CHAPTER – 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

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2.1 INTRODUCTION

Commodity derivatives play a pivotal role in the price risk management process especially in any agricultural surplus country like India. Although there have been a number of studies that have analyzed efficiency markets of commodity in developed countries, similar concerns have been expressed in India as well. Various literatures are made available emphasizing the importance of Futures Markets for Price Discovery and Price Risk Management. The whole literature reviewed has been classified into the following categories: Reviews on Overview of Commodity Markets, Reviews on Price Discovery, Reviews on Price Relationship, Reviews on Price Volatility and Reviews on Farmers Perception.

Masahiro Kawai (1983)\(^1\) investigated the price determination process of storable commodities by explicitly taking into account that, the introduction of a futures market alters the decision-making procedure of individual optimizing agents. The study analyzed the optimizing behavior of agents, who produce and trade storable commodities in the absence or presence of opportunities for futures contracting and derived a set of individual supply and demand functions under price uncertainty and risk aversion which enables to understand how activities of production and inventory holding should be modified as a consequence of introducing futures markets and the role played by futures market in transferring price risk from hedgers to speculators. The futures market also provides another important facility for distributing commodity demand and supply from one period to the next and hence, may have
a potential to reduce price fluctuations over time. Thus the existence of a futures market may extend the scope of successful price stabilization through government intervention.

Christophe Chassard (1987)² evaluated the main determinants of option premiums emphasizing the differences between futures and option contracts and apply the Black and Scholes formula to the Phibro proposal. The results revealed that the Phibro proposal failed to anticipate future price volatility correctly and tried to give some insight on how option contracts may complement futures contracts and how the development of this kind of instrument may complement the NYMEX options or futures contracts.

Thomas P. Zacharias, Mark D. Lange, William J. Gleason, and Harlon D. Traylor (1987)³ examined the farm level cross-hedging of rough rice in Louisiana using futures prices established on the Chicago Board of Trade for the September soft red winter wheat contract. Four selected pre-harvest cross-hedging dates are compared with harvest pricing of rice. Chicago market was selected primarily due to its trade volume and actual delivery is not possible in cross-hedging. The results revealed that Comparison of the cross-hedge decision with harvest pricing serves as a basis for determining the potential feasibility of cross-hedging in relation to other marketing strategies. The applicability of cross hedging to the farm situation is further tested by incorporating yield risk and futures transactions costs

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and the results further established that farm-level cross-hedging can be considered a viable marketing alternative. Future efforts could compare cross-hedging with various farmer-owned storage policies and allow for sequential or multiple cross-hedging at the farm-level.

Anthony E. Bopp and George M. Lady October (1991) analyzed the relative significance of energy futures prices compared to energy spot prices as predictors of cash prices in the future and compares the use of futures and lagged spot prices as explanatory variables in forecasting models. The results indicated that the predictive significance of each series is found to be the same when deseasonalized data is employed, but when actual prices are employed, futures prices correctly anticipate the observed seasonal pattern. Spot prices were found to provide essentially the same forecasting significance as futures prices and revealed that futures prices correctly anticipated the seasonal pattern in the spot prices and that both the futures and spot series provided superior explanatory power if adjusted to embody the forward seasonal component appropriate to the actual price being forecast. The results also indicate that either the spot or futures can be the superior forecasting variable depending upon market conditions and that futures prices are equal to the known spot price plus the notion of the cost of carrying a good into the future. Moreover the findings also states that to forecast tomorrow’s price, today’s cash price does as well as today’s futures price for tomorrow.

PREM Notes (1999) attempts to state what governments and donors can do to develop markets that ameliorate commodity price volatility as commodity price volatility affects governments, producers, processors, traders and local financial institutions.

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The study reveals that early attempts that dealt with commodity price volatility tried to stabilize prices with buffer funds, buffer stocks, international commodity agreements, or government intervention in commodity markets but failed to stabilize commodity prices and the policymakers emphasized programs using market instruments that dealt with uncertainty. Though limited know-how, lack of transparent local reference prices, problems of scale still remain as important barriers market-based commodity risk management instruments have become more popular with several private sector participants, state-owned companies, and developing country governments using commodity derivatives markets to hedge their commodity price risks aided by the globalization of commodity markets, market liberalization and lower trade and capital barriers. The study also states that though several international organizations offer general technical assistance to build the risk management skills of policy makers and market participants, the providers of risk management instruments states that producers, traders and processors in many developing countries cannot overcome their low credit ratings and lack of collateral for hedging transactions. Granting a special legal status to standardized warehouse receipt to serve as a transferable instrument is a more sophisticated way to overcome these difficulties. Moreover developing country producers also face fewer hurdles in accessing risk markets though local banks, warehouse companies can provide a distribution network for risk management products because the scale of supporting financial sectors are often weak and making these instruments available to small producers will require establishing a system that allows the aggregation of price risks from many small producers so they can be hedged in international markets. Basis risk also arises when local prices do not move in line with prices in international markets which is more of an issue for agricultural commodities than for metal and energy. Many developing countries have been pursuing commodity market liberalization, which has created opportunities for using risk management instruments by improving local price discovery and more closely
linking domestic and international prices. Thus developing countries should put special emphasis on establishing such systems to improve the dissemination of price information.

Morgan, C.W. (2000)\textsuperscript{6} in his paper examined past and current policy attempts to provide a background to the more general issue of development and growth in less developed countries to reduce the effects of price volatility in primary commodity markets. The problem for LDCs is that in many cases they are both producer and consumer and thus face significant difficulties, especially in terms of raising foreign exchange earnings and hence promoting growth. Appropriate and easily usable policy instruments could be deployed to remove these risks. Given the paucity of policy options and the constraints imposed by macroeconomic policies the World Bank devised a programme that market-based mechanisms can bestow benefits on traders with an institution to overcome the significant problems that prevent LDCs from trading on futures markets and gaining these benefits. The matching of a practical proposal with a theoretical ideal is the main plank of their policy. The success of the intermediary scheme lies in the ability of the institution to persuade LDC governments and that the traders are being offered a realistic, low-cost and relatively risk free chance to cover some of their price risks and if the pilot scheme is successful then there is a clear opportunity for commodity market policy to be transformed radically from its original interventionist roots. In doing so, it could provide the type of mechanism that would generate benefits for many producers in many countries. More recently the exchanges are more generally viewed as providers of insurance and disseminators of price information, thus providing a forum for both hedgers and speculators to carry out their activities.


Sahadevan, K.G. (2002)\textsuperscript{7} evaluated the efficiency of recognized exchanges in price discovery, their organizational, trading and regulatory set up for futures trading in commodities along with the interrelationship between prices, volume of transaction, open positions and volatility of the markets. The results on price discovery revealed that the futures market are not efficient and the futures prices are not an unbiased predictor of the future ready rates. The analysis of the relationship between price return, volume, market depth and volatility shows that the return and volatility of futures as well as ready markets does not influence the market volume and depth and the price volatility in the ready markets does not have any impacts on the market conditions in futures markets. The exchange specific problems like low volume and market depth, lack of participation of trading members and irregular trading activities along with state intervention in many commodity markets are major ills retarding the growth of futures market calls for more focused and pragmatic approach from government, the regulator and the exchanges for making the agricultural futures markets a vibrant segment for risk management which can play an important role especially in an agriculture dominated economy of India.

Hany A. Shawky, Achla Marathe, Christopher L.Barrett (2003)\textsuperscript{8} investigated the empirical relationship between spot and futures electricity prices traded on the New York Mercantile Exchange and delivered at the California-Oregon border. The results indicated that the behavior of the electricity market is broadly consistent with efficient markets. However, because of the unique features of electricity as a non storable commodity and the relatively few players on the generation and wholesale demand sides of the market the study

found that electricity futures are significantly different than for other standard commodities with respect to estimates of futures premium and hedge ratios and a large premium may be required to bring equilibrium to a futures market where supply and demand conditions are so volatile as a result of which it suffers from limited industry-outsider participation and thus may not be sufficiently integrated with the broader financial markets. Moreover the price volatility in the spot market is typically many times higher than the price volatility in the futures market. The results also revealed that positive shocks to spot prices have significantly more impact on both current and future values of electricity than shocks to futures prices. Moreover shocks to both spot and futures returns appear to be relatively short-lived before they converge to their long-run equilibrium.

Susan Thomas (2003) analysed the possible barriers to increasing the volumes traded at one of the more successful commodities futures markets, the Vijai Beopar Chambers Ltd along with a big jiggery spot market at Muzaffarnagar in India. The study recommended a better system for collection and dissemination of prices or a design for better governance at the exchange to improve the liquidity on VBCL. The study stated the processes and systems as major issue for controlling systemic risk arising from counterparty default and the current barriers to entry to trading on the floor based on social networks should be changed. The study also recommended that committees should be replaced by rules that are legally binding wherever possible and the arbitration should be done by third parties who are not exchange members but rather are professionals from the field of finance and encourage a move towards less member involvement in the management and operation of the exchange.

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suggesting FMC to refocus its role from controlling the details of operations to researching and addressing broader level issues, while the existence of well-established, transparent and liquid futures market can be used by financial institutions to better manage their exposure to the agricultural sector, and offer innovative products to farmers.

Chakariya Bowman & Aasim M. Husain (2004) aimed to assess the accuracy of alternative price forecasts for 15 primary commodities, six industrial metals (Aluminium, copper, lead, nickel, tin and zinc) and Nine agricultural items (Wheat, maize, soybeans, soybean meal, soybean oil, sugar, cotton, coffee-other milds, and coffee-robusta) took into consideration three types of commodity price forecasts, those based on judgement, those relying exclusively on historical price data, and those incorporating prices implied by commodity futures. The spot and futures prices appear to be non stationary and form a cointegration relation for most of commodities. The spot prices tend to move toward futures prices over the long run, and error correction models exploiting this feature produce more accurate forecasts. The analysis indicated that although judgmental forecasts tend to outperform the model-based forecasts over short horizons for several commodities, futures-based models yield better forecasts than historical-data-based models or judgement, especially at longer horizons. Although there is considerable comovement between spot and futures prices, futures prices tend to exhibit less variability than spot prices acting as an anchor for spot prices, and error correction models that exploit the long-run cointegrating relationship provide better forecasts of future spot-price developments. The results also suggested that futures prices can provide reasonable guidance about likely developments in spot prices over the longer term as the incorporation of futures prices in an error-correction framework yields superior forecast performance for most of the commodities.

The predictive capacity of the models may also be enhanced by incorporating variables capturing the demand for individual commodities, and by pooling forecasts generated by various alternative statistical models or by employing more sophisticated time series techniques.

Robert S. Pindyck (2004)\textsuperscript{11} examined the short-run dynamics of commodity prices and inventories, focusing on the behavior and role of volatility, in case of crude oil, heating oil and gasoline and revealed how changes in volatility affect spot prices, futures prices and inventories and measured the magnitude of these effects. The study found that changes in volatility do influence market variables in case of heating oil, although the effects are not large and the results fit the theory of commodity price dynamics very well, whereas the results are less clear cut for crude oil and gasoline due to use of a quadratic approximation. The study also stated that accounting for changes in volatility can explain changes in the spot-futures spread, but not changes in the spot price itself. Though changes in market variables may affect production decisions more slowly than can be captured by the weekly differences, market variables do little to explain the behavior of volatility and price variation may be partly the result of speculative noise trading or herd behavior rather than fundamentals.


Worthington, Andrew and Higgs, Helen (2004)\textsuperscript{12} examined the relationship between futures and spot electricity prices for two of the Australian electricity regions in the National Electricity Market, namely, New South Wales and Victoria during the period 1999 to 2001 and used GARCH model to identify the magnitude and significance of mean and volatility spillovers from the futures market to the spot market. The results confirm that Australian electricity spot prices are stationary and indicated the presence of positive mean spillovers in the NSW market for peak and off-peak futures contracts and mean spillovers for the off-peak Victorian futures market. Suggesting that spot electricity prices could be usefully forecasted using lagged price information from the futures market.

Julie Dana (2005)\textsuperscript{13} presents a technical framework for the management of commodity price risks. The study reveals that thorough risk assessment is an important first step in analyzing the problems of price volatility at macro, meso, and micro-levels with a need to differentiate between direct and indirect price risks and then to look at impacts for all actors in the commodity chain. The study also states that commodity risks are severe in developing countries, and are felt not only by producers, but throughout the trading chain and is possible to bridge the market gap between developed world markets for risk management and developing country organizations that need the products and services by providing training and education that enables implementation of commercially-based risk management. Providers view risk management training and education as a vital precondition which supports their ability to enter new and emerging markets. Attempts to market risk management products directly at smallholder producers have not proven to be viable because of price setting policies of market intermediaries, small production.


\textsuperscript{13} Please purchase PDF Split-Merge on www.verypdf.com to remove this watermark.
The most fundamental of the prerequisites for successful implementation, is that the institution involved must have a strong commercial incentive to improve risk management practices. This interest should be expressed by a willingness to meet external project assistance with time and resources to jointly invest in the work. Governments and policy makers also need to know about the choices, policies and instruments that would facilitate better risk management at the commercial value. Solutions should be broad enough to encompass a range of products, commercial activities and responses to risk.

**Menzie D. Chinn, Michael LeBlanc, Oliver Coibion (2005)** examined whether futures prices are an unbiased and or accurate predictor of subsequent spot prices and the relationship between spot and futures prices for energy commodities, crude oil, gasoline, heating oil markets and natural gas. The results found that futures prices are unbiased predictors of future spot prices in petroleum, gasoline and heating oil markets, with the exception in natural gas markets as natural gas futures prices are a biased predictor of subsequent spot prices. Moreover futures do not appear to predict well subsequent movements in energy commodity prices, although they slightly outperform time series models and natural gas futures appear to be a slightly more successful predictor of future spot prices, especially at the longer horizon.

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Nitesh Ranjan (2005) attempted to test the relationship between spot and futures prices of Refined Soya bean Oil and to seek whether commodity exchanges can bring about price stabilization in agricultural commodities. The study established active futures trading along with reduced seasonal price variations with the introduction of futures in Soy oil at the commodity exchanges. The lead and lag relationship between futures prices and ready market price for soya oil deduced that futures prices influence daily market prices to a greater level helping to determine the daily spot price stating that futures and spot prices of Soy oil move in tandem and observed that futures trading in Soya bean oil have reduced variation in its daily ready prices. The study stated that Increase in yield during the years of futures trading was due to the newer technology adopted, but cannot be established that the use of technology for yield augmentation is the outcome of futures trading which do not truly reflect the sowing decisions. The study also suggested that product standardization is one of the prerequisite for futures trading which are likely to reduce transaction cost, counter-party risks and risks inherent in the fluctuations in commodity prices and that the Indian commodities market move towards the process of product standardization, framing apt regulatory mechanisms but need to improve further the basic infrastructure for fully utilizing the potential of commodity futures market. Moreover futures trading in Soya oil is a recent phenomenon and its true impact on factors like production and technology would be felt only after a few more years.

Yang, J., Balyeat R.B., & Leatham, D.J.(2005) examined the lead-lag relationship between futures trading volume and open interest and cash price volatility for seven major agricultural commodities Corn, soybeans, Sugar, Wheat, Cotton, Hog and Cattle.

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15. Nitesh Ranjan (2005), “Role Of Commodity Exchanges, Futures & Options (A Case Study On Soya Oil), Occasional Paper -46, Department of Economic Analysis and Research, NABARD.
The results show that an unexpected increase in futures trading volume uni-directionally causes an increase in cash price volatility for all seven commodities in both sub-periods, except for hogs in the first sub-period and soybeans in the second sub-period. With respect to the lead-lag relationship between cash price volatility and open interest, it was found that only a unidirectional causality pattern exists for some commodities and the direction of causality varies, as unexpected open interest uni-directionally causes cash price volatility for corn and hogs while cash price volatility uni-directionally causes unexpected open interest for sugar, soybeans and cotton in the first sub-period. In the second sub-period, unexpected open interest uni-directionally causes cash price volatility for cotton and live cattle, while cash price volatility uni-directionally causes unexpected open interest for soybeans and wheat.

Asani Sarkar (2006)\textsuperscript{17} In his study on Indian derivative markets found that the Indian market has equalled or exceeded many other regional markets, while the growth is being spearheaded mainly by retail investors, private sector institutions and large corporations, smaller companies and state-owned institutions are gradually getting into the act. As Indian derivatives markets grow more sophisticated, greater investor awareness will become essential. Institutions in addition, will need to devote more resources to develop the business processes and technology necessary for derivative trading. Thus further regulatory reform will help the markets grow faster.


Euna Shim (2006) analysed how some developing countries like India, South Africa, Malaysia, Brazil, Argentina, Indonesia and Thailand succeeded in launching local exchanges and contracts in agricultural commodities competing against highly liquid international exchanges in countries. The results found that presence of sufficiently large domestic market followed by development of financial intermediaries, institutional arrangements and presence of committed actors along with a contract with an underlying product significantly different from existing ones or with a large basis risk are the most important success factors. The results also found that agricultural commodities futures markets are better positioned to launch a new contract owing to the low value-weight ratio of agricultural products with liquidity being the most important factor characterizing futures market operations and specifics associated with futures contracts, largely determined the successful launching and maintenance of futures markets. Macroeconomic stability and government regulations that are favourable to futures trading were almost prerequisites for successful local futures exchanges. Presence of well-established financial intermediaries that can readily avail futures contracts to potential users, was another critical factor in determining the success of the agricultural futures markets. Committed actors, export-orientation, and a low level of industry vertical integration were able to complement the establishment of agricultural futures markets in developing countries.

Fu Liu Qing & Qing Zhang Jin, May (2006)\textsuperscript{19} in their article examined the price discovery process and volatility spillovers for copper, aluminum, soybean, rubber and wheat in Chinese spot-futures markets. The results indicate the evidence of long-run equilibrium relationships and significant bidirectional information flows between spot and futures markets in China, with futures being dominant. The volatility spillovers from futures to spot are more significant than the other way around, although innovations in one market can predict the futures volatility in another market. The copper, aluminum and soybean markets are more efficient than the rubber and wheat markets in price discovery suggesting that price discovery mainly concentrates on the futures market in Chinese commodity market. The results also shows that spillovers from futures to spot are more significant than the reverse direction. Thus futures is more informationally efficient than the underlying spot market confirming that Chinese commodity futures markets already have the basic price discovery and hedging functions, and the ability in discovery is being enhanced with the development of Chinese futures market.

Gaurav Raizada, Gurpreet Singh Sahi (2006)\textsuperscript{20} analysed the efficiency of commodity futures specifically in wheat traded at National Commodity & Derivatives Exchange Ltd and its effect on social welfare and inflation in the economy. The results of the study stated that it is not even weakly efficient in the short term with spot leading the futures price determination and that futures market are not performing their main role of allowing for price discovery indicating a poor price discovery process as well. The study also revealed that the commodity

trade volumes and money supply has significant impact on inflation which is persistent as it depends on its past values. The inflationary effects of commodity futures markets provides significant results and can be stated that the maturity of commodity futures markets in times to come will allow for efficient price discovery and reducing the inflationary impact on economy as well.

Loraine Ronchi (2006) evaluated the role of fair-trade in overcoming the market factors limiting producer returns as the market share of Fair trade coffee grows in importance and its intervention in commodity markets is of increasing interest. The results stated that failure of market power and low producer capacity in coffee markets in LDCs are identified as underlying causes of the low share of coffee returns faced by producers suggesting that producers selling to vertically integrated, multinational coffee mills face lower producer price mark-downs compared with domestically owned non-cooperative mills and the role of fair trade in these respects is found effective. The study revealed that fair trade mills also improve farmers’ returns through improved efficiency of their organizations and its support for co-operatives in mitigating market power is found not to be misplaced in Costa Rica.

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Randy Schnepf (2006) provided a general description of price determination in major U.S. agricultural commodity markets for wheat, rice, corn, soybeans and cotton. This report focuses on the major factors affecting price formation as all are actively traded on at least one of the major commodity futures exchanges which facilitates hedging and forward contracting, indirectly linking their prices across markets. Factors playing a vital role in determining the price suggest that wheat market structure has greater supply and demand elasticity than most other field crops, as wheat supply and demand respond faster than the supply and demand of other grains when confronted with some external shocks. The price sensitivity of wheat feeding and government export programs, coupled with the opportunity for U.S. spring wheat growers and southern hemisphere producers to respond to northern hemisphere winter wheat conditions, provides an important stabilizing effect on U.S. wheat market prices in the face of variable world demand. US is among the world’s leading rice exporting nations, the very limited amount of rice entering world markets relative to the large level of annual world consumption makes the international rice market fairly sensitive to an unexpected production shortfall in one of the major exporting or consuming countries. In case of cotton local and international market conditions for substitutes play a role in U.S. and international cotton price formation. Thus, new market information alter the expectations of market participants and lead to a new equilibrium price as sellers revise their offer prices and buyers revise their purchase bids based on the new information.

Baskara, M. (2007) analysed the relationship between spot and futures prices of the selected agricultural commodities randomly selected from among cereals, pulses, oilseeds, spices and plantation crops. They were wheat, maize and rice, among cereals urad, channa

and tur, among pulses RBD palm oil, soya oil and groundnut oil among oils, pepper, chilli and jeera among spices and rubber, cashew and coffee among plantation crops traded in national level commodity exchanges to examine whether the futures market is integrated with the spot market. The cointegration of spot and futures markets could be established only for NCDEX futures markets for channa, MCX futures and spot markets for maize, NMCE futures, NCDEX futures and spot market for soya oil. The study also analysed the share of agricultural commodities traded across national level commodity exchanges in India. In case of volume of cereals traded in national level commodity exchanges for wheat, NCDEX retained top position of total trade in national exchanges followed by MCX and NMCE. NCDEX continued to have a larger share than MCX in the total quantity of maize traded in the national exchanges. In case of Cereals the overall share of NCDEX was high for wheat and maize and in case of rice the share of MCX was maximum followed by NMCE. In case of pulses NCDEX had a major share in the total quantity traded on the three national exchanges. With regard to the futures trade in oils MCX topped among the three exchanges in respect of RBD palm oil, the share of NMCE was maximum in respect of refined soya oil and ground nut oil. In case of spices NCDEX had maximum share in respect of pepper while Chilli & Jeera was traded on larger quantity in NCDEX. The future trade in cashew occurred only in MCX which accounted for full trade on national exchanges. Whereas NMCE had distinctly larger quantity of trade in rubber and NMCE accounted for the best regarding coffee. The study also identified the handicaps perceived by the members/brokerage houses and their clients in futures trading. The major problem faced by members were lack of technical staff in back office and front office, inadequate infrastructure facility, hurdles in clearing, settlement and delivery and that of clients were volatility in price along with difficulties in predicting future market trend.

Berg, Ann E. (2007) examined the role of futures contracts as risk management tools for producers in potatoes, mentha oil, and cardamom. The analysis states that many farmers are either unaware of futures or paying limited attention to them as they often lack hedgeable quantities, sufficient capital to withstand margin calls, or requisite patience for account paperwork. The farmers aware of futures markets declared that commodity futures exchange prices are better than physical market prices and strongly favour physical delivery suggesting that aggregators such as cooperatives can better provide farmers with hedging and risk mitigation capabilities by pooling purchases and passing on pricing efficiencies to farmers. The results indicate that mentha oil having a more transparent and organized markets facilitates income benefits for the farmer and distiller thereby transforming Indian farming and the Cardamom farmers have been more willing to use futures, as it has conferred multiple benefits like spot price stabilization, higher prices, quality assurance and lower payments to intermediaries. The results also shed light on the benefits including improvements in marketing alternatives, price stability, to producers, other value chain participants, and income increases for farmers enhancing agricultural infrastructure in addition through expanded warehousing and reliable grading, which has reduced distressed selling and improved the quality and consistency of the commodities.

Bharat Ramaswami & Jatinder Bir Singh (2007) examined the exceptional success of the soya oil contract at the National Board of Trade and the impact of soya oil imports on the basis. The study found that trading volumes at the NBOT soya oil contract at Indore have grown rapidly relative to the change in supplies and in open interest suggesting a growth in speculative trading along with offering opportunities to short and long hedgers to construct riskless profit-earning trading strategies. The one count on which the NBOT falls short is that the contracts for trading are open for a shorter period of three months or less.

The study stated that soya oil imports exercise a significant impact on the basis providing enough short-term volatility to make the contract attractive to both hedgers and speculators and the impact varies with the extent of supplies that come from domestic production attracting hedging interest from commercial firms. The study also found that enforcement of contract is costly like in many developing countries in India whereas the institutional mechanisms of futures exchanges are attractive allowing agents to transact without costly verification of personal histories and without being tied to long-term bilateral deals is therefore conceivable that the development of futures exchanges could precede that of spot markets in developing countries. The study also stated that the success of soya oil is exceptional as against the failure of contracts in soyabean and soyameal and the inability to hedge soyabean and soyameal positions would also have limited the interest and capacity of domestic oil crushers to participate in the soya oil futures contract. Despite this, the soya oil contract has been liquid which underscores that imports have ensured a full marketing season for soya oil. Although imports reduce seasonality, they increase short term volatility because of the sensitivity of soya oil prices to world prices. Imports driven hedging has drawn traders from consuming regions spread across the country.

Isabel Figuerola- Ferretti and Jesus Gonzalo (2007)\textsuperscript{26} attempted to measure the phenomenon of price discovery in London Metal Exchange for, Aluminum, Copper, Lead, nickel and zinc by demonstrating the existence of a perfect link between an extended GS theoretical model and the PT decomposition. The study revealed that the proposed equilibrium model implies co-integration admitting an Error Correction Representation characterizing the price discovery process in commodity markets, where the linear combination depends on the elasticity of arbitrage services and is determined by the liquidity traded in spot and the futures market. This result not only offered a theoretical justification for the PT decomposition, but also provides a simple way of detecting which of the two prices is dominant in the price discovery process by applying it directly to London Metal Exchange data as they have highly developed future contracts. The study also stated that the future price is information dominant for all metals aluminum, copper, nickel and zinc with a liquid future markets whereas the spot price is information dominant for Lead with the least liquid contract and all markets with the exception of copper are backwarded in equilibrium.

Lokare, S.M. (2007)\textsuperscript{27} endeavours to test the efficacy and performance of commodity derivatives in steering the price risk management. The results show that the total value of commodity derivatives trading accounts for about 2/3 of overall GDP, reflecting the extent of depth this market has gained in the economy. The value of agricultural commodities traded is more in the country while the share of bullion, oil and other metals is relatively low. The liquidity in respect of primary commodities was found to be high only in few commodities such as castor seed, soyabean oil and to some extent cotton while in the case of others, it was

thin. The contracts of most of the commodities pepper, mustard and gur throw a strong evidence of co-integration between the spot and future prices, only sugar and nickel did not throw any evidence of co-integration. Thus trading in the commodity derivatives is moving in the desired direction of achieving improved operational efficiency but at a slower pace. In terms of volatility, variability in future price was substantially lower than the spot price, reflecting thereby an inefficient utilization of information in the market. An analytics of effectiveness of these markets in terms of their function of price risk management divulges that basis risk in respect of certain commodities was low and hence hedging in their case proved to be an effective proposition. In case of several others the risk was moderate, the basis risk was considerably high in respect of gur, mustard, wheat, sugar, cotton, sunflower oil, lead, copper and tin indicaing that hedging in their case was less effective. It was also found that some of the older exchanges have not been able to generate resources and not flexible to introduce the reforms. Several measures are warranted for the rapid development of these markets in the country.

Sahadevan, K.G. (2007) evaluated the benefits of futures of potato and menthe in terms of mitigating the market risk of various players in the entire supply chain and of improving price realization. The study also examined the potentials of potato and menthe for introducing futures along with the advantages of on-line trading in terms of reach, access, transparency, and price discovery. The results of the study stated that the farmers are exposed to many uncertainties with regard to production as it is highly sensitive to weather conditions and other extraneous factors, while price realization greatly depends on the farmer’s financial position. However, farmers often fail to realize profitable price primarily due to inadequate formal marketing facilities and lack of collateral credit availabilities from formal sources.

The study revealed that spot markets in potato as well as menthe oil showed substantial improvements in terms of increased price realization, suggesting that market potential in these commodities for futures trade is increasing during the period especially after the introduction of futures and are therefore indirectly benefited from the futures markets. The study also suggested that farmer’s organizations in addition to improving the supply chain can also ensure indirect participation of small farmers in futures markets stating that commodity exchanges have a crucial role to play in developing a sound warehousing and collateral financing system.

Dr. Alok Kumar Mishra (2008) investigated the present status, growth constraints and developmental policy alternatives for commodity futures markets in India, identified 23 commodity exchanges considering MCX, MCDEX, NMCE as national level exchanges trading around 146 commodities. The study identified that warehousing finance, warehousing receipts and the integration of regional and national level of exchanges are the major bottlenecks faced by the exchanges. The study also attempted to examine whether commodity future can be considered as a unique diversifying agents to the equity portfolio by considering Sensex as the proxy for the equity portfolio and MCX COMDEX representing the commodity futures index and three categories of commodity futures such as MCX Metal, MCX Energy and MCX Agriculture and indicated that adding a small portion of commodity futures in the portfolio considerably improves the risk-adjusted return, except for MCX Energy futures with its very low return, very high volatility and unfair reward for risk other commodity futures have enhanced risk-adjusted returns when added to a pure-equity diversified portfolio suggesting that commodity futures are effective tools for portfolio

diversification and that best diversification is achieved with MCX Agri futures. They are also the perfect candidates for reducing downside risks as commodities have the ability to react favourably during economic downturns or macro economic conditions unfavourable to equities stating that commodity derivatives play a pivotal role in the price-risk management process especially in any agricultural surplus country.

**Cardinal Edge Management Services (P) ltd (2008)** evaluated the efficacy of commodities futures for farmers participation in commodity derivatives trading for cotton in Surendranagar. The study found that the procedural hurdles serve as a regulatory constraint, while uncertainty of government interventions act as a dissuading influence on genuine market participants and weakens the free-market behavior of commodity markets necessitating the presence of institutional entities which can act as technical support providers for farmer’s participation on commodity exchanges. The study also suggested that various facilitating agencies have to play an instrumental role for ensuring convergence between the available instruments and the farmers’ requirement with due safeguards for protecting the interests of both stakeholders, providing long term financial, technical and capacity-building support to the farmers for meeting the deliverables and benchmarks agreed and ensuring long term linkages with cotton industry for standardization of production and market operations.

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Chiung Chiao Chang & Yen Hsien Lee (2008) employed the threshold error-correction model to investigate the asymmetric causal relationship between spot and futures in Taiwan futures market by using the intraday data running from January 2001 to May 2005. The results found the existence of threshold co-integration and a bidirectional feedback causality relationship between spot and futures markets both in the short-run and long run along with asymmetric price transmissions between these two markets in the long run. The results were consistent with the asymmetric error-correction model in the spot market and stated that the negative deviations have a significant effect on the dynamic relationship between spot and futures prices, indicating the effect of arbitrage activity on the basis. However, a positive deviation having no significant effect on the spot price implies that the presence of short selling constraints limits reverse arbitrage.

Golaka C Nath & Thulasamma Lingareddy (2008) analysed the impact of futures trading in three important commodities urad, gram, wheat which were banned by the government from trading in futures and their impact on spot prices and tried to find if the seasonal/cyclical fluctuations in these commodities prices were affected by the introduction of futures. The findings state that future trading in the selected commodities had apparently led to increase in price of commodities like urad but not for other commodities. However, the introduction of futures in selected commodities have not helped in reducing seasonal/cyclical fluctuations in prices but have increased the volatilities in the spot market for some of the commodities. To find the impact of futures trading on price volatilities, the study period was divided into three distinct phases PI-covers prior to futures trading, PII-covers futures trading

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in all the three commodities, PIII – covers post ban period. The results indicated that the prices of urad, gram and pulses have increased in the period when futures trading were allowed in these commodities and declined in other two periods of pre-futures trading and post-ban of futures trading in urad and wheat. Futures activity in terms of volume has a positive and significant causal effect on volatilities in spot prices of urad and wheat while the same could not be established in case of gram. Correlation of volatilities indicated that there was a significant spillover of volatilities among pulses and food grains. The study finds that the introduction of future trading in the selected commodities had apparently led to increase in price of commodity like urad but not for wheat and gram. The spot prices of all three commodities have increased in the post futures period except for urad and declined after the ban on futures trading was introduced. There has been a sharp fall in volatility after the ban of futures however the price volatility increased significantly when futures were allowed. The study also finds that the introduction of futures has not affected the seasonal fluctuations of the commodities.

**Navinderpal Singh, Andrew McKenzie (2008)** addresses the extent futures hedges are able to remove or reduce increased price risk for two storable commodities, corn and soybeans, in two market settings, North Central Illinois and Memphis Tennessee by examining daily cash and closing futures price movements around reports released in August, September, October and November for the period from 1992 to 2006. Various risk measures, including Value at Risk, are used to determine hedging effectiveness, and “Analysis of Variance” is used to uncover the underlying factors that contribute to hedging effectiveness.

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The results indicate that corn short-futures hedges for North Central Illinois result in larger potential losses immediately following report release dates than on other pre or post report days and hedging results are consistent with the notion that cash and futures markets may experience a temporary disconnect with the influx of news that induces large price movements. The results show that a cash marketing strategy would result in significantly larger losses than those associated with short-hedges. Moreover the results also reveal that hedging corn in Memphis generated on average potential losses greater than hedging corn in North Central Illinois. If movements in cash and futures prices are highly correlated and basis is stable, hedging will be effective.

Salvadi Easwaran, R. and Ramasundaram, P. (2008) in their study examined the role of futures exchanges on price discovery and the relationship between price return, volume, market depth and volatility of four agricultural commodities castor, cotton, pepper and soya traded in futures exchanges. The results indicated that price discovery does not occur in agricultural futures market and that the market volume and depth are not significantly influenced by the return and volatility of futures as well as spot markets. The futures and spot are not integrated. Thin volume and low market depth, infrequent trading, lack of effective participation of trading members, non-awareness of futures market among farmers, no well-developed spot market in the vicinity of futures market, poor physical delivery, absence of a well-developed grading and standardization system and market imperfections are the major deficiencies retarding the growth of futures market.


Sandhya Srinivasan (2008) ascertained whether or not the government is taking the right measures to solve the prevailing food crisis and control inflation and find out whether the ban on futures trading is logical along with the cause and effect relationship between the spot and futures market. The study stated that the rising inflation rate has been attributed to a number of factors and suggested that using monetary policy, along with revaluation of currency as solutions to curb inflation whereas banning futures hasn’t been a viable solution. The study also stated that the prices are interdependent and the futures markets gives signals to the spot markets on the direction in which prices will move in future and the futures prices are determined on the basis of the conditions in the spot market stating that futures markets should be developed along with spot markets and integrated effectively to bring about greater participation from the producers and consumers of the underlying assets, so that the futures markets perform the function of price discovery more effectively and the intended beneficiaries are able to use the market to hedge risks. The study also revealed that banning futures is an illogical solution because it did not help curtail the price rise and obstructs the development of a mechanism to regulate unhealthy speculation and higher food aid to the poor is essential to minimize the impact of food crisis in the short run whereas the government must invest in developing agriculture and providing better infrastructure in terms of storage and transportation, and the organization of spot markets in the long run. Tightening the monetary and fiscal policy in India, and removing bio-fuel subsidies in the US and EU will help ease food prices.

Stelios D. Bekiros, Cees G.H Diks (2008)\textsuperscript{36} In their study investigated the linear and nonlinear causal lead-lag relationships between spot and futures prices of West Texas Intermediate Crude oil for two periods, from October 1991 –1999 and from November 1999 – October 2007 as it is used as an indicator of world oil prices and is the underlying commodity of New York Mercantile Exchange’s oil futures contracts. The GARCH-BEKK model not only helps to understand the short-run movements, but also explicitly capture the volatility persistence mechanism.

Sushismita Bose (2008)\textsuperscript{37} examined the characteristics of Indian commodity futures market by using the notional price indices to judge whether prices indicate efficient functioning of the market. The results gives an idea of how well the indices would serve as benchmark in case index trading is allowed in future as part of the liberalization policy as the multi-commodity indices have higher exposure to metals and energy products, with clear and efficient price dissemination in national and international markets, behaving like the equity indices in terms of efficiency and flow of information. There is also evidence that Indian spot and futures indices do not deviate too much from global trends thereby contributing to price discovery, reduce volatility and by providing helpful information to domestic investors, producers, and policy makers. It also provides an outlook of the commodity futures market in India. The study reveals that apart from the very fragmented agricultural market, futures market in the rest of the commodities including a variety of commercial crops, is already showing a lot of potential for effective hedging and price discovery. It need to be stressed that even in the absence of futures markets, spot market prices will reflect the market participants’


\textsuperscript{37} Sushismita Bose (2008)
view about future demand and supply. Futures markets only seek to link the present scenario and the future prospects in a transparent and efficient manner in the presence of a large number of participants. The results also indicate that given limited resources it could very well be a viable option to open up futures markets for agricultural commodities like cotton, soya, and guar seed, which have commercial value in national and global markets.

Zibaei, M. and Hosseini-Yekani, S.A. (2008) in their study attempted to investigate the effects of changing the expiration interval on the behavior of the futures prices in case of corn futures contracts in Iran Commodity Exchange. The results show that increasing the expiration interval leads to decreasing the volatility and increasing the level of corn futures prices. Thus the choice of lengthy expiration intervals leads to increasing hedging performance thereby inducing the producers and speculators of corn to contribute in the futures market.

Chia-Lin Chang, Michael McAleer, Roengchai Tansuchat (2009) analysed the volatility spillover effects across and within the four markets West Texas Intermediate, Brent, Dubai, and Tapis using three multivariate GARCH models, namely the CCC, VARMA_GARCH and VARMA_AGARCH models. The results showed that the GARCH and AGARCH models showed evidence of volatility spillovers and asymmetric effects of negative and positive shocks on the conditional variances, also showed that the conditional

correlation forecasts exhibited both upward and downward trends and suggested that 
AGARCH was superior to both GARCH and CCC. The results also presented some volatility 
effects from Brent and WTI returns, and from the Brent and WTI crude oil markets to the 
Dubai and Tapis markets, which confirmed that the Brent and WTI crude oil markets serve as 
the world references for crude oil.

**Guillermo Benavides (2009)**\(^{40}\) examined the volatility accuracy of volatility forecast 
models for the case of corn and wheat futures price returns. The results of the study indicated 
that the option implied model is superior to the historical models in terms of accuracy and 
that the composite forecast model was the most accurate one. The study recommended to use 
a composite forecast model if both the time-series and the option implied data are available. 
The results also stated that, the implied volatilities contained most of the information of the 
realized returns for both commodities and that composite approaches are the most accurate 
alternative to forecast price returns volatilities for commodities.

**Mantu Kumar Mahalik, Debashis Acharya and M. Suresh Babu (2009)**\(^{41}\) 
examined price discovery and volatility spillovers of four futures LAGRIFP, LENERGYFP, 
LMETALFP, LCOMDEXFP and spot indices of Multi-commodity Exchange in Indian spot-
futures commodity markets. It was found that commodity futures markets of agriculture 
future price index (LAGRIFP), energy future price index (LENERGYFP), and aggregate

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39. Chia-Lin Chang, Michael McAleer, Roengchai Tansuchat (2009), “Forecasting Volatility and 

of Volatility Models, Option Implieds and Composite Approaches for Futures Prices of Corn and 
commodity index (LCOMDEXFP) effectively serves the price discovery function in the spot market implying that there is a flow of information from future to spot commodity markets, but the reverse causality does not exist while there is no co-integrating relationship between metal future price index (LMETALFP) and metal spot price index (LMETALSP). The volatility spillovers reveal that future trading could intensify volatility in the underlying spot market due to the larger trading program and the speculative nature of the future trading because the volatility in spot is larger than volatility in any futures market, except in the case of LAGRI index where volatility spillover from spot to future. The reasons may be due to the fact that the agricultural farmers are not dealing with the futures market that involves huge uncertainty backed by the high risk. This shows the nature of commodity market is quite backward in terms of lack of incentives and low quality of technology available to the farmers. This in turn, discourages the agricultural farmers to keep the large size of holdings for the production. Besides, farmers in the spot market are not relying on the futures market on account of unjustifiable rising prices generated by speculators and necessitates the government intervention to check the dynamics of both spot and future commodity markets in India.

Dr. Purushottam Sharma (2009) examined the impact of commodity futures on spot price volatility, the problems faced in physical delivery procedure along with farmers and traders view on commodity futures trading for wheat the futures of which has been banned, and maize with continuous futures trade. The study found that there has not been any

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significant change after the introduction of futures trading in the spot price volatility of Shahjahanpur wheat and Davangere maize and did not contribute to increased market efficiency of the spot markets. But in case of Bareilly wheat market the nature of volatility has changed and the efficiency of wheat and maize market increased after the introduction of futures trading with futures volume and open interest having significant causal impact on spot prices. The results indicated that the futures price variability is substantially less than the cash price variability indicating inefficient utilization of information for maize, and in some contracts of wheat. Moreover, the wheat futures contracts does not provide for hedge opportunity whereas futures contracts of maize provide perfect hedge opportunity to minimize their risk. The results also revealed that only few wheat and maize farmers were aware about commodity futures and no wheat and maize trader and processor took physical delivery due to location problems, problem of assaying, complex procedure, inferior quality of the delivered commodity and preferred to settle in cash. Most of the wheat traders stated that there was no effect of introduction of commodity futures on their turnover, cost of trade, profit earning and price risk management whereas most of the maize traders responded that turnover of their trade, profit had increased and price risk have reduced after the introduction of futures.

Roengchai Tansuchat, Chia-Lin Chang, Michael McAleer (2009) estimated the long memory volatility model for 16 agricultural commodity futures returns from different futures markets, namely, corn, oats, soybeans, soybean meal, soybean oil, wheat, live cattle, cattle feeder, pork, cocoa, coffee, cotton, orange juice, Kansas City Wheat, rubber, and palm

oil using a variety of conditional volatility models, namely GARCH, EGARCH and APARCH and fractionally integrated conditional volatility models namely FIGARCH, FIEGARCH and FIAPARCH. It was found that the GARCH model is preferred to EGARCH for live cattle, soybeans, soybean oil and palm oil suggesting that GARCH is not appropriate for commodity futures returns. The results showed that the EGARCH model out-performed GARCH and the APARCH model was also preferred to GARCH. The results also showed evidence of fractional integration in most agricultural commodity futures markets, with significant performance of the fractionally integrated models, FIGARCH and FIEGARCH better than traditional conditional volatility models such as GARCH and EGARCH.

Seyed-Ali Hosseini-Yekani, Mansour Zibaei and David E. Allen (2009) attempted to determine the most suitable agricultural commodities to be adopted for establishing a futures market by identifying factors that contribute significantly to the success or failure of existing agricultural commodities futures contracts in established futures markets and simulating the hedging performance of potential commodities to determine the optimum contract choice in Iran. The results of the study stated that relative basis risk, spot price fluctuation, cash market size, liquidity costs and commercialization rates are the five most important factors which could explain the success of futures market in terms value, whereas liquidity cost is the only factor which affects the volume of futures trading negatively and commercialization rates, cash market size and spot price fluctuation have the greatest effects across these factors in the choice of a commodity for futures trading. The results also showed that the effect of quality conditions of commodities in terms of their homogeneity and its influence on success or failure of futures contracts is mainly related to the individual futures market abilities and developments in terms of grading and standardization systems suggesting

that although some of the commodities have acceptable levels of necessary conditions for entering them into futures market, they do not have enough attraction for potential participants, particularly the farmers considered for their use as futures contracts in terms of their estimated hedge ratios and hedging effectiveness. The results also suggested that saffron, pistachios and rice are the three most feasible commodities to be adopted in order to establish commodity futures trading after these dates, tea and apples are at a secondary level of suitability for their entry to the futures market in Iran.

Tanchanok Khamkaew, Roengchai Tansuchat, Chia-Lin Chang, Michael McAleer (2009) investigated volatility transmissions in the returns on rubber spot and futures price across three major rubber futures markets, namely Tokyo Commodity Exchange (TOCOM), Osaka Mercantile Exchange (OME) and Singapore Commodity Exchange and Agriculture Futures Exchange (SICOM) and two rubber spot markets, Bangkok and Singapore from September 1994 to March 2009 as world prices of rubber are not only subject to changes in demand, but also to speculation regarding future markets. The results showed that there were spillover effects between most pairs of spot and futures rubber returns, while some pairs of returns showed evidence of interdependence. In addition the asymmetric effects of negative and positive shocks of equal magnitude on the conditional variance suggested that AGARCH was preferable to its GARCH counterpart and the estimates of the conditional correlations between the volatilities of spot and futures returns suggested that the conditional correlations were dynamic.


Ghosh Nilanjan (2010) attempted to test few problems affecting the efficiency of the wheat futures markets in India, after the resumption of wheat futures in May 2009 following a ban. The data from NCDEX was taken for study as wheat futures trading seems to be relatively more active there than at other futures exchanges. The results show that there is no indicative evidence of the physical-market players considering the futures prices as reference price for wheat establishing the inefficiency of the wheat futures market, and its inability to act as a forum for reference prices for the physical market. The result also shows that none of the physical market variables have any role to play in the volume and volatility in the futures markets and concludes that it is not possible for a thin market, bereft of adequate participation and liquidity, to provide a forum for discovering the reference price for the physical market, and thus it cannot destabilize the latter.

Gurbandini Kaur & Rao, D.N.(2010) examined the correlation between spot and future prices to ascertain the extent to which spot prices impact the prices of future contracts for four agricultural commodities Chana, Pepper Malabar, Refined Soya Oil and Guarseed and to investigate whether future contracts are fairly priced for these products to ascertain the existence of arbitrage opportunities. The results revealed that as future contract approaches its expiry, the spot close and opening prices of future contracts tend to converge indicating that arbitrage opportunities exist. The results also shows that there exists strong positive correlation between future open and spot close for Pepper Malabar, Refined Soya Oil and Guar Seed whereas in case of Chana, spot close price had not influenced significantly the opening price of future contracts and no significant volatility has been observed in the prices.

of spot and future contracts of the chosen agricultural commodities confirming the existence of arbitrage opportunities, based on the type of commodity, timing and the magnitude of under pricing. Moreover future contracts of Pepper and guar seeds are not fairly priced while not much can be inferred about the Future contracts of Refined Soya oil and chana due to lack of sufficient statistical evidence.

Hooi Hooi Lean, Michael McAleer, Wing-Keung Wong (2010)\textsuperscript{48} examined the performance of spot and futures, and investors’ behavior in these markets, by analyzing the entire period and the sub-periods, as well as different convex combinations of the portfolios of spot and futures by using both mean-variance and stochastic dominance approaches. The findings of the study suggested that there is no arbitrage opportunity between spot and futures oil, in a short period and arbitrage opportunities will disappear in the long run if the market is efficient. Spot and futures do not dominate one another and investors are indifferent from investing in spot or futures. The study also reveals that the SD approach introduced provides useful information to investors for decision making in oil markets which other methods may not be able to assist in a better understanding of the oil markets and the spot and futures oil markets are efficient and rational for both the Brent and West Texas Intermediate crude oil markets.


Lonnie K. Stevans and David N. Sessions (2010)\textsuperscript{49} examined the relationship between the U.S. real price of oil and factors like futures prices, the value of dollar, exploration, world demand and supply that affect its movement over time. The results revealed that both oil stocks, inventories and futures prices are found to be positively cointegrated with each other and supply dominates price movements for short-term futures contracts in the crude oil market whereas the real price of oil are predominantly determined by the futures price for longer-term contracts that are inherently more speculative. The results also indicate that the shorter-term futures contracts need to be retained and the more speculative futures contracts to be eliminated to limit speculation in the oil market as changes in supply have a larger effect on real oil prices than changes in shorter-term futures prices in predicting oil prices levels with price levels being driven by powerful fundamental economic forces and the laws of supply and demand and not by speculation in case of shorter-term futures prices, the regulators could keep the shorter-term futures contracts and eliminate the more speculative futures contracts to limit speculation in the oil market.

Sunanda Sen Mahua Paul (2010)\textsuperscript{50} studied that future trading in agricultural goods chana, soya, potato and wheat has neither resulted in price discovery nor less of volatility in food prices and no effects are visible on farmers in fetching higher prices along with future markets in commodities seem to have provided new avenues of speculation to traders in equity markets in India. The results observed steep increase in spot prices for major food items along with a granger causal link from future to spot prices for commodities and noticed a pattern where investments in stock markets have links with those in the commodity market


http://ssrn.com/abstract=1154686
via portfolio adjustments relating to the financialisation of the commodity market. The results also inferred that a boom in stock prices was matched by parallel increases in commodity prices, possibly with future prices pushing up the spot prices and the slump in the stock market initiated a portfolio adjustment by moving funds to the commodity market following the financialisation argument put forward by UNCTAD for observing links between the markets for financial assets and commodities. Moreover, commodity prices have also been guided by the upward movements in prices in international markets with the opening of cross-border trade and inferred that future price is causing changes in spot prices.

Vazakidis Atanasios (2010) examined the dynamic relationship between the FTSE/ASE-20 spot price index and futures price index along with their respective volatilities in the Athens Derivative Exchange (ADEX) and in the Athens Stock Exchange (ASE). The results revealed contemporaneous interactions as well as unidirectional and bi-directional causal effects running between the examined market indices and their volatilities. Bi-directional causal effects were found between spot and futures returns with regard to the detection of Granger causal effects though the effect running from spot returns is rather weaker and provided stronger evidence that the stock index futures market leads the spot market with regard to the lead lag relation between the two market indices along with a one-way causal effect running from spot returns to the volatility of spot price index and the volatility of spot price index indirectly causes impact on spot returns as there are causal impacts running from the volatility of futures price index to the volatility of spot price index as well as to the futures price index.


Bahattin Buyuksahin, Jeffrey H. Harris (2011)\textsuperscript{52} analysed the relation between crude oil prices and the trading positions of various types of traders in the crude oil futures market along with the lead and lag relations between price and position data at daily and multiple day intervals as crude oil futures peaked and the numbers of financial participants increased in the crude oil futures market from 2000-2008. The results suggest that hedge funds and other non-commercial position changes Granger-cause price changes, and price changes precede their position changes. The results also suggests that price changes leads the net position and net position changes of traditional speculators as well as commodity index traders in crude oil futures market with little or no feedback in the reverse direction. This uni-directional causality suggests that traditional speculators as well as commodity swap dealers are generally trend followers.

Brajesh Kumar, Ajay Pandey (2011)\textsuperscript{53} investigated the cross market linkages in terms of return and volatility spillovers of Indian commodity futures for nine commodities, Soybean & Corn, three metals Aluminum, Copper and Zinc, two precious metals, Gold and Silver, two energy Crude oil and Natural Gas with futures markets outside India. The results of long run relationship between Indian futures prices and their world counterparts indicate that for all the nine commodities the Indian markets are cointegrated with the world markets and there exists one-way causality from world markets to Indian market in most of the commodities. The Impact of CBOT on Indian agricultural futures market is unidirectional and approximately 30% - 40% variations in returns of Indian commodity futures are explained by CBOT futures prices. In case of precious metals, NYMEX market uni-

directionally affects Indian futures prices and it explains around 98-99% variation in Indian futures returns. In case of industrial metals Indian market is extensively influenced by LME and other developed markets with LME having stronger impact on Indian prices while Indian market having no impact on LME or other futures markets and there exists an unidirectional information spillover through returns. For energy commodities, Brent crude oil and Natural gas, both Indian and NYMEX market Influence each other but, NYMEX has stronger impact on Indian prices. However, in case of energy commodities, the effect of world prices is not as strong as in case of precious metals and industrial metals due to high governmental control in crude oil and natural gas or because of difference in inventory and transportation costs. For agricultural commodities, Volatility spillover takes place from Indian futures to CBOT futures. Bidirectional volatility spillover between Indian and NYMEX is also observed for Gold futures. In case of industrial metal futures, volatility spills from LME, to Indian market except for copper futures whereas Indian market also affects LME futures. In case of crude oil and Natural gas, unidirectional volatility spillover from NYMEX futures to Indian futures is found. Thus the results revealed the leading role, US market plays in information transmission to the Indian market for Soybean, corn, gold, silver, crude oil and natural gas with LME leading the Indian markets for industrial metals and the ability of Indian futures markets to assimilate information through return and volatility spillovers from world markets.

**John M. Fry , Baoying Lai, Mark Rhodes (2011)** examined the interdependence of coffee spot and futures markets by examining the effects of external shocks like adverse harvests and changes in futures contract specifications. The results indicate that spot and

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futures markets for coffee are interdependent and a bi-directional causal relationship is found between spot and futures markets along with evidence of interdependence between unexpected volume and unexpected open interest. Tests for structural change reveal that changes associated with external shocks like severe drought affecting coffee production in Brazil in 1999 and modifications made to the Robusta futures contract in 2008 led to changes in the behavior of economic agents in spot and futures markets for coffee. The results suggest that futures market volatility dominates spot volatility in the first and second periods and the spot volatility dominates futures market volatility in the third period. These results also suggest that futures markets are becoming increasingly efficient over time. The impact of spot markets upon futures markets appears to be growing over time, and futures markets for coffee appear to be increasingly driven by risks associated with the underlying spot price. Thus spot markets have seen an increasing effect, upon the volatility of futures prices. However the effect of futures markets on the volatility of spot prices has declined and the exception is the Robusta spot market, which remains influenced by futures markets to a significant extent.

Lucia Baldi, Massimo Peri, and Daniela Vandone (2011) analized the relationships between spot and futures prices in the presence of potentially unknown structural breaks within each specific sub-period identified for corn and soybeans. The results reveal that breaks relate to events that have significantly affected the supply and demand of corn and soybeans for food and energy purposes. The first break as regards corn is detected at the beginning of 2005 Energy policy Act which changed US energy policy. The next break for corn detected in dec2006 during the first rise of prices due to the strong demand for feed

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use from developing countries like China and for ethanol production. The first break is detected for soybean at the beginning of 2007 as the total production decreased due to adverse weather and steadily growing biodiesel requirements. The last break is detected for corn and soybean in 2008 as the international prices of all coarse grains declined sharply due to favourable global prospects, ample supplies in world markets, and the lack of liquidity and trading volume. In the first sub-period detected by breaks the futures prices lead spot prices, whereas there are bidirectional flow of information between spot and futures markets in the second and third sub-period in case of corn. For soybeans the function of price discovery is unclear before the first break. Whereas there is evidence of causality effect from spot to futures prices, in the second sub-period, but the futures prices do not contain any information about spot prices and in the third period there is bidirectional information flows between the two markets stating that futures prices play a major role in price discovery as the futures market react more quickly to new or unexpected information than the underlying spot market and price discovery is more related to fundamental patterns rather than financial trading on futures markets in case of soybean as futures market is less deeper and thicker than corn futures market. However in times of crisis and in phases of strong price increase, the cash market also becomes an important actor in the price discovery process.

Manuel A. Hernandez Raul Ibarra-Ramirez & Danilo R. Trupkin (2011) examined the level of interdependence and volatility transmission in global agricultural futures markets across major exchanges of corn, wheat and soybeans between the United States, Europe and Asia. The results indicate that a higher interaction is found between the

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United States and both Europe and Asia, with highly interrelated agricultural markets and there are both own and cross volatility spillovers and dependence among most of the exchanges. The results also shows that exchanges in the United States, Europe and Japan derive relatively more of their volatility persistence from within the domestic market. Chicago plays major role in terms of spillover effects over the other markets, particularly for corn and wheat. China and Japan also show important cross-volatility spillovers for soybeans and the level of interdependence has increased only in recent years between the exchanges for some commodities. The leading role of Chicago over the other international markets especially in closed, highly regulated markets like China. confirms the importance of the United States in global agricultural markets.

Mukherjee, Dr. Kedarnath (2011)\textsuperscript{57} attempted to re-validate the impact of futures trading on 9 major agricultural commodities, Spices-Chilli, Jeera and Pepper, Pulses-Chana, Cereals-Wheat, Oil and Oil Seeds-Mustard seed, Castor seed, Soya oil, and Others-Mentha oil in India. The study exhibited that the destabilizing effect of the futures contract is casual in nature and tends to vary over a long period of time even though the inflationary pressure on commodity prices have gone up sharply after the introduction of commodity futures contracts. The findings significantly revealed the comparative advantage of futures market in disseminating information, leading to a significant price discovery and risk management that can again help to develop successfully the underlying commodity market in India and suggested to strengthen the market structure to achieve the broader target. The study also

proved the efficiency of both the markets by the presence of bidirectional causation between the spot and futures market, with stronger flow of information from futures to spot market, also confirmed the stronger efficiency of futures market, leading the spot market to become more efficient. At the same time, insignificant volatility spillover from futures to spot market suggests that trading of commodity futures contract shall not essentially be accounted for the rising volatility in the spot market, and the rising inflationary pressure, at least for the essential agricultural commodities in Indian economy. A successful history of futures trading, with a proper regulatory framework is very essential to develop the underlying commodity market of a fast growing economy, may be with a possibility of short-lived imbalances and difficulties.

**European Staff Commission Document (2012)** identified and analysed causes and prospects of high agricultural commodity prices which started increasing in 2006/2007 and soared in 2008 utilized mostly as food and the major drivers behind increased prices and increased volatility as price volatility has always been present and hikes in the prices occurred even before. The study stressed on how different factors, supply and demand play varying roles in development of different commodities. The study found that changes in agricultural production influencing only supply side, changes in macroeconomic environment and their impacts influencing both supply and demand sides includes population and income growth and its consequences for urbanization change in the currency system, crisis on the financial markets and increased interest in investing on commodity markets, agricultural and trade policies and various policy responses influencing mostly supply, but also have an

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impact on the demand side includes agricultural and trade policies and various policy responses are put in place to mitigate the effects of high prices. The study revealed that crop production shortages in major producing countries have more important effects on markets in the short term while changes in the macroeconomic conditions are more important in the longer term. The study also insisted that it is becoming increasingly clear that structural factors like the growth in global food demand can be reasonably expected to maintain prices at sustained levels over the medium-term, and technological progress over the longer run with high prices having the potential to promote investment and higher productivity over the medium and longer run in agriculture world-wide. Whereas Slower rate of growth can have the potential t reduce demand for commodities and soften upward pressure.

Joscha Beckmann (2012) studied the relationship between spot and futures prices of agriculture products namely coffee, corn, cotton, soybeans, soybean oil, sugar and wheat by applying the smooth transition regressive model which is well suited to distinguish periods where futures markets are able to perform a price discovery function from times where other market factors, such as speculative pressure, outshine such a function. The results state that a long-run relationship exists between spot and futures and confirmed that nonlinearities need to be accounted for when the relationship between spot and futures prices for food commodities is analyzed. This may be due to the fact that future commodity markets are more innovative that enables them to expose the all available new information with respect to the price of the commodities and investors’ behavior in the market and that all the investors are able to realize their expected future price of the spot commodity price due to the efficiency of the future market. The results suggested that a smooth switching approach

should be adopted instead of a discrete threshold model. The results also show that spot returns mostly adjust to the forward spread in case of a small spread or low volatility, however, if volatility is large, future spot returns are not only increasingly detached from the current forward premium, a positive forward spread may even result in a drop of future spot prices and vice versa. Overall the arbitrage opportunities which may be traced back to the engagement of speculators. The overshooting of spot returns might result from upward pressure while a weak or inverse relationship possibly arises if market participants do not consider futures prices to obtain relevant information or expect market prices to turnaround in the future. The results indeed display that spot prices in many cases only show positive adjustment to futures prices if the latter do not depart extensively from the current spot prices. Further, speculators seem to become increasingly engaged once futures prices depart from spot prices to a certain degree.

**Jason West (2012)**\(^6\) examined an approach for estimating OTC forward contract prices of seasonally-affected commodities corn, cotton and sugar at maturities beyond the longest quoted liquidly traded future contract. This study has augmented the basic Nelson-Siegel term structure model due to its internally consistent and parsimonious functional form to better estimate seasonal agricultural commodity forward prices. The study indicated that the model is stable and provides an excellent fit to existing futures contracts and anticipated forward contracts allowing market participants to obtain efficient estimates of agricultural commodity contract prices beyond the maturity of exchange-traded futures contracts, which will improve the ability of the market to trade and hedge longer-dated contracts. Whereas the model suffers from certain limitations like unstable volatility term structure, assuming that

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limited liquidity premiums applied to long-dated contracts may not hold during periods of significant market illiquidity for contracts beyond the futures strip. The study also indicated that the ability to achieve price discovery in agricultural commodities with limited liquidity levels provides hedgers with the confidence to obtain fair prices for OTC forward contracts beyond the futures strip.

Prof. Sanjay Sehgal, Dr. Namita Rajput & Rajeev Kumar Dua (2012) focused on discovering the price for ten agricultural commodities chana, guar seeds, soya bean, kapas, potato agra, turmeric, black pepper, barley, maize and castor seeds. Price discovery results are encouraging as it is confirmed for all commodities except Turmeric. However, the Indian commodities market is still not perfectly competitive for some commodities and needs strong policy support owing to its relevance in the macro economy, stating that these markets are becoming informationally mature and market regulators have taken adequate steps for market development.


Siu-Kai Choy & Hua Zhang (2012) investigated the price discovery dynamics in the Hong Kong equity index markets, where regular futures contracts, mini futures contracts and the underlying Hang Seng Index stocks are all traded electronically on the Hong Kong Automatic Trading System. The results revealed that in Hong Kong the regular futures contracts market plays a dominant role in price discovery by its lower transaction costs on a per dollar basis, along with the impacts of transaction costs on price discovery. whereas the mini futures and cash index markets play minor roles.

2.2 Research Gap

The Futures Market in respect of agricultural commodities had led to increase the exposure of agricultural produce to price and other market risk. In the Indian context there are very few studies available on the utility of futures trading in selected agricultural commodity in a skeleton manner.

However there is no firm study on the Perception about the utility, factors hindering and prompting farmers and traders in taking up futures trading. This present study is an attempt to know the perception about the utility of futures trading from the farmers and traders of pepper and cardamom. To ascertain the efficiency of the futures trading of agricultural commodities, this study has taken into account both primary and secondary data sources and device the results.