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COMMODITY MARKETS: PERFORMANCE ANALYSIS OF SELECTED NON – AGRICULTURAL COMMODITIESUSING TECHNICAL ANALYSIS

E V P A S Pallavi

Senior Assistant Professor, Department of Management Studies, MVGR College of Engineering (Autonomous), Vizianagaram, Andhra Pradesh, India

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ABSTRACT

India is agriculture centered economy where, two – third of the one billion populations depends on agriculture. Commodity derivative market has seen manyvariations in its trading, but seems to have finally reached now to a positive vibe.Commodity derivatives exchanging and money repayment of commodity futures and options had been restricted since 1952 and until 2002 commodity market was for all intents and purposes non-existent. In September 2005, the country had three national level automated exchanges and for about 21 regional exchanges for trading commodity derivatives. For about eighty commodities had been permitted for derivatives trading.A commodity market is a market that trades in major economic segments rather than industrial products. There are two classes' hard products and soft products. Commodity markets can include physical exchanging and derivatives settlement through spot prices, forwards, futures, and options. To hedge price risk farmers are entering into commodity derivative contracts.This article mainly focuses on Indian commodity market and also considered trading patterns of investors in commodity derivatives. The study also reveals the relationship between the selected commodities and also study what factors influencing the commodity prices.

KEYWORDS: *Commodity Derivatives Risk, Return and Portfolio*

INTRODUCTION

India, is farming based economy where two – third of the one billion populaces relies upon agrarian items.surprisingly India has an under developed commodity market. in contrast to physical markets, traders in future markets re using commodity derivatives as risk hedging tool. India is one of the top producers in commodities and also has a long track record of commodity trading and financial derivatives.

The commodity derivatives market has gone with many good and bad times, however at this point it appears to have at long last landed to a dimension of volume by expanding its contracts.The market has gained enormous ground regarding innovation, progress, value disclosure and exchanging action.

Commodity markets have ordinarily been a factious issue at different strategy mediums over the world, especially with the imbroglio made by charges from different corners that they help exorbitant speculation and are thus in charge of the ongoing item value appreciation. While this doubt of outrageous speculation in the product markets has dependably been there among policymakers in creating countries like India, it has turned out to be increasingly broad since 2008 in the wake of overall inflationary weights on nourishment and vitality divisions.The sudden flattening in the estimation of different resources basic various derivatives, which incorporates commodity derivatives, in the wake of the worldwide

emergency has incited more prominent uneasiness about the economic utility of futures market.The doubt has achieved such a high, that even the U.S., the primary supporter of market powers with the most dynamic item trades on the planet, is seeing new methods of guideline, and is likewise investigating the job of commodity derivatives exchanging costs of wheat, rice, and unrefined petroleum.

Meaning of Commodity Market

A market place where items are exchanged alluded as a commodity market. These commodities incorporate bullion (gold and silver), non – ferrous (base) metals, for example, copper, Zinc, aluminum, tin, nickel, vitality (raw petroleum, gaseous petrol etc.,), horticultural products, for example, soya, palm oil, espresso, pepper, cardamom, cashew and so on.

Commodity market refers to markets that trade in agricultural rather than industrial products. It is a physical or virtual market place for buying, selling and trading raw commodities. For investment purpose there are currently 50 major commodity market are there to facilitate the ease of investment trade in commodity market.

OBJECTIVES OF THE STUDY

The primary objective of the study is to critically evaluate the performance of copper and aluminum commodities. Apart this following are the objectives of the study.

- To study and analyze the trend of the selected commodities.
- To find out the relationship between copper and aluminum.
- To find out overbought and oversold zone of the selected commodities.
- To compare the magnitude of average gains and losses for a specific period of time.

RESEARCH METHODOLOGY

The type of research design used in the study is analytical research. The data collected for the study are secondary in nature. Secondary data for the study have been collected from Multi Commodity Exchange (MCX) and Bhav copy of commodities. The data was taken from March 1st 2018 to March 29th 2019. The tools used for the analysis were

- Pivot point
- Bollinger Bands
- Relative Strength Index
- Correlation

LITERATURE REVIEW

Elements that impact the development of copper cost on London Metal Trade by Gamgee Fong (2010). The examination inspected the three elements to realize the developments basing on copper stock dimension, aluminum cost and swapping scale. Balance vector model is utilized to ascertain the positive and negative stock value development of copper product. The creator saw the aluminum value which is the substitute of copper and estimated the value impact of this substitute on copper cost.

Universal relationship of Indian commodity future markets Ramesh Kumar and Ajay Pandey (2011). This paper broke down the unidirectional and bidirectional cross market linkage of exceptionally tradable and less tradable wares. The model used to look at the costs is GARCH and BEKK and tried the market co-development of two agrarian wares, that is, soya bean and corn, with two valuable metals, for example gold and silver and three ferrous metal, in particular, aluminum, copper and zinc.n investigation of cost of Base metal exchanges India, PankajSinha and KritikaMathure (2013) the paper characterizes the value personal conduct standard of India stock and its outcome on instability on Indian value advertise.

The paper approves on the presentation of alternative contract as a subsidiary instrument to fence the hazard in metal market. Worldwide budgetary emergency is the factor which impacted the Indian market and prompted cost revelation and expanded the instability in Indian market in 2008.To evaluate the product showcase in value advertise the costs of five base metals, for example aluminum, copper, tin, lead and nickel's spot and future costs were considered from November 2007 to January 2013. The paper show the value standard of conduct of future and spot contracts of five metals exchanged MCX. The outcomes found that the value instability of metal moves the value unpredictability of value advertises.

Overview of Copper Commodity

In world metal utilization, copper positions third after steel and aluminum. It is an item whose affluence legitimately mirror the condition of the world's economy, thus likewise named as Dr Copper.

Copper, the best non-valuable metal transmitter of power, has incredible quality, pliability, and protection from taking and erosion to make it the picked and most secure conveyor of electrical wiring in structures. Monetary, mechanical, and societal variables influence the free market activity of copper. Land-based assets are evaluated at 1.6 billion tons of copper, and assets in remote ocean knobs are assessed at 0.7 billion tons. Around the world, about 33% of all copper devoured is reused copper.

Copper is delivering in excess of 25 nations today. In view of worldwide dissemination of copper generation, the danger of aggravation in worldwide supplies is low. Then again, due to its hugeness in development and power transmission, any unsettling influence in provisions will have a noteworthy outcome on the economy.

Makers, exporters, advertisers, processors, and SMEs with experience to copper can deal with their value chances by supporting. At the point when vulnerability seems enormous, current hazard the executive’s methods and systems, including market-based hazard the executives monetary instruments like 'Copper Futures', offered on the MCX stage can improve abilities and combine intensity through value chance administration.

Factors Influencing the Market

- Indian copper prices redirectpredominant international spot market and the USD–INR exchange rates.
- Commodity explicit systems, for example, the development of new generation offices or procedures, new uses or the discontinuance of recorded uses, surprising mine or plant terminations (cataclysmic event, supply disturbance, mishap, strike, etc), or industry rebuilding—all influence the cost of the metal.
- Trade policies introduce by the government (application or suspension of taxes, penalties and quotas) affect supplies as they regulate (restricting or encouraging) material flow.

Overview of Aluminum Commodity

Aluminum is a compound component in the boron bunch with image Al and is the most generally utilized non-ferrous metal. Antiquated Greeks and Romans utilized aluminum salts as coloring mordents and as astringents for dressing wounds. It is a gleaming white, delicate, pliable metal. It makes up about 8% by weight of the world's strong surface and after oxygen and silicon, the third most plentiful of all components in the world's hull. In light of its solid fascination in oxygen, it isn't found in the natural state yet just in consolidated structures, for example, oxides or silicates. The metal starts its name from alumen, the Latin name for alum.

Aluminum is hypothetically 100% recyclable with no loss of its regular characteristics. As indicated by the International Resource Panel's Metal Stocks in Society report, the worldwide per capita load of aluminum being used in the public arena (that is in autos, structures and gadgets) is 80 kg. Quite a bit of this is in increasingly created nations (350 kg–500 kg for each capita) as opposed to in less-created nations (35 kg for each capita). Knowing the per capita stocks and their estimated life expectancies is significant for arranging reusing. By utilization, aluminum is by steel.

The substances of the market call for hazard the executives procedures that are basic for clients of aluminum, for example, makers, exporters, advertisers, processors, and SMEs. At the point when vulnerability poses a potential threat, current systems and techniques, including market-based hazard the executives money related instruments like 'Aluminum Futures', offered on the MCX stage can improve efficiencies and join adequacy through risk management.

Factors Influencing the Market

- Prices leadership in the international markets
- Dollar exchange rates.
- Economic factors: industrial growth, global financial crisis, recession, and inflation
- Commodity-specific events: construction of new production facilities or processes, new uses or the discontinuance of historical uses, unexpected mine or plant closures (natural disaster, supply disruption, accident, strike, and so forth), and industry restructuring
- Government trade policies (application or suspension of taxes, penalties, and quotas)
- Geopolitical events

RESULTS AND DISCUSSIONS

Table 1: Pivot Point of Copper Commodity

Date	High	Low	Close	Pivot Point (P)	R1	R2	S1	S2	Result
19-Mar	468.65	434.25	458.67	453.86	473.46	488.26	439.06	419.46	Bearish
19-Feb	466.75	430.65	460.23	452.54	474.44	488.64	438.34	416.44	Bullish
19-Jan	439.9	397.4	436.58	424.63	451.85	467.13	409.35	382.13	Bullish
18-Dec	447.8	407	406.13	420.31	433.62	461.11	392.82	379.51	Bearish
18-Nov	452.7	423.2	436.23	437.38	451.55	466.88	422.05	407.88	Bearish
18-Oct	469.35	434.15	435.68	446.39	458.64	481.59	423.44	411.19	Bearish
18-Sep	463.25	414.3	420.23	432.59	450.89	481.54	401.94	383.64	Bullish
18-Aug	429.3	402.55	431.25	421.03	439.52	447.78	412.77	394.28	Bearish
18-Jul	453.2	409.55	453.23	438.66	467.77	482.31	424.12	395.01	Bearish
18-Jun	493.25	445.45	455.29	464.66	483.88	512.46	436.08	416.86	Bearish
18-May	474.5	448.95	468.24	463.90	478.84	489.45	453.29	438.35	Bearish
18-Apr	465.7	428.6	441.25	445.18	461.77	482.28	424.67	408.08	Bullish
18-Mar	458.6	425	446.23	443.28	461.55	476.88	427.95	409.68	Bearish

Source: Computed Values

The above table shows the pivot point of Copper commodity the analysis reveals that the pivot point of copper is not above the highest price except in August 2018. The point is high in the month of May 2018 i.e 463.90 which is not crossed the high price of the selected commodity. In the month of August 2018 the point is more than the high price with 431.25.

This may happen due to the decisions of U.S monetary policy and Trump's Victory. The pivot point is very low in the month of December 2018 i.e 420.31 the reason may be price fluctuations of copper in London Metal Exchange and the production level of copper in the world.

Table 2: Pivot Point of Aluminum Commodity

Date	High	Low	Close	Pivot Point (P)	R1	R2	S1	S2	Result
19-Mar	1,950.50	1,845.50	1,846.48	1880.83	1916.15	1985.83	1811.15	1775.83	Bullish
19-Feb	1,919.50	1,820.25	1,868.13	1869.29	1918.34	1968.54	1819.09	1770.04	Bullish
19-Jan	1,914.50	1,764.00	1,779.68	1819.39	1874.79	1969.89	1724.29	1668.89	Bullish
18-Dec	1,990.90	1,816.75	1,982.15	1929.93	2043.12	2104.08	1868.97	1755.78	Bearish
18-Nov	1,994.25	1,908.50	1,964.78	1955.84	2003.19	2041.59	1917.44	1870.09	Bullish
18-Oct	2,242.00	1,897.50	2,076.68	2072.06	2246.62	2416.56	1902.12	1727.56	Bearish
18-Sep	2,109.50	1,999.00	2,104.32	2070.94	2142.88	2181.44	2032.38	1960.44	Bearish
18-Aug	2,157.25	2,007.50	2,041.75	2068.83	2130.17	2218.58	1980.42	1919.08	Bearish
18-Jul	2,151.75	1,990.25	2,127.68	2089.89	2189.54	2251.39	2028.04	1928.39	Bearish
18-Jun	2,341.25	2,155.75	2,305.68	2267.56	2379.37	2453.06	2193.87	2082.06	Bearish
18-May	2,381.00	2,251.75	2,252.72	2295.16	2338.56	2424.41	2209.31	2165.91	Bullish
18-Apr	2,556.00	1,983.00	1,984.00	2174.33	2365.67	2747.33	1792.67	1601.33	Bullish
18-Mar	2,153.00	1,990.25	2,153.68	2098.98	2207.70	2261.73	2044.95	1936.23	Bearish

Source: Computed Values

The above table shows the pivot point of Aluminum commodity the analysis reveals that the pivot point of Aluminum is not above the highest price. The point is high in the month of May 2018 i.e2295.16 which is not crossed the high price of the selected commodity. This may happen due to the Indian rupee and US Dollar exchange rates and the trade

polices set by the government. The pivot point is very low in the month of January 2019 i.e1819.39 the reasons may geopolitical events involving governments or economic paradigms and also demand and supply of the commodity.

Table 3: Relative Strength Index (RSI) of Copper

Date	Average Closing Price	Change	Average Gain	Average Loss	RS	RSI	Result
March, 2019	2.9	-0.30	0.26	0.36	0.73	41.06	Neutral
Feb, 2019	2.85	0.27	0.42	0.24	2.00	61.81	Neutral
Jan, 2019	2.671	0.23	0.56	0.33	1.76	62.99	Neutral
Dec, 2018	2.72	-0.28	0.43	0.62	0.74	41.26	Neutral
Nov, 2018	2.76	0.20	0.50	0.51	1.04	49.52	Neutral
Oct, 2018	2.767	-0.24	0.43	0.50	0.86	44.21	Neutral
Sep,2018	2.708	0.23	0.60	0.37	1.80	60.17	Neutral
Aug, 2018	2.721	-0.24	0.49	0.63	0.79	43.15	Neutral
July, 2018	2.777	-0.17	0.38	0.46	0.91	45.01	Neutral
June, 2018	3.117	-0.18	0.14	0.76	0.20	15.18	Neutral
May, 2018	3.064	0.01	0.50	0.33	1.71	60.11	Neutral
April, 2018	3.087	0.05	0.39	0.43	0.94	46.92	Neutral
March, 2019	3.066	-0.08	0.45	0.48	1.01	47.5	Neutral

Source: Computed Values

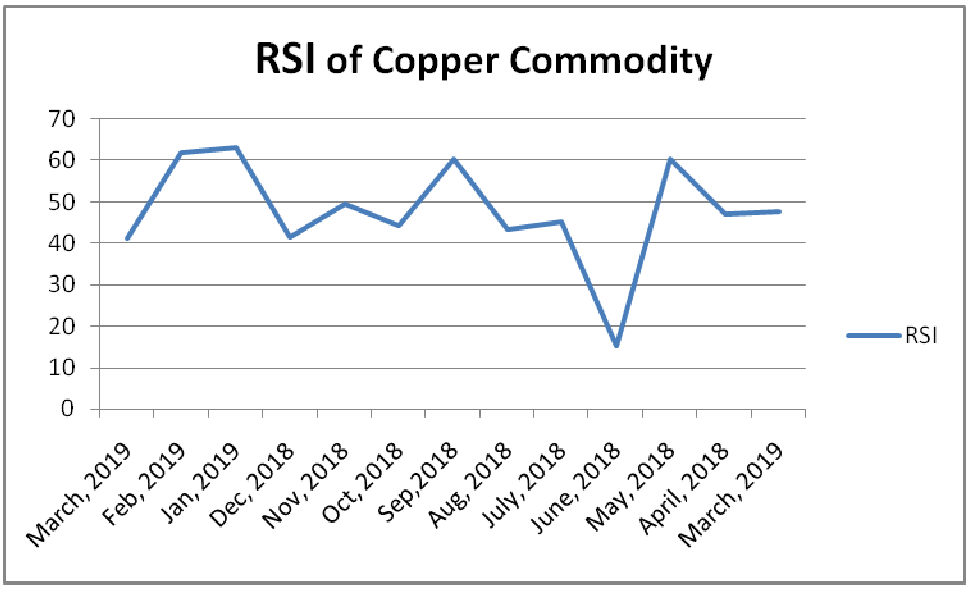

Figure 1

From the above analysis Relative Strength Index is calculated by using average gain per the day and average loss per the day. The RSI value is 62.99 in the month of January 2019. When RSI crossed 62.99 it is time to sell and in the above analysis RSI falls to 15.18 in June 2018 there is no indication to buy the commodity hence the result is Neutral.

Table 4: Relative Strength Index (RSI) of Aluminum

Date	Average Closing Price	Change	Average Gain	Average Loss	RS	RSI	Result
March, 2019	1,878.50	0.04	0.56	0.42	1.38	57.13	Neutral
Feb, 2019	1,868.66	-0.02	0.36	0.33	1.18	52.93	Neutral
Jan, 2019	1,855.06	0.17	0.52	0.48	1.20	51.94	Neutral
Dec, 2018	1,904.37	-0.36	0.27	0.52	0.54	31.39	Neutral
Nov, 2018	1,947.81	0.04	0.30	0.34	1.02	47.53	Neutral
Oct, 2018	2,039.40	-0.25	0.22	0.50	0.45	29.74	Neutral
Sep,2018	2,034.41	-0.14	0.70	0.60	1.27	54.07	Neutral
Aug, 2018	2,061.40	0.08	0.54	0.58	1.00	48.40	Neutral
July, 2018	2,096.06	-0.16	0.39	0.55	0.74	40.13	Neutral
June, 2018	2,247.06	-0.14	0.18	0.49	0.38	26.78	Neutral
May, 2018	2,309.55	-0.30	0.48	0.60	0.83	44.49	Neutral
April, 2018	2,252.30	0.75	1.46	1.28	1.27	52.90	Neutral
March, 2018	2,074.60	4.41	0.95	0.71	1.11	44.24	Neutral

Source: Computed Values

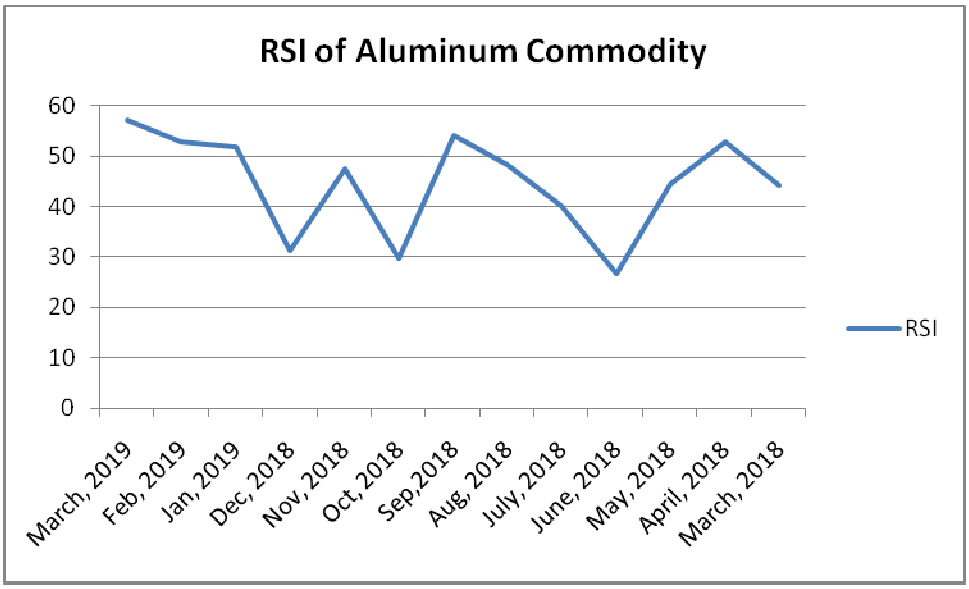

Figure 2

From the above analysis Relative Strength Index is calculated by using average gain per the day and average loss per the day. The RSI value is 57.13 in the month of March 2019. When RSI crossed 57.13 it is time to sell and in the above analysis RSI falls to 26.78 in June 2018 there is no indication to buy the commodity hence the result is Neutral.

Table 5: Bollinger Bands for Copper Commodity

Date	Standard Deviation	Upper Band	Lower Band	Bandwidth
March, 2019	0.029	5.58	5.74	0.12
Feb, 2019	0.045	5.88	5.70	0.18
Jan, 2019	0.055	5.60	5.38	0.22
Dec, 2018	0.039	5.42	5.27	0.16
Nov, 2018	0.038	5.59	5.44	0.15
Oct, 2018	0.034	5.58	5.42	0.16
Sep,2018	0.050	5.64	5.44	0.20
Aug, 2018	0.054	5.49	5.27	0.22
July, 2018	0.041	5.59	5.42	0.17
June, 2018	0.115	6.11	5.65	0.46
May, 2018	0.067	6.37	6.10	0.27
April, 2018	0.035	6.23	6.09	0.14
March, 2018	0.049	6.22	6.02	0.19

Source: Computed Values

Bollinger Bands are unpredictability groups put above and beneath a moving normal. Volatility depends on the standard deviation, which changes as volatility increments and diminishes. The groups naturally enlarge when instability increments and contract when unpredictability diminishes. Their dynamic nature enables them to be utilized on various protections with the standard settings. For sign, Bollinger Bands can be utilized to distinguish M-Tops and W-Bottoms or to decide the quality of the pattern. The upper band touch 6.37 on May 2018 indicates the overbought condition. The lower band touches 6.10 indicate the oversold condition. The bands are widening at the end of May hence Price of copper is highly volatile during the study period.

Table 5: Bollinger Bands for Aluminum Commodity

Date	Standard Deviation	Upper Band	Lower Band	Bandwidth
March, 2019	29.960	3812.88	3693.03	239.71
Feb, 2019	28.050	3794.87	3682.65	112.22
Jan, 2019	26.900	3737.00	3683.19	107.62
Dec, 2018	34.280	3782.09	3644.96	137.13
Nov, 2018	24.470	3928.12	3830.24	97.89
Oct, 2018	32.610	4032.21	3901.79	130.43
Sep,2018	47.430	4207.65	4017.93	189.72
Aug, 2018	37.800	4189.96	4038.75	151.21
July, 2018	35.630	4198.72	4056.22	142.50
June, 2018	41.590	4434.82	4268.45	166.37
May, 2018	40.410	4661.28	4499.66	161.63
April, 2018	88.940	4821.08	4465.27	355.74
March, 2018	117.69	4467.89	3997.12	470.77

Source: Computed Values

The upper band touch 4821.08 on April 2018 indicates the overbought condition. The lower band touches 4499.66 indicate the oversold condition. The bands are widening at the end of May hence Price of Aluminum is highly volatile during the study period.

Test on Relationship Between Copper and Aluminum Commodities using Correlation

Table 6

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Copper	289	2.57	3.29	2.8576	.16712
Valid N (listwise)	289				

Table 7

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Aluminum	289	1773.00	2548.00	2043.9838	158.94259
Valid N (listwise)	289				

Table 8

Correlation			
		Copper	**Aluminum**
Copper	Pearson Correlation	1	.662**
	Sig. (2-tailed)		.000
	N	289	289
Aluminum	Pearson Correlation	.662**	1
	Sig. (2-tailed)	.000	
	N	289	289
Correlation is Significant at the 0.01 level (2-tailed).			

From the above analysis it is clear that the mean value for copper commodity is 2.86 with a standard deviation of 0.17 and the mean value for aluminum commodity is 2043.98 with a standard deviation of 158.94. The analysis also reveals the relationship between copper and aluminum commodities by using Pearson correlation the analysis reveals that there is a significant relationship between copper and aluminum commodities.

CONCLUSIONS

India is an agro based economy where two – third of the one billion population depends on agricultural and allied activities. Non – agricultural commodity market holds many profitable opportunities for trend following trader. Basing on the study it is revealed that the rise in the price of copper have direct relationship with the rise in price of aluminum. The changes in commodity market related to the changes in global markets, rise in global commodity prices.

Commodity market is a global market and the price discovery will be basing on global demand and supply conditions.

REFERENCES

1. *Akgiray, V., Booth G.G., Hatem J.J., and Mustafa C. (1991).Conditional Dependence in Precious Metal Prices, The Financial Review, Vol. 26, Issue 3, pp.367- 386.*
2. *Arouri, M.E.H, Hammoudeh S., Lahiani A., and Nguyen D.K., (2012). Long memory and structural breaks in modeling the return and volatility dynamics of precious metals, The Quarterly Review of Economics and Finance, Vol. 52, Issue 2, pp.207-218.*
3. *Bagchi, D. (2012). Cross-sectional analysis of emerging market volatility index (India VIX) with portfolio returns, International Journal of Emerging Markets, Vol. 7, Issue 4, pp.383 – 396.*
4. *Bernard, J.T., Khalaf, L., Kichian, M. and Mcmahon, S. (2008). Forecasting commodity prices: GARCH, jumps, and mean reversion. Journal of Forecasting, Vol. 27, pp.279–291.*
5. *Bollerslev, T. (1986). Generalized autoregressive conditional Heteroskedasticity, Journalof Econometrics, Vol. 31, Issue 3, 307-327.*
6. *Bracker, K. and Smith, K. L. (1999).Detecting and modeling changing volatility in the copper futures market, Journal of Futures Markets, Vol. 19, pp.79–100.*
7. *Brunetti, C. and Gilbert C.L. (1995). Metals price volatility, 1972-95, Resources Policy, Vol. 21, Issue 4, pp.237-254.*
8. *Cochran, S.J., Mansur I., and Odusami B. (2012). Volatility persistence in metal returns: A FIGARCH approach, Journal of Economics and Business, Vol. 64, pp.287-305.*
9. *Cochran, S.J., Mansur I., and Odusami B. (2011). Threshold Effects of the Term Premium in Metal Returns and Return Volatilities: A Double Threshold-FIGARCH Approach, Working Paper, Villanova University.*
10. *Watkins, C. and McAleer M. (2006). Pricing of non-ferrous metals futures on the London Metal Exchange, Applied Financial Economics, Vol. 16, Issue 12, pp.853-880.*