CHAPTER 6

FINDINGS AND SUGGESTIONS

6.1 FINDINGS

In this chapter major findings of the study after doing statistical and econometric analysis have been highlighted. The analysis has taken into consideration 13 commodities in four segments. The selected commodities are Gold and Silver(Bullion Segment), Crude Oil WTI and Natural Gas (Energy Segment), Copper, Aluminium, Zinc, Lead and Nickel (Base Metal Segment), Cardamom, Mentha Oil, Crude Palm Oil and Cotton(Agricultural Commodities.) traded in MCX for the period 2007-17. The findings are presented objective wise and segment wise which have been compared with the earlier studies to find the concurrence or otherwise with the results of the study.

6.1.1MARKET BEHAVIOUR OF COMMODITIES MARKET

- In the bullion segment, the trend analysis revealed a similar pattern of movement in futures and spot market of commodities. The average future prices of commodities in bullion segment are found to be higher than spot market, indicating Contango which means that future spot price is anticipated to be more than current spot prices. The analysis of Coefficient of Variation and CAGR reveals that gold has performed better than silver market as the relative variance is low and the growth rate is high in gold market. The study concurs with the study of Peterson (2015).

- In energy segment, the trend analysis revealed that future and spot market move in similar manner. The average future prices of commodities in energy segment are more than spot prices indicating Contango which means that anticipated future spot prices are more than current spot prices. The coefficient of variation reveled that the natural gas is relatively more variable than crude oil. The CAGR reveled that both commodities have a negative growth rate during the period.

- In base metals segment, the trend analysis revealed that future and spot market move together. The average future prices of commodities in base metals segment are more than spot prices indicating Contango which means that anticipated future spot prices are more than current spot prices. The coefficient of variation reveals that Nickel is more variable than other commodities in the segment. The CAGR analysis revealed that zinc has more growth rate than other commodities. The nickel has found to have negative growth rate during the period.

- In the agricultural Commodities segment, the trend analysis revealed that future and spot prices of the commodities move together. The average future prices of all commodities in the segment except cardamom are found to be less than spot prices indicating backwardation indicating that future spot prices are anticipated to be less than current spot prices. The coefficient of variation reveals that mentha oil is more volatile than other commodities in the segment and cotton is the least volatile commodity in the segment. The CAGR analysis revealed that cardamom has highest growth rate than other commodities. The findings are in line with study of Chhajed &Mehta (2015).

6.1.2 IMPACT OF MACROECONOMIC INDICATORS ON COMMODITY MARKET

- Inflation is found to have a positive impact on Silver, Crude Oil, Natural Gas, Copper, Aluminium, Zinc, Nickel and Copper future prices. Thus it is found that investment in these commodities will act as a hedge against inflation.

- Exchange rate is found to have a negative impact on nickel and mentha oil futures prices.

6.1.3 PRICE DISCOVERY IN COMMODITIES MARKET

- In gold the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is more from future to spot than from spot to future. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, future prices leads and spot prices lags. Thus it is concluded that in gold market, a leading role of futures market can be found for price discovery.

- In Silver, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is more from future to spot than from spot to future. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, future prices leads and spot prices lags. Thus it is concluded that in Silver market, a leading role of futures market can be found for price discovery.

- In Crude oil, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is more from future to spot than from spot to future. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, future prices leads and spot prices lags. Thus it is concluded that in Crude oil market, a leading role of futures market can be found for price discovery.

- In Natural Gas, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is from future to spot and not from spot to future. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, future prices leads and

spot prices lags. Thus it is concluded that in Natural Gas market, price discovery is happening in futures market.

- In Copper, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is more from future to spot than from spot to future. The Wald test reveals that there is a short run causality running from future to spot is more than spot to future. The granger causality test reveals that in short run, lead lag relationship is more from future to spot than from spot to future. Thus it is concluded that in Copper market, a leading role of futures market can be found for price discovery.

- In Aluminium, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is more from future to spot than from spot to future. The Wald test reveals that there is a short run causality running from future to spot and not from spot to future. The granger causality test reveals that in short run, lead lag relationship is future to spot and not from spot to future. Thus it is concluded that in Aluminium market, a leading role of futures market can be found for price discovery.

- In Zinc, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is more from future to spot than from spot to future. The Wald test reveals that there is a short run causality running from future to spot is more than spot to future. The granger causality test reveals that in short run, lead lag relationship is future to spot more than spot to future. Thus it is concluded that in Zinc market, a leading role of futures market can be found for price discovery.

- In lead, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is future to spot than and not from spot to future. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, lead lag relationship is

unidirectional from future to spot. Thus it is concluded that in Lead market, the futures market does the price discovery function.

- In Nickel, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is future to spot than and not from spot to future. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, lead lag relationship is unidirectional from future to spot. Thus it is concluded that in Nickel market, the futures market does the price discovery function.

- In Cardamom, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is future to spot is marginally more than spot to future. But the magnitude of error correction is found to be low compared to other non agricultural commodities. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, lead lag relationship is unidirectional from future to spot. Thus it is concluded that in Cardamom market, the futures market does the price discovery function.

- In Mentha Oil, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium from spot to future is more than future to spot. But the magnitude of error correction is found to be low compared to other non agricultural commodities. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, lead lag relationship is unidirectional from future to spot. Thus it is concluded that in Mentha oil market, a leading role of spot market can be seen for price discovery in long run.

- In Crude Palm Oil, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium from spot to future and future to spot are almost the same. But the magnitude of error correction is found to be low compared to other non agricultural commodities. The Wald test reveals that there is a short run

causality running from future to spot and from spot to future. The granger causality test reveals that in short run, lead lag relationship is bidirectional but stronger from future to spot. Thus it is concluded that in Crude palm oil market, both future and spot are equally efficient in discovering prices in long run.

- In Cotton, the cointegration test reveals that there is long run equilibrium relationship between future and spot prices. The VECM test reveals that speed of adjustment towards equilibrium is future to spot is more than spot to future. But the magnitude of error correction is found to be low compared to other non agricultural commodities. The Wald test reveals that there is a short run causality running from future to spot. The granger causality test reveals that in short run, lead lag relationship is unidirectional from future to spot. Thus it is concluded that in Cotton market, the futures market does the price discovery function.

6.1.4 VOLATILITY SPILLOVER AMONG SPOT AND FUTURES COMMODITY MARKETS

- For Gold, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is no leverage effect in gold market. The volatility persistence is found to be more in future market of gold which means that volatility in future market takes longer time to die out than spot market of gold.

- For Silver, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is no leverage effect in Silver market. The volatility persistence is found to be more in future market of Silver which means that volatility in future market takes longer time to die out than spot market of Silver.

- For Crude Oil, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is leverage effect in Silver futures and spot market which confirms that bad news creates more volatility than good news. The volatility persistence is found to

be more in future market of Silver which means that volatility in future market takes longer time to die out than spot market of Silver.

- For Natural Gas, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is leverage effect in natural gas futures which confirms that bad news creates more volatility than good news in futures market of natural gas. The volatility persistence is found to be more in future market of Natural Gas which means that volatility in future market takes longer time to die out than spot market of Natural Gas.

- For Copper, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is leverage effect in Copper futures which confirms that bad news creates more volatility than good news in futures market of Copper. The volatility persistence is found to be more in future market of Copper which means that volatility in future market takes longer time to die out than spot market of Copper.

- For Aluminium, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is no leverage effect in Aluminium futures and spot market. The volatility persistence is found to be more in future market of Aluminum which means that volatility in future market takes longer time to die out than spot market of Aluminum.

- For Zinc, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is no leverage effect in Zinc futures and spot market. The volatility persistence is found to be more in future and spot market of Zinc which means that volatility in future market and spot market takes long time to die out.

- For Lead, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future

to spot. The result is in consistent with price discovery results. It was found that there is no leverage effect in Lead futures and spot market. The volatility persistence is found to be high in future and spot market of Lead which means that volatility in future and spot market takes longer time to die out.

- For Nickel, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is consistent with price discovery results. It was found that there is leverage effect in Nickel futures which confirms that bad news creates more volatility than good news in futures market of Nickel. The volatility persistence is found to be high in future and spot market of Nickel which means that volatility in future and spot market takes longer time to die out in Nickel market.

- For Cardamom, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from spot to future. The result is inconsistent with price discovery results which show the inefficiency in disseminating the price. It was found that there is leverage effect in Cardamom spot market which confirms that bad news creates more volatility than good news in spot market of Cardamom. The volatility persistence is found to be high in spot market of cardamom which means that volatility in spot market takes longer time to die out in Cardamom market.

- For Mentha Oil, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from spot to future market. The result is consistent with price discovery results. It was found that there is no leverage effect in Mentha oil futures and spot market. The volatility persistence is found to be more in spot market of Mentha oil which means that volatility in spot market takes long time to die out.

- For Crude Palm Oil, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from future to spot. The result is inconsistent with price discovery results which show the inefficiency in disseminating the price. It was found that there is leverage effect in Crude Palm oil future market which confirms that bad news creates more volatility than good news in future market of Crude Palm oil.

The volatility persistence is found to be high in future market of crude palm oil which means that volatility in future market takes longer time to die out in Crude palm oil market.

- For Cotton, the bi variate EGARCH model reveals that there is bidirectional volatility spillover from future and spot market with stronger spillover from spot to future. The result is inconsistent with price discovery results which show the inefficiency in disseminating the price. It was found that there is no leverage effect in cotton spot and future market of cotton. The volatility persistence is found to be high in spot and future market of cotton which means that volatility in spot and futures market takes longer time to die out in cotton market.

SUMMARY

The study analyses the price discovery and volatility spillover in Indian commodities market with special reference to MCX. The study revealed that for commodities like Gold, Silver, Crude oil, Natural Gas, Copper, Aluminium, Zinc, Lead, Nickel, Cardamom and cotton, a leading role of futures market can be seen in the price discovery process. In the case of Mentha Oil, Spot market is found to be efficient in the price discovery process. In the case of Crude Palm oil, both future and spot market are found to be equally efficient in the price discovery process. The volatility spillover results are consistent with the price discovery results except for cardamom. This shows the inefficiency in disseminating of future spot prices to the spot market of cardamom. The magnitude of correction in case of deviation from equilibrium is found to be lower in agricultural commodities compared to other commodities. The volatility persistence of spot market of agricultural commodities is also found to be higher than future market. This shows the inadequate market participation and inefficient price dissemination of agricultural commodities.

Further, the analysis of market behavior revealed that compared to all other commodities, gold have grown maximum during the selected period. The commodities in the energy segment have demonstrated a negative growth rate during the period. In the base metals segment all commodities except nickel have a positive growth rate. All the agricultural commodities exhibited a positive growth rate. The Contango backwardation analysis revealed that all commodities except Mentha oil, Crude Palm oil and cotton

exhibits Contango, which means that the anticipated future spot price is more than the current spot price. The backwardation of the Mentha oil, Crude Palm oil and cotton reveals the uncertainty of the farmers regarding the price movement because of which they lock the current price as high price in order to make sure the price is locked. The impact of selected macroeconomic indicators is analysed using multivariate step wise regression. The results show that increase in inflation causes an increase in prices of Silver, Crude Oil, Natural Gas, Copper, Aluminium, Zinc and Nickel future prices. Thus investment in these commodities can act as a hedge against inflation. An increase in exchange rate causes the price of Mentha oil and nickel to decrease.

6.2   SUGGESTIONS

The suggestions are given based on the findings of the study. From the analysis of commodity market, it is revealed that the lack of participation of investors has led to the inefficiency of agricultural futures market in enabling the price discovery process. The presence of high volatility persistence of spot markets in agricultural commodities is due to less participation of farmers in the commodity futures market trading. The findings also reveal that the presence of information asymmetry across spot markets, which have led to the inefficiency of futures market in discovering the price. Following measures are suggested to the farmers, investors and policy makers which will enable to increase the market participation in commodity futures market and reduce the information asymmetry which will enable the growth of commodity market in near future.

6.2.1 TO THE FARMERS

- It is suggested that farmers should participate more in future trading. This will enable them to take correct cropping decisions as to which product to sow in the coming season as they will be aware of what will be the future spot price by looking into the futures prices of the commodity. This will ensure them to get the correct price for their produce as they will be confident of what the future spot price will be so that they can plan their finances accordingly.
- The participation of farmers in futures market will help them to repay the loan promptly as this will act as insurance to the profit margin available to the farmers.

- Farmers are advised to get proper training in online commodity trading from authorized agents or NGOs which will enable them to understand the benefits of trading in commodity market.

- More farmers and agriculturists are suggested to use online portals such as e-NAM (Electronic National Agriculture Market) which is a single window service to provide information like commodity arrival and prices, buy and sell trade offers etc. By using portals like these farmers can reduce transaction costs and information asymmetry.

- Farmers who does not have storage capacity are advised to use futures market to speculate their positions on commodity market whereby, he can buy a position at futures market at the time of harvesting and sell it in spot market simultaneously thereby he can gain from the price increase in both future and spot market.

- Farmers are suggested to use commodity market whereby they can avoid the exploitation of commission agents or traders which will help them to realize the money for their produce fully as they are dealing directly with the buyers.

6.2.2 TO THE POLICY MAKERS

- The government should allow the participation of banks in commodity trading as they will help to increase the participation of small investors in commodity trading.

- By allowing banks to participate in commodity market, it can give credit facilities to both agriculture and non agriculture sectors by hedging thereby reducing nonperforming assets.

- The large network of banks can also be used to disseminate information about spot and future prices of commodities in local languages which will help in financial inclusion and also improve awareness of farmers regarding commodity market and the future prices of the commodities.

- Many new products relating to commodity markets can be introduced by the government such as warehouse receipt financing, weather derivatives, freight derivatives etc which will greatly help in development of commodity markets.

- The existing infrastructure and facilities like ware houses and communication systems need to be updated which will further improve the development of commodity market.

- The growth of the commodity market can be further improved by the participation of mutual funds and insurance agencies as these will ensure the participation of retail investors in commodity market.

- The integration of commodity market and securities market is suggested which will help in the participation of more investors and thereby increasing trading volumes. It will also provide liquidity to the market which is important for the growth of both markets.

- Commodity specific exchanges like IPSTA should be given international status as these commodities are dealing with commodities which are highly export oriented. This will help to increase the volume of trade in these specific commodities.

- Reducing government interventions in fixing the price of the commodities will help to boost the confidence of investors as such interventions creates financial loss to the investors. The prices should be allowed to get fixed according to demand and supply conditions.

- It is suggested to introduce options contracts for commodities in agricultural commodities which would be beneficial to farmers.

- Tax benefits which are given in trading in equities market should be extended to commodity market which will further help in increasing participation in commodities market.

- The contract specifications should be made uniform across the exchanges which will help to ensure that the price remains the same across exchanges.

- Currently the minimum lot size fixed for agricultural commodities are very high which restrict the participation of small farmers and traders. It is suggested that the authorities should launch micro and mini contracts of agricultural commodities which will help in the participation of small farmers and traders.

- Warehouse receipts should be standardized which will help in setting standards for grading of commodities, packing storing and preservation. This will help in getting credits from the banks by pledging warehouse receipts.

- The findings of cardamom market show that even though the price discovery is happening in futures market, the volatility spillover is more from spot to future market. One of the reasons for this because of information asymmetry between spot and futures market. This can be reduced if the spot markets are integrated and are connected with good communication systems.

- The findings suggest that in some agricultural commodities are not efficient in discovering the price. This is due to the less participation of farmers in commodity market. The farmers should be educated about the advantages of trading in commodity market and they should be provided training for trading in the markets through authorized people.

- The study reveals that volatility persistence is more in spot market of agricultural commodities than the futures market. This shows the inefficiency of futures market in these commodities. It is suggested that steps should be taken to increase the participation of investors in futures market which will improve the price discovery and there by realizing better prices for the products.

6.2.3 TO THE INVESTORS

- Before investing in commodity market, the investors are suggested to have a thorough understanding of the commodity market which will help in avoiding losses in their trading.

- It is suggested that more Indian Corporations participate in Commodity Trading which will help them to remove the uncertainty of raw material prices which will ultimately help to control production costs.

- The retail investors are advised to include commodities in their portfolio as it act as a hedge against inflation and unfavorable stock market conditions.

- It is suggested that the investors should analyse the current market conditions and check whether the market is in Contango or backwardation to formulate the decision of entry or exit in the market.

- The exporters can use commodity market to understand in advance what would be the price prevailing in future which will help them to quote realistic price and thereby securing export contract in competitive market.

- High net worth individuals should also consider investing in commodities market as a part of their overall asset allocation.

- The study revealed that future and spot market are integrated in long run. This provides many hedging opportunities for investors by taking position in one market and offsetting it with an opposite position in other market.

- The study revealed that any shock in future market is transmitted to spot market. So the investors can take the futures market as a guide to understand the spot market price thereby making trading strategies which will help them to get profit from spot market.

- The study revealed that both future and spot market are moving together in long run. Thus before taking position in one market the investors should understand the movement in other market along with other factors to avoid any risk.

- The bi directional relationship in commodities spot and future market provides opportunity for arbitrage. The investors can use this to maximize the return.

- As the futures and spot market are integrated in long run, and give almost same return in long run, the investors can take investment either of the market based on the convenience of the investor.

- The investors are advised to invest for a longer period of time as it will help to stabilize the return.