs	263	372	309	309	317
Z	-15.774	-8.978	-12.906	-12.906	-12.407
(2-tailed)	.000	.000	.000	.000	.000

Computed From: SPSS 11.5, Data from MCXIndia.com

RUNS TEST FOR SAMPLE COMMODITIES

Mean Mode	Silver	Gold	Copper	Natural Gas	Crude Oil
Test Value(a)	669631.112	770831.12	333920.0869	80349.3394	538675.32
Cases < Test Value	692	573	469	530	541
Cases ≥ Test Value	338	457	561	500	489
Total Cases	1030	1030	1030	1030	1030
Number of Runs	167	344	315	307	305
Z	-20.376	-10.449	-12.375	-13.015	-13.107
(2-tailed)	.000	.000	.000	.000	.000

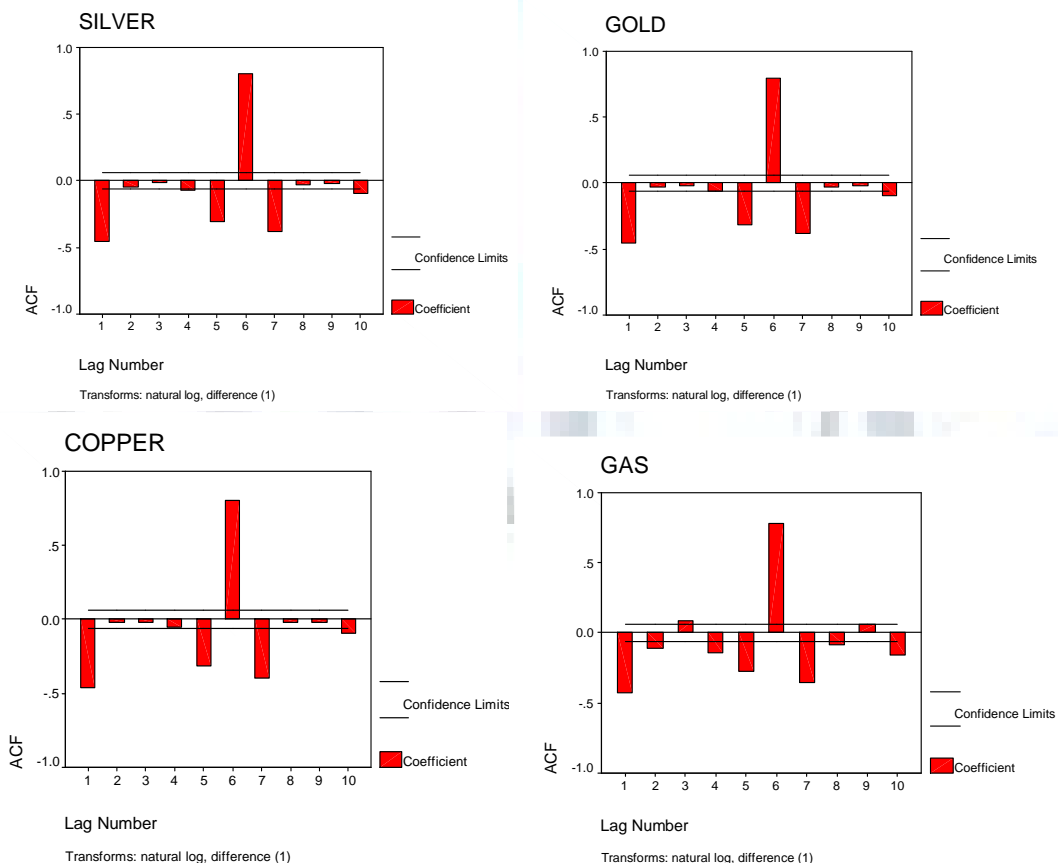
Computed From: SPSS 11.5, Data from MCXIndia.com

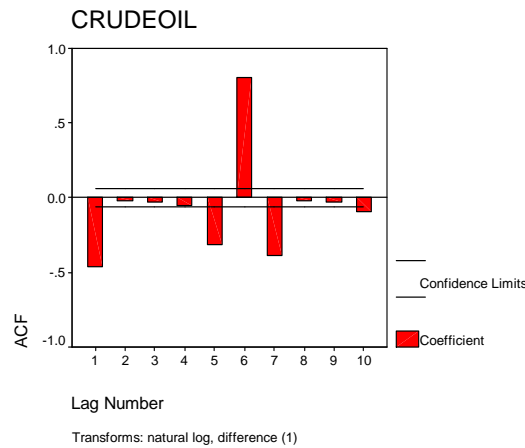
AUTO CORRELATION TEST RESULTS FOR SILVER, GOLD, COPPER, NATURAL GAS AND CRUDE OIL

Lag	Silver	Gold	Copper	Natural Gas	Crude Oil	Std. Error
1	-0.450	-0.457	-0.464	-0.429	-0.464	.031
2	-0.041	-0.032	-0.024**	-0.111	-0.021**	.031
3	-0.009**	-0.017**	-0.021**	0.086	-0.026**	.031
4	-0.072	-0.062	-0.056	-0.143	-0.056	.031
5	-0.309	-0.311	-0.317	-0.273	-0.312	.031
6	0.804	0.794	0.807	0.781	0.802	.031
7	-0.383	-0.379	-0.394	-0.356	-0.389	.031
8	-0.032**	-0.027**	-0.024**	-0.089	-0.022**	.031
9	-0.019**	-0.022**	-0.019**	0.058	-0.028**	.031
10	-0.098	-0.091	-0.094	-0.159	-0.090	.031

Computed From: SPSS 11.5, Data from MCXIndia.com, ** denotes Negative Correlation

AUTO CORRELATION CHARTS SHOWING THE MOVEMENT OF COMMODITY MARKET FOR THE PERIOD OF 19TH SEP 2008 TO 31ST JAN 2012





AUGMENTED DICKEY FULLER TEST RESULTS FOR COMMODITIES

Commodities	Trend		Trend & Intercept	
	Level	First Difference	Level	First Difference
Silver	-2.477783	-8.734271	-4.050233	-8.731045
Gold	-3.206875	-7.780983	-3.696133	-7.773948
Copper	-2.556254	-10.32972	-5.561275	-10.32410
Natural Gas	-2.702383	-9.222912	-2.790615	-9.218893
Crude Oil	-1.822029	-11.47925	-3.880948	-11.46638
1% level	-3.436625	-3.436625	-3.967160	-3.967160

Calculated from Eviews 5.1, Data from MCXIndia.com

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