CHAPTER – 8

CONCLUSION

Commodity markets have gained importance in recent decades by playing a pivot role on determining the nation’s economy. The commodity market is a place where commodities such as bullion, metals, energy and agricultural products have been traded. The commodity market is as old as a human civilization with the existence of the spot market. But, uncertainty in production or counter party risk has paved the way for derivative instruments in the commodity market. The industrial growth in India demands more metals and energy consumption whereby becoming the largest importer of these commodities in the world. Indian agricultural commodities are highly demanded throughout the world, making India one of the largest producer and exporter of these commodities. Thus, the producers, importers, exporters and industrial users’ participate in the Indian commodity market to mitigate their risk.

Government of India made a bigger move to merge the commodity market regulator, the Forward Markets Commission (FMC) with the financial market regulator, the Securities Exchange Board of India (SEBI) to bring convergence in capital market regulations and to bind the economies of scale for all market participants, which took place on 28th September, 2015 in Mumbai. Immediate after the merger SEBI reformed the behaviour of Indian commodity derivatives market with great challenges from the underlying spot market that are fragmented and not under the regulatory control of SEBI. SEBI works with the vision to develop the Indian commodity derivatives market with the introduction of new products and new category of market participants that would lead to better price discovery and liquidity in the commodity market. The commodities permitted for trade in March 2017 were 51 that increased to 113 commodities in June 2015 with major share of agricultural commodities traded in three national exchanges namely, the Multi Commodity Exchange (MCX), National Commodity and Derivatives Exchange (NCDEX) and National Multi Commodity Exchange (NMCE) and one regional exchange namely, Chamber of Commerce (COC), Hapur. The commodity futures market in India reported a total trade of ₹ 54.25 lakh crore as of March 2017 which was ₹ 16.86 lakh
crobe in 1st quarter of 2014-15 (FMC Bulletin April-June 20151 and SEBI Bulletin March 20172). This shows the prospects in Indian commodity derivatives market which is expected to widen with SEBI’s expertise frameworks and policies.

The present study on the efficiency of Indian commodity futures market was focused on five dimensions of assimilating information into the futures market such as its relationship with the spot market, the presence of volatility in it, the stock futures influence, the influence of macroeconomic indicators and the influence of the international market with them. The MCX-COMDEX, benchmark index of MCX and NCDEX-Dhaanya, benchmark index of NCDEX constituent commodities (Gold, Silver, Copper, Zinc, Aluminium, Nickel, Lead, Crude oil, Natural gas, Kapaskhali and Mentha oil from MCX-COMDEX and Castor seed, Chana, Cotton seed oilcake, Jeera, Mustard seed, Refined soy oil, Turmeric and Wheat from NCDEX-Dhaanya) were chosen for the study as commodity index are not traded in India. The period of study is for 10 years from 1st January 2006 to 31st December 2015, as this period covered several financial and political events in and out of India. The analysis was performed over the whole study period and the key findings are summarized below:

8.1 TRADING PATTERN OF COMMODITY FUTURES IN INDIA

India has a long history of commodity market that underwent various ups and downs over centuries but has not grown much. The Liberalisation, Privatisation and Globalisation (LPG) policy introduced in the early nineties paved way for the Government to recognize the importance of commodity futures market in India. Thereby, the Indian commodity market started to develop after the introduction of National level commodity exchanges after 2003 providing the on-line trading platform. Before going for in-depth analysis on Indian commodity market efficiency, taking a quick trend on the futures and spot prices movement is helpful. This was examined with the line charts for both the spot and futures prices of all the selected commodities. The overall graph shows that both futures and spot prices move together for all commodities which mean that the information flow is present between the spot and futures markets. Bullion showed a steep increase throughout the study period with

Gold prices declining after 2013 and Silver after 2012. The metal prices showed constant trend except for some period with ups and downs. In energy commodities, Crude oil showed an upward trend with a steep decline in the 4th quarter of 2008 and 2014, whereas Natural gas showed downward trend throughout the study period. The MCX agricultural commodities, Kapaskhali showed an upward trend and Mentha oil showed a steep spike in 2011. The global factors such as 2008 crisis, change in Organization of Petroleum Exporting Countries (OPEC) policies and production and consumption from China causes ups and downs of bullion, metal and energy commodities apart from internal economic and political policies. However, the agri-commodities prices of NCDEX such as Castor seed, Chana, Cotton seed oilcake, Jeera, Mustard seed, Refined soy oil and Wheat showed a constant upward trend throughout the study period with Turmeric showing a steep spike only from 2009 to 2012. These were mainly due to the fundamental factors of production, demand and supply. This makes investors prefer trading in non-agricultural commodities and only real hedger trade in agricultural commodities which are confirmed by total contracts traded in these commodities.

8.2 CAUSAL RELATIONSHIP BETWEEN COMMODITY SPOT AND FUTURES PRICES

The relationship between the spot and futures markets were examined by applying Granger Causality of Granger (1969)\(^3\) to know whether the exchange traded futures market assimilates information from fragmented mandi traded spot market. As the data are of time series, before applying Granger Causality, all the 19 commodities (Gold, Silver, Copper, Zinc, Aluminium, Nickel, Lead, Crude oil, Natural gas, Mentha oil, Kapaskhali, Castor seed, Chana, Cotton seed oilcake, Jeera, Mustard seed, Refined soy oil, Turmeric and Wheat) spot and futures prices were tested for unit root through Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Except for Aluminium all commodities futures prices and spot prices were stationary at the 1st difference at 5% level of significance. The stationary series were used for analyzing Granger Causality. Out of 19 commodities taken, 11 commodities (Gold, Silver, Zinc, Aluminium, Mentha oil, Castor seed, Chana, Jeera, Refined soy oil, Turmeric and

Wheat) showed a bi-directional causal relationship with higher F-statistics for futures price causing the spot price, 7 commodities (Copper, Nickel, Lead, Crude oil, Natural gas, Cotton seed oilcake and Mustard seed) showed uni-directional causality from futures to spot and Kapaskhali showed uni-directional causal relationship from spot to futures. The higher F-statistics of these two commodities causing effect indicates the higher influential causality. The F-statistics of bi-directional causality shows a higher value for futures price causing spot price. Thereby, the null hypothesis $H_0$ that there is no causal relationship between spot and futures prices of commodities gets rejected for bullion, metal, energy and agricultural commodities except for the commodity Kapaskhali. This evidenced that the Indian commodity futures market effectively assimilates information from the spot market, performing the price discovery function for all commodities except Kapaskhali commodity due to its seasonal trading.

8.3 MEASURING VOLATILITY IN THE COMMODITY FUTURES MARKET

Volatility is a major risk threatening the investors’ investment. The commodity futures market must imbibe the volatility information present in the market to effectively determine the futures price. The volatility in the commodity futures market was examined on futures return series through the Autoregressive Conditional Heteroscedasticity (ARCH) of Engle (1982)$^4$. Similarly as in Granger Causality analysis, the futures returns of 19 commodities (Gold, Silver, Copper, Zinc, Aluminium, Nickel, Lead, Crude oil, Natural gas, Mentha oil, Kapaskhali, Castor seed, Chana, Cotton seed oilcake, Jeera, Mustard seed, Refined soy oil, Turmeric and Wheat) were tested for unit root with ADF and PP test and found stationary at level at 1% level of significance. The volatility is captured from the ARCH effect present in the regression of lagged futures return regressed upon the futures return. The basic Ordinary Least Square (OLS) regression results found that the futures returns of commodities were influenced by their lags. But, on testing the residuals of the regression it was evident that the regression of Gold, Silver, Copper, Zinc, Aluminium, Nickel, Lead, Crude oil, Natural gas, Mentha oil, Castor seed, Jeera and

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Wheat suffered from Heteroscedasticity problem, which were rectified by ARCH model. The bullion and metal commodities (Gold, Silver, Copper, Zinc, Aluminium, Nickel and Lead) results exhibited that irrespective of lagged futures return, the ARCH term or volatility also influenced their futures returns resulting presence of volatility in them. Similarly, the energy commodities, Crude oil and Natural gas futures also exhibited significant influence from ARCH term, validating the presence of volatility in them. The volatility in these commodities mainly occurred due to high trading, unexpected economic changes in India as well as in the world. The agricultural commodities, Mentha oil, Castor seed, Jeera and Wheat futures return also shows significant influence from ARCH term, resulting in presence of volatility which could be the outcome of demand exceeding supply due to production factors and government intervention. However, the agricultural commodities, Kapaskhali, Chana, Cotton seed oilcake, Mustard seed, Refined soy oil, Turmeric futures OLS did not show heteroscedasticity in their residuals resulting in absence of volatility in these commodities that are mostly affected by fundamental factors. Overall results of commodities figure out the presence of volatility in the futures returns thereby influencing the futures prices. Thus, the null hypothesis, $H_0$; that there is no volatility in the commodity futures market gets rejected, validating the presence of volatility in the Indian futures market. This explains that the Indian commodity futures market is effective in imbibing the volatility information in them performing the risk management function of the futures market.

8.4 SPILLOVER BETWEEN EQUITY AND COMMODITY FUTURES MARKETS

The Indian equity market has emerged in recent decades but it outperforms the Indian commodity futures market in terms of trading volume and market capitalization, thereby gaining higher share in investors’ investment portfolio. Being an alternative asset class, the equity market information also affects the commodity prices. Thus, the return spillover between the equity and commodity market in India were examined through the Vector Autoregression (VAR) and Impulse Response Function. The Nifty 50 futures were considered as the representative of equity market as Nifty 50 is a barometer index of equity market along with the 19 commodities (Gold, Silver, Copper, Zinc, Aluminium, Nickel, Lead, Crude oil, Natural gas,
Mentha oil, Kapaskhali, Castor seed, Chana, Cotton seed oilcake, Jeera, Mustard seed, Refined soy oil, Turmeric and Wheat) futures. The return series were used for analysis and their unit root tested through ADF and PP tests showed that all the return series were stationary at the level, at 1% level of significance. The VAR result showed bullion commodity Gold, metal commodity Nickel, energy commodity Natural gas and Agricultural commodities Kapaskhali, Mentha oil, Chana, Cotton seed oilcake, Jeera, Mustard seed and Wheat showed no spillover effect between the equity and commodity markets elucidating their independent nature and behaviour. Commodities such as Silver, Copper, Zinc, Aluminium, Lead and Turmeric showed significant equity to commodity market spillover, which explains that Nifty 50 returns influence commodity returns in these commodities expressing their increasing industrial demand. The Crude oil exhibited bi-directional spillover between the Indian equity and commodity futures market explaining that both Nifty 50 futures return and Crude oil futures return influence each other, with higher influence from the commodity market to the equity market. The Refined soy oil exhibited significant unidirectional spillover from commodity to equity futures, which explains that commodity returns impact Nifty 50 returns stating their international trade influence. The impulse response function validates the VAR results with expressing that the influence peaks at second-day as the result of market timing effect that diminishes immediately and nullifies after four days. Thus, the null hypothesis, \( H_0^3 \): that there is no return spillover between the equity and commodity futures market gets rejected for Silver, Copper, Zinc, Aluminium, Lead, Crude oil, Refined soy oil and Turmeric. This results that the Indian futures market also assimilates information from the equity market.

### 8.5 IMPACT OF MACROECONOMIC INDICATORS ON COMMODITY FUTURES

Commodities are directly related to trade which is affected by the economic and political policy changes. Thus, the macroeconomic indicators play an important role in determining the commodity prices changes. The impact of the most relevant macroeconomic indicators of commodity market, Wholesale Price Index (WPI) – a proximity for inflation, Indian Rupee versus United States Dollar (INR-USD) – a proximity for exchange rate and Mumbai Inter-Bank Offer Rate (MIBOR) – a
proximity for the interest rate (Sahi & Raizada, 2006)\textsuperscript{5} on 19 selected commodities futures prices were analyzed through multiple regression. The multiple regression resulted that Gold is influenced only by the INR-USD exchange rate which is because Gold is highly demanded in India that is fulfilled by the high imports of Gold, as imports and exports are affected by exchange rates. Silver, Copper, Zinc, Aluminium, Crude-oil and Refined soy oil were influenced only by the WPI resulting in higher industrial usage and trading that leads to inflation. Nickel was influenced by WPI and INR-USD and Lead was influenced by WPI and MIBOR which may be because of their industrial usage and availability. Castor seed is influenced only by the MIBOR which supports the typical money availability for agricultural production. The Kapaskhali and Refined soy oil were influenced by the WPI which were due to their contribution in it. Natural gas, Menthal oil, Chana, Cotton seed oilcake, Jeera, Mustard seed, Turmeric and Wheat had no influence from the selected three macroeconomic indicators. The results evidenced that the Silver, metal commodities and Crude oil have inflation influence due to their higher industrial usage and the agricultural commodities mostly affected by weather and yield conditions were not influenced by macroeconomic indicators. Thus, the null hypothesis, $H_0$; that there is no impact of the macroeconomic indicators on the commodity futures market gets rejected for bullion, metals, Crude oil, Castor seed, Kapaskhali and Refined soy oil and accepted for Natural gas and other agricultural commodities explaining that bullion, metal and energy commodities effectively reacts to macroeconomic information which is absent in agricultural commodities except for few.

8.6 RELATIONSHIP OF COMMODITY PRICES BETWEEN INDIA AND THE WORLD

The LPG policy opened the way for trade beyond boundaries that paved way for the international markets to influence the domestic market. For better efficiency of domestic market, it is also important to assimilate the international markets information as avoiding competitive information may not hold well. Thus, the market integration was examined for commodities commonly traded on domestic and

international commodity market platform through correlation and Granger Causality. Gold, Silver, Copper, Aluminium, Nickel, Zinc, Lead, Crude Oil, Natural Gas, Wheat and Soy oil are the commodities selected for analyzing the relationship between Indian and International commodity market. The Pearson correlation analysis showed that the international prices and the Indian prices for all the commodities except Indian Wheat spot are highly correlated significantly, resulting that the International and Indian commodities prices are related. The Granger causality shows the lead-lag relationship between the Indian and International commodity prices. The Silver, Copper, Aluminium, Lead and Soy oil showed effect from the International spot prices to Indian spot prices. Whereas, the Indian prices for Gold, Nickel, Zinc, Crude oil, Natural gas and Wheat showed no causality with the international prices. This explains that though Indian and International commodity prices are highly correlated, some lack causing effect between them, which may be due to frequent event influence in them or Government intervention. Thus, the null hypothesis, $H_0^5$; that there is no relationship between the Indian and world commodity prices gets rejected for Silver, Copper, Aluminium, Lead and Soy oil and gets accepted for Gold, Nickel, Zinc, Crude oil, Natural gas and Wheat. This shows that Indian commodity spot market assimilates international price information resulting in market integration between them. Thus any policy measures on Indian commodity futures market should be done with keeping in view the integration of Indian and international commodity spot market.

8.7 CONCLUSION

Efficiency is a most uttered topic in evaluating any market, that too in a nation like India which had commodity market’s existence over centuries but is still in its developing phase. Efficiency cannot be achieved easily as it is not confined to a small area. As per the theory of Fama, a market is said to be efficient only when it inculcates all available information making no investors earn an abnormal profit. The information may be historical events or public information or insider information. The Indian commodity market saw various bans which affected its development. Thus, the study attempted to measure the Indian commodity futures market efficiency in five important dimensions of relation with the spot market, its own volatility, equity market, macroeconomic indicators and international markets over a period of ten
years from 1st January 2006 to 31st December 2015. The Indian commodity market does not permit index trading, thus, to analyze the commodity market efficiency, most traded index constituent commodities were chosen for the study.

The present study found efficient price assimilation of spot market to the futures market in bullion, metal, energy and agricultural commodities, volatility presence in bullion, metal, energy and some agricultural commodities. Similarly, the bullion, metal, energy with some agricultural commodities showed equity market spillover, macroeconomic influence and relationship with international markets. Therefore, on a whole, the study showcases that the bullion, metal and energy commodities are efficient in India whereas, the agricultural commodities still lack information assimilation making them yet to be efficient.

8.8 CONTRIBUTION TO INVESTORS

The present study focuses on Indian commodity market efficiency which helps the commodity investor to make a better investment. Investors are always confident to invest only in efficient markets. An efficient market incorporates available information making the investors to better understand the risk. If the market is inefficient, the investors’ risk will be more as the market reacts in an unpredictable way. The Indian commodity market’s development in recent years paved way for it to emerge as the last frontier for earning high returns which attract more investors. The present regulator of Indian commodity market has brought various policy changes so as to keep both the Indian equity and commodity markets well collaborated which gains more confidence for financial investors also to trade in commodity market whereby the liquidity of the market increases. The results of this study point out that the efficiency of bullion, metal and energy commodities makes these commodities safe for the investors to trade and earn returns. The investors should notice the performance of previous day’s price and past volatility, as the commodity futures prices are influenced by its lags and volatility. The investor can build up portfolio with equity and commodity futures as there is spillover between these markets. The investor must also look into the changes in macroeconomic variables and international commodity prices as both has influence on futures prices before making their investment decision. An investor’s investment will be fruitful when he accounts all
these suggestions in his investment plan.

8.9 CONTRIBUTION TO THE POLICY MAKERS

The FMC was established as the governing authority of Indian commodity market in 1953 after the recommendation of A.D. Shroff Committee. The FMC was controlled by Ministry of Consumer Affairs, which did not give FMC the autonomous power to control the commodity market, thus, FMC did not turn up as an effective regulator for the market. The Indian commodity market saw a slow progress. Thus, in the union budget of 2015, the Finance Minister Arun Jaitley proposed the merger of FMC with SEBI to accelerate the commodity market. This resulted in SEBI becoming the Indian commodity market regulator from 28th September 2015 onwards. The present study of commodity futures efficiency would contribute to the regulators to know about the market performance. The bullion, metal and energy commodities showed efficiency in imbibing information from the commodity spot market, stock market, international market and macro-economic variables and also incorporating the futures market volatility information. This expresses the regulators to confidently propose new derivatives instrument that would make the bullion, metal and energy markets a competitive asset class. It would be easy for the regulator to govern the impact of new policies in an efficient market. Already SEBI has proposed for options trading in bullions and metals. As in the case of agricultural commodities, the market did not show complete efficiency. Hence, the regulator has to first make this market efficient after which development can be achieved.

8.10 FUTURE SCOPE OF RESEARCH

The present study has been limited only to the index constituent commodities of MCX-COMDEX and NCDEX-Dhaanya which keeps changing on rebalancing the indices. Hence extending the study with all traded commodities in the national exchanges will be worth whose result will reveal an in-depth pulse of the Indian commodity futures market. This will also help the traders of omitted commodities to make a better investment decision.
“To be a super-trader, you'll need an edge to overcome the laws of probability and the uncertainty of the marketplace. That edge comes from information flow, the ability to correct your habits in terms of the market's characteristics, and being able to take risks, cut losses, expand your information network, ferret out ideas, and take recommendations.”

- Trading to Win, Ari Kiev