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Accounting and Auditing

Nexus between Returns in Commodity Market and Equity Market: A Case of Indian Steel Industry

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Abstract: There has been a rapid expansion in the commodities market in the recent past due to the sharp rise in appetite of institutional investors or financial institutions for commodities for asset management purpose. Commodities markets are demonstrating an ever-increasing volatility due to structural shifts in supply and demand sides leading to wide price swings. This volatility is puzzling researchers, academicians, and portfolio Managers who try to understand the volatility to design transmission mechanisms. The article attempts to examine the relationship between the steel price in commodity market and equity share price of steel industries. The article also attempts to examine association between CNX metal index with spot market steel price, spot market commodity metal index and Nifty index. The method used is primarily regression analysis. It has been found that the variables individually are having comparatively lesser impact on CNXMIR but jointly they are explaining 73% of total variation.

Keywords: Commodity market returns; CNX metal index returns; Nifty Index returns

JEL Classification: G11; G12

1. Introduction

Commodities derivative markets along with financial derivatives markets are currently growing by leaps and bounds. There has been a sharp increase in the prices of energy and metal commodities in the recent past. In recent years, commodity markets have experienced a rapid growth in liquidity and an influx of investors who are attracted to commodities purely as investments (financial assets and securities), rather than as a means to support "real" economic activity via the hedging of risks (Vivian and Wohar, 2012 p. 395). The size of the commodity market is large compared to the size of physical market. Round the world there are fifty major commodity exchanges trading in nearly ninety commodities. Commodities markets are demonstrating an ever-increasing volatility due to

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structural shifts in supply and demand sides leading to wide price swings. There has been a rapid expansion in the commodities market in the recent past due to the sharp rise in appetite of institutional investors or financial institutions for commodities for asset management purpose. Non-professional participants are also testing the waters that increase the volatility. Increasing investment levels have flowed into the commodity market between 2006 and 2010 which spurred a debate as to whether speculation might have caused excessive increase in the cost of primary commodities and their volatility Tang & Xiong (2010). Volatility of commodity price is significant like exchange rate or interest rate volatilities.

Though commodity and stock markets are influenced by different factors and work in different dynamics, research proved the inverse relationship between commodities market and Treasury bond prices which in turn has an impact on the stock price. It is proved that movement of energy commodities have an impact on the stock prices. The relationship between the commodities and stock market prices is important to investors, policy makers, industry and economy of the country as a whole. However, the dependent structure of the stock market and commodity market is not studied frequently. In this paper, we contribute to the emerging empirical literature dealing with the relationships between commodity and stock markets. In specific we studied the impact of commodity price on the stock market price of the companies which use this commodity as a raw material in their manufacturing process. A firm that is using the commodity as an input see its stock price fall due to the increased costs that lower profits (Bary,1996; Doherty, 1999; Haines, 1997; Tufano, 1998). Conversely the slowdown in production affects the raw materials markets as well.

Increase in the commodity price lead increase in the cost of goods sold of companies which use this specific commodity as an input in the manufacturing process. This in turn reduce the profitability of these companies. Hence most companies follow the practice of hedging against the price risk of the commodity or pass on the commodity price increase to their customers there by reducing the effect on the profitability. Hence volatility of commodity price has a direct impact on the operating earnings of the company in which the commodity the used as an input or output factor **provided** these costs or revenues are significant and are not passed over to other companies or hedging is done. Profitability has a direct impact on the stock price of the companies.

Since steel is an important commodity we focus our on the impact of spot price of steel on the stock price of steel industries.

2. Review of Literature

Bannister and Forward (2002) observed that the history of U. S. stock and commodities prices has been illustrated by repeated super cycles resembling the patters of U. S economy. Rogers (2004) identified that a high negative correlation existed between the two markets over the past 140 years and they alternated the price leadership with 29-32 years cycles.

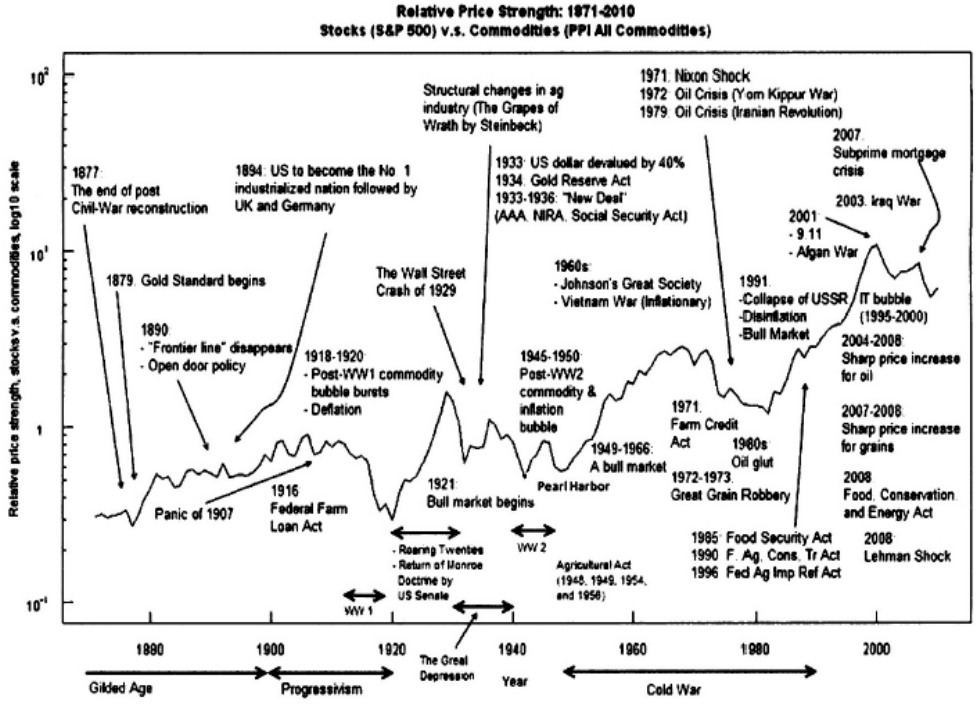

Chart 1. Relation between stock and commodity prices

Source: (Bannister and Forward, 2002)

Johnson, Robert (2009) established the relation between commodities market and stock market by empirically proving that "those stock markets of south American countries are highly affected by changes in commodity after controlling for changes in exchange rates, interest rates, and North American stock market changes". Nobuyoshi Yamori (2011) finds that 'there existed a negative or almost zero correlation between equity and commodity markets up to 2006; it increased significantly after the financial crisis in 2008" Considerable research has been done by Floros (2010), Athanasios (2010), Coleman (1996), Fung (1999), Joukivolle (1995), and Koutmos (1996) to study the lead lag relationship between commodities market and stock market.

An inverse relationship between return and volatility is observed in the commodity markets as compared to the stock markets. This implies that if the commodity market returns are negatively correlated with those of traditional financial assets, the introduction of commodities in those portfolios may result in the diversification of risks. Thus, an investor can take full advantage of the unique statistical properties of commodity investments by adding commodity assets to a financial-only portfolio. (Sheeba Kapil, Kanwal Nayan Kapil, 2010)

The existing empirical research regarding commodity and stock price nexus is mixed in nature. Chong and Miffre (2010) study the stock-commodity correlation from 1981 to 2006 and find that it has fallen over time and is decreasing in equity volatility. Kat and Oomen (2006) showed that the behavior of the correlation of commodities with stocks over the business cycle differs by commodity. Examining the period from 1991 to early 2008, Büyükşahin*et al*. (2011A) conclude that the stock-commodity correlation has not increased over time. According to Reuters stocks and commodities which were highly correlated earlier are becoming less and less correlated or 'decoupling'. "American Airlines exhibited a significant exposure with regard to the price of oil" Bilson (1994). Volvo Cars however is not significantly affected by the changes in the prices of oil or non-energy commodities. Oxelheim and Wihlborg (1995). "It's a common assumption that the average individual investor has zero allocation to commodities" says Matthew Carvalho, director of investment research at Loring Ward, a financial-advisory firm in San Jose, Calif. "But most investors have some indirect exposure to commodities through the stock market."

3. Objectives

1. To identify the impact of price movement of steel in commodity market on share price movement of their dependent industries where the risk is not passed over by hedging creating a steel price index for selected companies in steel industry

2. To identify whether commodity market can serve as a lead indicator for the stock price of the companies using the commodity as input.

3. To study the impact of commodity market returns on NIFTY returns

4. Methodology

4.1. Data Sources

Spot prices of steel have been taken from official website National spot exchange (http://www. nationalspotexchange. com). Data for Commodity metal index in spot market has been collected from Multi Commodity Exchange Website (http://www. mcxindia. com) and data of share prices of different steel companies and CNX metal index has been collected from NSE website (http://www. nseindia. com).

4.2. Study Period

The time period chosen for the study is from 17th March 2010 to 28th March 2013 daily data. This period has been chosen as the reform process started from 1991 though; liberalization began in eighties but gained momentum only in 1990s.

4.3. Techniques Used

Since Metals and minerals are intensively used in a number of sectors such as infrastructure, construction and manufactures and, Steel production is 20 times higher as compared to production of all non-ferrous metals put together, we attempt to study the impact of spot price of steel on the stock market price of industries which use it as a raw material. For our study we have collected daily prices of steel and MCX metal index in spot market and share prices of major steel industries & CNX metal index. . To prepare a steel index we have calculated daily returns of 5 major steel industries Vis a vis SAIL (Steel Authority of India Ltd.), Tata Steel, JSW steel Ltd, Jindal Steel and Power Ltd and Bhushan Steel Ltd. Simple average of their daily returns has been considered as steel index.

Returns are calculated with the formula $LN(cl_t/cl_{t-1})$. Where LN is natural logarithm and cl is the day's closing price. The returns are then averaged to get steel index. The five companies chosen are SAIL, Tata Steel, Jindal Steel and Power and Bhusan. The other variables are Return on Stock Market, MCX Metal Index and CNX Metal Index. The returns are calculated using the same procedure stated above.

In the second stage unit root tests are performed for testing for the existence of stationarity amongst the variables using Augmented Dicky Fuller (ADF) test.

In the third stage variables are tested for the existence of multi collinearity.

In the fourth stage, Cointegration amongst the pairs of variables is performed using Johansson's test for cointegration and Engel Granger Causality is examined.

In the fifth stage VAR/ VECM Model is used to examine the inter relationships and lags in the model.

5. Results and Discussion

5.1. Linkages between Commodity Market Returns, Spot Market Returns, Nifty, CNX Metal Index and MCX Metal Index in Steel Industry in India

The variables used in the model are: Commodity Market Returns (CMR), Spot Market Returns (SMR), CNX Metal Index (CNXMI), Nifty Index (NI) and MCX Metal

In order to pre-empt the possibility of running spurious regressions, the time series properties of variables used in the analysis was tested. The time series uni-variate properties were examined using ADF test. All the variables were found to be stationary at levels i. e. I (0), the reason may be that they are already transformed to logarithms and returns are calculated for all the variables. The results of ADF test are summarized in the table 1 below:

Table 1. Results of ADF Unit Root Test

Variable	t-Statistic	Prob.
CNX MI	-25. 02	0. 0000*
NIR	-25. 70534	0. 0000*
CMR	-28. 00646	0. 0000*
SMR	-26. 17140	0. 0000*
SIR	-26. 30508	0. 0000*

Note: * Significant at 0. 01 level. ADF test includes intercept and slope for variables in levels while for the variables in first difference the intercept is included. Lag length has been chosen based on Schwartz crieteria. ADF values are compared with Mc Kinnon critical values.

The second stage in the empirical analysis is the computation of cointegration test. Two or more variables are said to be cointegrated if they share common trends i. e. they have long run equilibrium relationships. According to Engel and Granger (1987), if a set of non-stationary variables are co-integrated then it follows that the variables will come back to equilibrium in the long run. The results of Johanson's cointegration test are summarized in the table 2 below:

Table 2. Cointegration Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0. 05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob. **
None *	0. 206208	683. 5778	69. 81889	0. 0001
At most 1 *	0. 186060	518. 9218	47. 85613	0. 0001
At most 2 *	0. 174586	372. 1377	29. 79707	0. 0001
At most 3 *	0. 155935	235. 3343	15. 49471	0. 0001
At most 4 *	0. 148313	114. 4624	3. 841466	0. 0000
Trace test indicates 5 cointegrating eqn(s) at the 0. 05 level				
* denotes rejection of the hypothesis at the 0. 05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				

Hypothesized		Max-Eigen	0. 05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob. **
None *	0. 206208	164. 6560	33. 87687	0. 0001
At most 1 *	0. 186060	146. 7841	27. 58434	0. 0001
At most 2 *	0. 174586	136. 8034	21. 13162	0. 0001
At most 3 *	0. 155935	120. 8719	14. 26460	0. 0001
At most 4 *	0. 148313	114. 4624	3. 841466	0. 0000
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0. 05 level				
* denotes rejection of the hypothesis at the 0. 05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

The results show that there is high level of cointegration amongst the variables used. Both the tests show significant results and therefore of VAR/VECM methodology is used which captures short term dynamics amongst the variables.

5.2. VAR/VECM Model for Spot Market Return (SMR) and MCX Index Return (MCXIR)

VECM Model for spot market index return on steel and MCX Index Return was fitted to study the impact of commodity market returns on MCX returns. The results are tabulated in the table 3 below

Table 3. VECM Model for SMR and MCXIR

Standard errors in ( ) & t-statistics in [ ]		
Cointegrating Eq:	CointEq1	
SMR(-1)	1. 000000	
MCXIR(-1)	0. 714242	
	(0. 08288)	
	[8. 61781]	
C	-0. 001555	
Error Correction:	D(SMR)	D(MCXIR)
CointEq1	-0. 661796	-0. 552361
	(0. 06141)	(0. 07530)
	[-10. 7765]	[-7. 33538]
D(SMR(-1))	-0. 242507	0. 362880
	(0. 05676)	(0. 06960)
	[-4. 27236]	[5. 21377]

D(SMR(-2))	-0. 176755	0. 276545
	(0. 04901)	(0. 06009)
	[-3. 60663]	[4. 60194]
D(SMR(-3))	-0. 075989	0. 133293
	(0. 03703)	(0. 04540)
	[-2. 05236]	[2. 93600]
D(MCXIR(-1))	0. 353729	-0. 490026
	(0. 04384)	(0. 05375)
	[8. 06906]	[-9. 11627]
D(MCXIR(-2))	0. 262929	-0. 377863
	(0. 03944)	(0. 04836)
	[6. 66727]	[-7. 81431]
D(MCXIR(-3))	0. 101568	-0. 203824
	(0. 03021)	(0. 03705)
	[3. 36178]	[-5. 50193]
R-squared	0. 457129	0. 455642
Adj. R-squared	0. 451746	0. 450245

The results show that spot market is significantly influenced by its own first, second and third lags and also with the lagged values of MCXIR. All the t values are significant. But the significance is gradually declining. Similarly MCX returns are also influenced by the lagged returns of spot markets. The R^2 of 45% reveals that almost 45% of variation in SMR is explained by its own lagged values and by the lagged values of MCXIR.

5.3. VAR/VECM Model for Spot Market Return (SMR) and Nifty Index Return (NIR)

VECM Model for spot market returns on steel and Nifty Index Return was fitted to study the impact of commodity market returns on Nifty returns. The results are tabulated in the table 4.

The results show that NIR is not having significant impact on spot market returns of steel (SMR) but SMR has got significant impact of NIR with a all the three days lags and its own lags as well. NIR also has got significant impact of its own lagged values as well as of SMR.

Table 4. VECM Model for SMR and NIR

Vector Error Correction Estimates		
Cointegrating Eq:	CointEq1	
SMR(-1)	1. 000000	
NIR(-1)	0. 736165	
	(0. 07372)	
	[9. 98584]	
C	-0. 001249	
Error Correction:	D(SMR)	D(NIR)
CointEq1	-0. 487747	-0. 681642
	(0. 06004)	(0. 07810)
	[-8. 12434]	[-8. 72827]
D(SMR(-1))	-0. 363310	0. 450247
	(0. 05786)	(0. 07527)
	[-6. 27909]	[5. 98204]
D(SMR(-2))	-0. 245783	0. 262364
	(0. 05083)	(0. 06612)
	[-4. 83571]	[3. 96817]
D(SMR(-3))	-0. 110661	0. 111221
	(0. 03833)	(0. 04986)
	[-2. 88740]	[2. 23087]
D(NIR(-1))	0. 254680	-0. 341949
	(0. 04153)	(0. 05403)
	[6. 13194]	[-6. 32911]
D(NIR(-2))	0. 201121	-0. 194526
	(0. 03704)	(0. 04819)
	[5. 42956]	[-4. 03705]
D(NIR(-3))	0. 126100	-0. 164685
	(0. 02841)	(0. 03695)
	[4. 43908]	[-4. 45666]
C	9. 16E-06	-6. 14E-06
	(0. 00033)	(0. 00043)
	[0. 02759]	[-0. 01421]
R-squared	0. 422239	0. 422527
Adj. R-squared	0. 416511	0. 416801

5.4. VAR/VECM Model for Spot Market Return (SMR) and Steel Index Return (SIR)

VECM Model for spot market returns on steel and Steel Index Return was fitted to study the impact of commodity market returns on Steel Index returns. The results are tabulated in the table 5 below.

Table 5. VECM Model for SMR and SIR

Cointegrating Eq:	CointEq1	
SMR(-1)	1. 000000	
SIR(-1)	17. 85255	
	(1. 25024)	
	[14. 2793]	
C	0. 018245	
Error Correction:	D(SMR)	D(SIR)
CointEq1	0. 001343	-0. 060049
	(0. 00181)	(0. 00422)
	[0. 74322]	[-14. 2342]
D(SMR(-1))	-0. 738089	-0. 031547
	(0. 03668)	(0. 08565)
	[-20. 1204]	[-0. 36832]
D(SMR(-2))	-0. 501659	-0. 064302
	(0. 04199)	(0. 09803)
	[-11. 9484]	[-0. 65593]
D(SMR(-3))	-0. 240490	-0. 058362
	(0. 03666)	(0. 08559)
	[-6. 56074]	[-0. 68190]
D(SIR(-1))	-0. 021302	0. 083396
	(0. 02772)	(0. 06471)
	[-0. 76860]	[1. 28873]
D(SIR(-2))	-0. 007594	0. 071429
	(0. 02261)	(0. 05280)
	[-0. 33586]	[1. 35294]
D(SIR(-3))	-0. 004321	0. 043297
	(0. 01613)	(0. 03765)
	[-0. 26795]	[1. 14984]
C	1. 19E-05	-1. 26E-05
	(0. 00035)	(0. 00081)
	[0. 03414]	[-0. 01547]
R-squared	0. 366658	0. 494072
Adj. R-squared	0. 360378	0. 489056

The results prove that SIR has does not have significant impact from SMR. T Values of all the coefficients are not statistically significant. SIR also doesn't have any significant impact from SMR.

5.5. Multiple Regression Model

In the last stage a multiple regression was fitted to know the impact of return on spot market, return on MCX index and nifty index on commodity markets. The results are summarized in the table 6, 7 and 8 below. The results show that commodity market CNXIR is having significant impact of returns in other markets like Nifty Returns, Spot Market Returns and MCX Metal Index. Before undertaking any muti-variate analysis it is necessary to test for multi-colinearity. Multi colinearity test for all the variables used is given in table 7. The VIF is approximately close to 1 which means absence of any multi collinearity problem in the data.

Table 6. Results of Multiple Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	. 901(a)	. 811	. 810	. 00719657926 7859

a Predictors: (Constant), NIR, SMR, MCXIR, SIR

Table 7. ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	. 159	4	. 040	767. 274	. 000(a)
	Residual	. 037	713	. 000		
	Total	. 196	717			

a Predictors: (Constant), NIR, SMR, MCXIR, SIR
b Dependent Variable: CNXIR

Table 8. Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-. 001	. 000		-2. 626	. 009		
	SIR	. 288	. 017	. 377	17. 343	. 000	. 561	1. 783
	SMR	-. 059	. 033	-. 030	-1. 812	. 070	. 990	1. 010
	MCXIR	. 108	. 028	. 064	3. 895	. 000	. 968	1. 033
	NIR	. 889	. 033	. 589	27. 201	. 000	. 563	1. 776

a Dependent Variable: CNXIR

The results reveal that commodity market returns index (CNXIR) is significantly dependent on Steel Index Returns (SIR), MCX Index Returns (MCXIR) and Nifty Index Returns (NIR). R-square of 90% shows the strength of relationship. It also shows the impact of other returns on commodity markets is instantaneous rather than lagged one and all the markets together are influencing commodity market returns.

6. Findings of the Analysis

- From the VECM Model of SIR and SMR it is proved that SIR has significant impact from SMR (-1) but other coefficients are not statistically significant. The overall R^2 for SIR has come to 0. 49 which implies that almost 49% of variation in SIR is explained by SMR.

- From the VECM Model of NIR and SMR it is proved that NIR is not having significant impact on spot market returns of steel (SMR) but SMR has got significant impact on NIR with a lag of one day.

- From the VECM model of MCXIR and SMR we can conclude that spot market is significantly influenced by its own first, second and third lags and also with the lagged values of MCXIR. All the t values are significant. But the significance is gradually declining. Similarly MCX returns are also influenced by the lagged returns of spot markets. The R^2 of 45% reveals that almost 45% of variation in SMR is explained by its own lagged values and by the lagged values of MCXIR.

- The multiple regression analysis shows that commodity market returns index (CNXIR) is significantly dependent on Steel Index Returns (SIR), MCX Index Returns (MCXIR) and Nifty Index Returns (NIR). R-square of 90% shows the strength of relationship. It also shows the impact of other returns on commodity markets is instantaneous rather than lagged one and all the markets together are influencing commodity market returns

7. Limitations of the Study

1. The analysis in the project has dealt only with a particular sector, i. e. , Steel Industry. Other commodities and its relevant industry have not been taken into account.

2. This research is limited to Spot market only and may or may not be applicable to future market.

3. The result of this research may or may not be applicable to other industries.

4. Analysis in this report is limited to Indian commodity and equity exchanges. Price movement at international exchanges has not been taken into account. Hence, the findings of this research may or may not be applicable to global market.

8. Conclusions

It is found from the analysis that the variables individually are having comparatively lesser impact on CNXMIR but jointly they are explaining 73% of total variation. There are other factors also like inflation, exchange rate volatility, hedging etc which also has got and impact on CNXMIR.

9. References

Alan Stevenson, Winnipeg & Dr Milton Boyd (2011). Lead –Lag Relationships Between Commodity Prices and Corresponding Company Stock Prices. *The Business Review*, Vol 19, No 1, pp. 43-47.

Antoniou, A. & Garrett I. (1993). To What Extent did Share Index Futures Contribute to the October 1987 Share Market Crash?. *The Economic Journal*, 103:421, pp. 1444-1461.

Aven, Paula (1997). Commodity Prices Shielde d Colo. energy stocks. *The Denver Business Journal*, Vol 49, Issue 8, p. 12.

Black and Keith (2009). *The Role of Institutional Investors in Rising Commodity Prices*. Vol 18, Iss 3, pp. 20-26.

Copeland, Maggie and Tom Copeland. (1998). Leads, Lags, and Trading in Global Markets. *Financial Analysts Journal*, (54)4, pp. 70-80.

Davis, Ann (2007). Stock market Quarterly review-Most commodity sidestep economic woes. *Wall Street Journal*, Eastern edition [New York, N. Y] 02 July, C. 5.

Eduardo Borenzten and Carmen M Reinhart (1994). The macro economic determinants of commodity prices. *International Monetary Fund Staff Papers*, Vol 41, No 2, pp. 236.

Henry, Brain (1995). Commodity stock prices are lagging the market. *Chemical Marketing Reporter*, Vol 248, Iss 16, pp 28.

John Valentine (1989). Commodity –Futures Prices show Mixed results, generally reflecting stability of stock markets. *Wall Street Journal*, Eastern edition [New York, N. Y] 17 Oct 1989, p. 1.

Kirby, Jason (2011). Economy: The Canada bubble: Fuelled by fast-rising commodity prices, the Canadian economy is booming and investors are flooding in. Is it all too good to be true. *Macleans*, Vol 124, Issue 10, p. 34.

Klaus, Matthies (2005). Commodity Prices Recede from Record Highs. *Intereconomics*, Iss November/December, pp. 361-364.

Nobuyoshi, Yamori (2011). Co-Movement between Commodity Market and Equity Market: Does Commodity Market Change. *Modern Economy*, Published online July (http://www. SciRP. org/journal. me, pp. 335-339.

Tang, Ke & Wei, Xiong (2010). Index Investments and Financialization of commodities. *NBER Working papers* w 16838.

Sheeba, Kapil & Kanwal Nayan Kapil (2010). Commodity trading advisors (CTAs) for the Indian Commodity market. *International Journal of Emerging Markets*, Vol. 5 No. 2, pp. 124-137.

Sohnke, M Bartram (2005). The impact of commodity price risk on firm value-An Empirical Analysis of Corporate Commodity Price Risk Exposures. *Multinational Finance Journal*, Vol 9, pp. 159-185.

Walid, Mensi; Makram, Beljid; Ade, Boubaker & Shunsuke, Managi (2013). Correlations and volatility spillovers across commodity and stock markets: Linkingenergies, food, and gold. *Economic Modelling* iss 32 (2013) pp. 15–22.

Zapata, Hector O.; Detre, Joshua D. & Hanabuchi, Tatsuya (2012). Historical Performance of Commodity and Stock Markets. *Journal of Agricultural and Applied Economics*, Aug, Iss. no 44, pp 339-357.

Online Sources

http://www. nationalspotexchange.com.

http://www. mcxindia.com.

http://www. nseindia.com.