

Relationship Between Commodity And Equity Markets: Evidence From India*

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Abstract - This paper attempts to find the relationship between commodity market and equity market in India. This Paper takes into account the commodity indices such as MCX AGRI, MCX METAL, MCX ENERGY and MCX COMDEX. The NIFTY 50 index has been used to represent the equity market in India. The period of the study is from 01/04/2013 to 31/03/2018. The relationship between commodity and stock market is examined using various econometric tools. The stationarity of the variables are checked using Augmented Dickey Fuller Test. After confirming stationarity in the order of one, the Johansen's cointegration test is applied to analyse the long run relationship between the variables. The Granger causality test revealed that nifty leads and Comdex and Metal indices lags. All other indices are found to have no lead lag relationship between each other. The findings of the study will be helpful for investors to plan their investment avenues. The study will be helpful for policy makers to strengthen the stock and commodity markets.

Keywords: Commodity Market, Cointegration, Equity Market, MCX, NIFTY, Relationship

I. INTRODUCTION

Over the years, commodities have been developed as a separate asset class just like stocks and bonds. After the year 2000 the trading in commodities have been intensified, with increasing role of financial motives, financial markets and financial actors in operation of commodity markets which is often referred as "Financialisation of commodities" (UNCTAD, 2011). One of the key factors for the increasing investment in commodities is the investors preference to hold commodities in their portfolio as a part of their diversification strategy, as commodities is found to have negative correlation with stocks and bonds. Commodity prices are fixed according to interplay between supply and demand of these commodities. Most of the developing countries like India need investment in commodities like steel, copper and oil to improve their infrastructure. There is also an increasing demand for investment in metals like aluminum and agricultural commodities like cotton to meet the demand of increasing

demand from middle class populations. This has created higher demand and price for commodities. The higher demand has also attracted investors, who formerly were investing in stocks and bonds, to take advantage of the negative correlation with stock market.

After the merger of the regulator of commodity market, FMC with SEBI, the commodity market is heading for a phenomenal change. The concept of single platform for trading of commodities and equities is coming into existence in near future in India. With BSE and NSE launching commodity derivatives contract in their exchanges, commodity trading is expected to grow further.

II. REVIEW OF LITERATURE

(Yamori, 2011) used Japanese market data and found that correlation between equity and commodity market is found to be negative and almost zero till 2006. The correlation is found to be increasing from 2008 financial crisis which

reveal that commodity market has lost the character as an alternative asset.

Bansal et.al. (2014) studied the role of commodity futures in portfolio diversification. The study has used mean variance optimization technique to identify optimum portfolio mix as to how utility of commodity futures changes with the change in risk aversion level of investors. The study revealed that with the introduction of commodities in portfolio there is an increase in returns without a corresponding rise in risk. The study concluded with the increase in risk aversion levels of the investor, allocation to commodity future tends to increase.

(Shehzad et al. 2014) did a multivariate analysis of commodities and stock market. The study used 25 stocks and 3 commodities over a period of 2004-12 and 10 commodity future contract from December 2009 to August 2012 in Pakistan. The study revealed that compared to stocks commodity future return shows stronger correlation with unexpected inflation. The GJR-GARCH model revealed that commodities have inverted asymmetric behavior where there is more impact from upward shocks compared to downward shocks. The stocks showed an asymmetric volatility where there is more impact from negative shocks compared to positive shocks.

(Periasamy & Sathish, 2015) studied the relationship between commodity and stock market in India for the period of 2008 to 2013 with help of tools like Standard deviation, Portfolio Risk and Return, Relative Strength Index and Simple Moving Average. The study concluded that there is a positive correlation between both markets and both market move closely together.

(Singh & Singh, 2015) analysed the correlation between commodity and stock market during a business cycle. The data definitions are as follows:

Table 1: Data Definitions

Data	Contents
MCX AGRI	The index comprises of Cardamom (2%), Mentha Oil (2.29%), Crude Palm Oil (6.65%) and Cotton (9.06%).
MCX METAL	The Index Comprises of Gold (15.17%), Silver(3.98%), Copper(7.48%), Aluminium (2.57%), Nickel (4.91%), Zinc (3.74%), Lead(2.15%).
MCX ENERGY	The Index comprises of Crude Oil (33.83%), Natural Gas (6.17%)
MCX COMDEX	It is the simple weighted average of MCX AGRI (20%), MCX METAL (40%) and MCX ENERGY (40%).
NIFTY 50	It consists of diversified 50 stocks in 12 sectors of the economy.

study compared returns on equity and commodity market during 2003-11. The study revealed that commodity market is less volatile than stock market. The study concluded that correlation between commodities and equities remained low in shorter period but in long run, correlation is found to be moderate.

(Boyrie & Pavlova, 2016) studied the dependence of commodity and equity market in emerging economies. The correlations between both markets have been found using Dynamic Conditional Correlation (DCC) Model. The results reveal that emerging markets especially in Asia have less co movement with commodities compared to developed economies. It was concluded that agriculture and precious metals offer better diversification opportunities in developing economies.

III. METHODOLOGY AND DATA

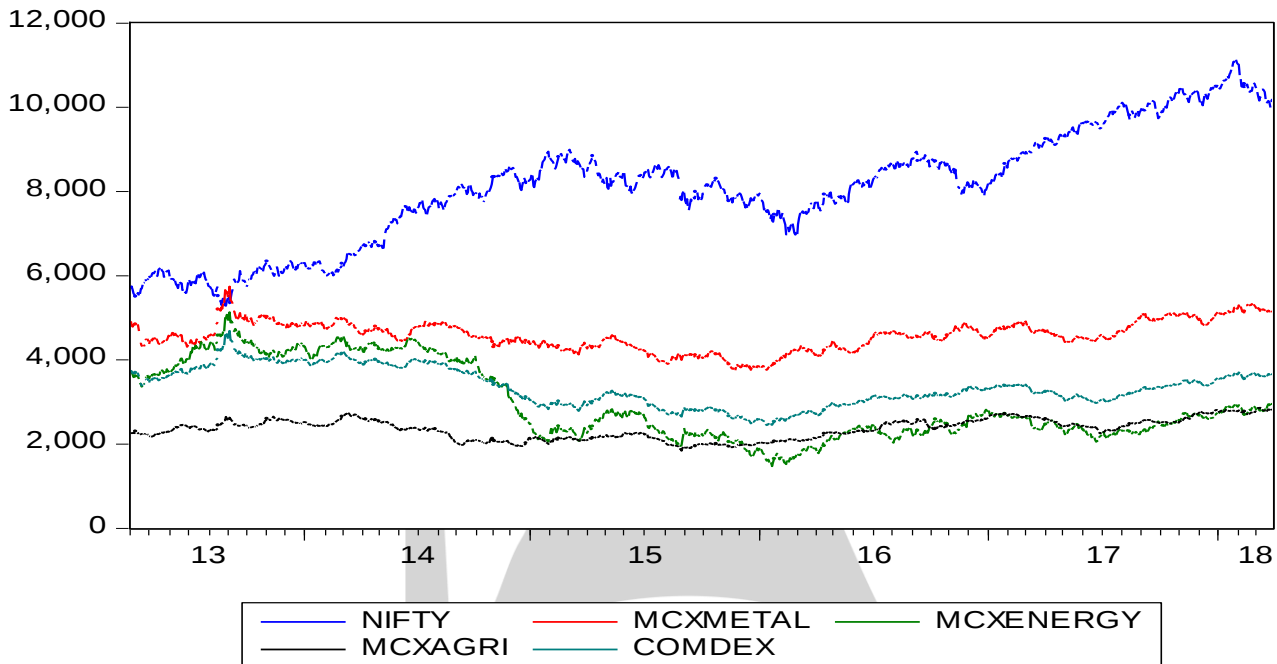
The study uses VAR cointegration framework to analyse the relationship between commodity and equity market. The empirical analysis is done in three steps. First the data is adjusted seasonally. Secondly, the stationarity properties are estimated for the data using unit root tests. Thirdly, Cointegration relationship is analysed using Johansen's Cointegration Test (Nazlioglu et.al. 2013)

Daily data has been used in the study. The data period of the study is from 01/04/2013 to 31/03/2018. The data of Commodity Indices are obtained from the website of MCX. The data have been converted into their logarithmic returns to minimize the Heteroskedasticity of the data. The constituents of these indices are the liquid commodities traded in Multi Commodity Exchange. The data of NIFTY 50 has been obtained from the website of NSE.

IV. RESULTS AND DISCUSSION

Before doing any analysis, trend analysis has been done to analyse the past performance of the indices.

Figure: 1 Trend Analysis of Commodity and stock market indices



The graph above shows that both equity and commodity market move in opposite directions in the past. This gives an opportunity to investors to diversify their portfolio as both markets behave differently in the given period. Further analysis in this regard will provide further insights to the relationship. Hence, various econometric tools have been employed to analyse the relationship between the markets.

UNIT ROOT TEST:

The variables are classified into stationary and non stationary variables. The variables are said to be stationary when the statistical properties of the variable such as mean standard deviation and autocorrelation are found to be constant over a period of time. In order to perform cointegration test, the variables should be stationary and integrated in the same order. The optimal lag length for performing these test have been selected using Akaike Information Criteria (AIC). The following table shows the unit root test performed on the variables using Augmented Dickey Fuller Test.

Table: 1 Results of ADF Test for Unit root

		Level	First Difference	Inference on Integration
LMCXAGRI	t statistic	-0.982	-21.810	I(1)
	Prob.	0.716	0.000	
LMCXMETAL	t statistic	-1.941	-37.238	I(1)
	Prob.	0.313	0.000	
LMCXENERGY	t statistic	-1.126	-35.389	I(1)
	Prob.	0.708	0.000	
LMCXCOMDEX	t statistic	-1.231	-35.644	I(1)
	Prob.	0.663	0.000	
LNIFTY	t statistic	-1.1807	-31.664	I(1)
	Prob.	0.649	0.000	

From the above table it can be seen that all the variables are non stationary at their levels. But when converted into their first difference, they are found to be stationary. So it can be concluded that all the variables are integrated at the order of one. Hence the primary precondition of doing cointegration tests is satisfied. Hence, Johansen cointegration test is applied on the variables to find out their long run equilibrium relationship.

JOHANSEN'S COINTEGRATION TEST

If the variables are integrated in the same order, the cointegration tests can be applied to analyse the long run relationship between the variables. If there is no cointegrating relationship between the variables, it is concluded that there is no long run equilibrium relationship between the variables. In the table no 3 the results of cointegration tests are presented.

Table No: 2 Results of Johansen's Cointegration Test for Indian Commodity indices and Nifty

Name of the variable	Vector (r)	Trace test				Maximum Eigen value				Remarks
		Eigen Value	Statistic	CV at 0.05	P Value	Eigen Value	Statistic	CV at 0.05	P Value	
MCX AGRI	$H_0: r = 0$	0.004	5.380	15.495	0.767	0.004	4.999	14.265	0.742	Not Cointegrated
	$H_0: r < 1$	0.0003	0.380	3.841	0.537	0.0003	0.380	3.841	0.537	
MCX METAL	$H_0: r = 0$	0.006	7.910	15.495	0.475	0.006	7.469	14.265	0.435	Not Cointegrated
	$H_0: r < 1$	0.0003	0.441	3.841	0.506	0.0003	0.441	3.841	0.507	
MCX ENERGY	$H_0: r = 0$	0.003	5.223	15.495	0.785	0.003	3.444	14.265	0.913	Not Cointegrated
	$H_0: r < 1$	0.001	1.779	3.841	0.182	0.001	1.779	3.841	0.182	
MCX COMDEX	$H_0: r = 0$	0.003	4.317	15.495	0.876	0.003	3.495	14.265	0.908	Not Cointegrated
	$H_0: r < 1$	0.0007	0.823	3.841	0.364	0.0007	0.823	3.841	0.364	

The table shows the cointegration result of each commodity indices with NIFTY 50. The results reveal that all the commodity indices are not co integrated with stock market indices. This shows that both market are does not exhibit a long run relationship between them. This implies that in long run, the variables do not move together.

GRANGER CAUSALITY TEST

To analyse the lead lag relationship, granger causality test have been done. Granger causality test will reveal in short run, which variable leads and which variable lags. The results have been presented in the table below:

Table No: 3 Result of Granger Causality tests

Null Hypothesis:	Obs	F-Statistic	Prob.
RCOMDEX does not Granger Cause RAGRI	1232	4.18205	0.0155
RAGRI does not Granger Cause RCOMDEX		0.66949	0.5122
RENERGY does not Granger Cause RAGRI	1232	1.41734	0.2428
RAGRI does not Granger Cause RENERGY		0.66558	0.5142
RMETAL does not Granger Cause RAGRI	1232	2.80283	0.0610
RAGRI does not Granger Cause RMETAL		0.28091	0.7551
RNIFTY does not Granger Cause RAGRI	1232	0.15377	0.8575
RAGRI does not Granger Cause RNIFTY		0.28641	0.7510
RENERGY does not Granger Cause RCOMDEX	1232	0.33222	0.7174
RCOMDEX does not Granger Cause RENERGY		0.72117	0.4864
RMETAL does not Granger Cause RCOMDEX	1232	0.37053	0.6904
RCOMDEX does not Granger Cause RMETAL		0.07223	0.9303
RNIFTY does not Granger Cause RCOMDEX	1232	4.18165	0.0155

RCOMDEX does not Granger Cause RNIIFTY		0.42829	0.6517
RMETAL does not Granger Cause RENERGY	1232	0.69815	0.4977
RENERGY does not Granger Cause RMETAL		0.13398	0.8746
RNIIFTY does not Granger Cause RENERGY	1232	1.34788	0.2602
RENERGY does not Granger Cause RNIIFTY		0.29544	0.7443
RNIIFTY does not Granger Cause RMETAL	1232	3.36086	0.0350
RMETAL does not Granger Cause RNIIFTY		2.08074	0.1253

From the table above it can be seen that the null hypothesis Nifty does not Granger Cause MCX Metal and Nifty does not Granger Cause Comdex is rejected. This shows that in short run, Nifty leads and Comdex and MCX Metal Lags. All other indices are found to have no lead lag relationship with Nifty.

V. CONCLUSION

In this paper the relationship between commodity and equity market have been analysed with reference to India. The period of the study is 01/04/2013 to 31/03/2018. After confirming stationarity at first difference, the Johansen's cointegration test has been analysed. The results show that there is no long run association between commodity and equity market. Further, lead lag relationship of the commodity and stock market indices have been analysed. The result shows that in short run, Nifty leads and Comdex and MCX Metal Lags. The study reveals that in long run, investment in commodity market will help the investors to diversify the portfolio, as both the market does not exhibit long term association with each other.

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