CHAPTER 2

REVIEW OF LITERATURE

A review of the earlier body of research in respect of the theme under consideration is rewarding in that it not only enables the researcher to identify the focus of his/her own research but also in the formation of the objectives of the study one undertakes. It is not unimportant to observe that even though serious research efforts dealing with the commodity exchanges in India have not yet proliferated, some research efforts at the national and international level, nevertheless, have been discernible pertaining to some of the issues taken up for investigation in the present study. It would, therefore, be quite useful to have a synoptic review of the research work as has been undertaken by different researcher workers in the area in the past. An attempt has, accordingly, been made in this Chapter to revisit the existing body of research pertaining to the theme under consideration. Such an exercise, we feel, will serve the dual purpose of enabling us to obtain some meaningful insights into the theme under consideration as also delimit the scope of our inquiry.

Hagelin and Pramborg (2002)\(^1\) in their study undertake to investigate whether the firms are successful or otherwise in reducing their foreign exchange exposure with currency derivatives and foreign denominated debt. The study is motivated by the possibility that exposure management may be costly, but yet ineffective in reducing total risk. The reason that underlies this effect is that expensive software and highly skilled professionals required for a comprehensive hedging programme may be out of reach for smaller firms. As a consequence, if the management fails to reduce total risk through hedging, the shareholder value may get eroded. On the other hand, a successful hedging programme may increase shareholder value by reducing costs related to different market imperfections. The results of the study indicate that foreign exchange exposure, as measured by firms’ foreign exchange betas (slopes of the regression lines), is increasing in inherent exposure. Also, exposure is decreasing in firm size. In the light of these findings, it is argued that partly due to their ability to use operational hedges, and partly due to their ability to hedge more efficiently owing to economies of scale in hedging activity, the larger firms may have lower inherent exposure than their smaller counterparts. The study also noted that financial hedges were effective in reducing
firms’ foreign exchange exposure. Financial hedging was found associated with risk reduction for firms that use currency derivatives and/or foreign denominated debt. Moreover, since translation exposure and transaction exposure tend to affect firms differently, the study, in particular, examined the impact from transaction exposure hedges and translation exposure hedges. The results of this exercise in the study under reference showed that there are risks reducing effects from transaction exposure hedges as well as from translation exposure hedges. A possible explanation for the latter, according to the authors, is that translation exposure approximates the exposed value of future cash flows from operations in foreign subsidiaries (i.e. economic exposure). If it is so, then economic exposure gets reduced by hedging translation exposure.

Singh (2002)\(^2\) in his study is of the opinion that futures markets play important role in determining the inventory decisions in the cash market. The futures market, in his opinion, is the nerve centre for collection and dissemination of information about the agent’s expectations of future cash market, and it performs the price insurance and price discovery functions. It is further observed that of the said two functions, the latter function enables the traders in making rational choices in the matter of inventory management. As a consequence, volatility of cash prices gets reduced. The study investigates the hessian cash (spot) price variability before and after (over 1988-1997 period) the introduction of futures trading to ascertain if the futures market helps in reducing the intra-seasonal and/or inter-seasonal price fluctuations. To be more specific, it seeks to show how the influence of hessian futures market has led to reduced cash market volatility in the hessian market. To know about the pattern of volatility over the season, Figlewisky measure of volatility has been adopted. To take account of inter-seasonal price variability, this volatility measure has been normalized to make it akin to coefficient of variation. The relationship between hessian price variability and jute prices has been investigated using regression of logarithms of volatility on logarithms of prices and monthly dummy variables. To take account of possible price variation differences between the two sub-periods, multiplicative dummy variable model was applied. The results emanating from the study showed that cash market volatility was less pronounced after 1992 when hessian futures market was established. The major role for futures market appears to be in reducing inter-seasonal volatility as opposed to intra-seasonal volatility. The main conclusion of this study is that the
futures market may be indeed viable policy alternative for policy-makers to reduce uncertainty in agricultural markets. Furthermore, the liberalization of state support policy aiming at stabilization of farmers’ income, it was apprehended, will increase risk and uncertainty for the market participants. In such a situation, observes the author, the futures market through its informational role may significantly improve the storage across the seasons, thereby stabilizing cash prices. In more precise terms, the results of the study suggest that futures market has reduced the price volatility in the hessian market. The hypothesis here is that futures market facilitates storage of jute to produce hessian to have its impact on spot market of hessian. This is possible only if the hessian futures market is efficient in terms of price discovery and price insurance. This depends, among other things, on liquidity (volume of contracts) of market. In hessian futures exchange, though volumes have consistently gone down but are still equal to production. In sum, the results suggest that the cash price volatility is less pronounced after 1992, when futures trading was allowed. The significant contribution of futures market, according to the study, is to reduce inter-year price volatility than intra-seasonal variability of prices of hessian. This potential of stabilizing cash market prices would tend to benefit such traders/ growers who have become deprived of the stabilizing impact of support policies, notes the study.

Sekhar (2003)\(^3\) in his paper carries out an analysis of major international and domestic markets volatility of agricultural prices in respect of rice, wheat, groundnut oil, coconut oil, sugar, coffee and cotton. The study reveals that the domestic wheat markets show higher intra-year variability in the 1990s than in the 1980s, while for rice, the pattern of variability was similar in 1980s and 1990s. On the other hand, coconut oil shows higher variability in the 1990s than in the 1980s. In case of sugar, as revealed in the study, 1980s showed higher variability than 1990s, while for cotton and coffee, it was 1990s that showed larger variability in prices than in 1980s. The monthly price movements of none of these commodities displayed a specific pattern. Further, the study found a dip in prices of wheat between February and May and a rise between June and January, while a slight rise in prices of rice was observed between March and July/August. Groundnut oil showed a decline in prices between September and December.
Thomas (2003) underlines in his study that strengthening institutions in spot and derivative markets for commodities is a necessary component of the liberalization process in agriculture, and can impact upon the lives of millions involved in this sector directly as well as indirectly. In this paper, the author describes the existing market design prevalent on both the spot and the futures markets. Some evidence is also shown on the role played by the nascent futures markets in price discovery. The study documents the problems of both the spot and the futures markets and suggests three policy proposals – (a) use the technology of Mumbai Inter Bank Offer Rates (MIBOR) for creating sound reference rates for transparency, (b) exploring a greater role for cash settlement, and (c) treating warehouse receipts as securities.

The paper by Benavides (2004) attempts to examine the volatility accuracy of volatility forecast models for the case of corn and wheat futures price returns. A univariate Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH), a multivariate Auto-Regressive Conditional Heteroskedasticity (ARCH) (the Baba-Engle-Kraft-Kroner, BEKK model), an option implied and a composite forecast model are the models considered in the study. The composite model includes time-series (historical) and option implied volatility forecasts. The results of the study show 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 (compared to the alternative models) having the lowest mean-square-errors. On the basis of these findings, the study recommended the use of a composite forecast model if both types of data are available i.e. the time-series (historical) and the implied options. The results of this paper seem to be consistent with that part of the literature that emphasizes the difficulty on being accurate about forecasting asset price return volatility. This is because the explanatory power (coefficient of determination) calculated in the forecast regressions were relatively low for all models.

Pindyck (2004) in his study examines the role of volatility in short-run commodity market dynamics, as well as the determinants of volatility itself. It is observed that commodity prices tend to be volatile, and the extent and degree of volatility itself seems to be varying over time. The study finds that changes in volatility can affect market variables by directly affecting the marginal value of storage, and by affecting a component of the total marginal cost of production: the opportunity cost of
exercising the option to produce the commodity now rather than waiting for more price information. Specifically, a model is developed in the study that attempts to describe the joint dynamics of inventories, spot and futures prices, and volatility, and estimates it using daily and weekly data for the petroleum complex: crude oil, heating oil, and gasoline. The study under reference provides preliminary evidence concerning the role of volatility as a determinant of commodity market dynamics. It is observed that in principle, volatility should affect market variables through the marginal value of storage and through the opportunity cost component of marginal cost. For the petroleum complex, changes in volatility do influence market variables, but the effects are not large. As for volatility itself, market variables do little to explain its behavior. Volatility can be forecasted, but based largely on its own past values. The estimation results presented here give limited support to the theory of commodity price dynamics presented in the beginning of the paper. For heating oil, the results fit the theory well - all estimated coefficients have the predicted signs and are significant. For crude oil, the opportunity cost variable has the wrong sign (opposite to the predicted sign), and for gasoline, both volatility and the opportunity cost variable are either insignificant or have the wrong sign (opposite to the predicted sign). These mixed results are on account of several reasons. First, it is unclear how much of a commodity’s short-run price movements can be explained by a model based on rational optimizing behavior and corresponding shifts of supply and demand in each of two markets. One might expect that some portion of commodity price variation is not based on such “fundamentals,” but is instead the result of speculative noise trading or group behaviour, and there is some evidence that this is indeed the case. Second, the mixed results may simply reflect a misspecification of the model. For instance, the opportunity cost variable is constructed from an option pricing model in which the spot price is assumed to follow a mean-reverting process with constant volatility, and uses a quadratic approximation to the exact series solution for the option value. In addition, it is contended that ideally, an equation for the marginal value of storage should come from an optimizing model that accounts for the various ways in which inventories are used. In practice, however, such a model is likely to be very complicated due to non-availability of data on marketing costs, stock-out behavior, etc. And finally, the real-world agents may not make the kinds of inter-temporal trade-offs embodied in the
Euler equations, particularly given the volatility of these markets, and the limited knowledge that the agents are likely to have of their own cost functions.

The study by Srinivasan (2004) examines the impact of alternative price stabilization policies for edible-oils and oilseeds in India on the farmers growing oilseeds, the consumers of edible oils and the processing sector with the help of a multi-market equilibrium dynamic simulation model. Price stability in the edible oil sector assumes significance from the viewpoint of realizing the growth potential as also from that of improving the nutritional security of Indian households, notes the author. While efficiency considerations suggest the linking of domestic to world prices, extreme fluctuations in price have to be avoided, for they can lead to undesirable consequences both at the macro and micro levels. Against this backdrop, the study seeks to address: What is the effectiveness of alternative price stabilization mechanisms in stabilizing oilseed/ edible oil prices? Can variable levies that vary within the bound tariff level provide adequate protection against world price fluctuations? What are the costs to the government, and benefits to the producers and the consumers? And, what is the impact on prices of oilseeds due to the operation of variable levies edible oil imports and vice-versa? These questions are answered by using the afore-mentioned methodology. Besides, it compares the various alternative mechanisms of price stabilization for ascertaining their effectiveness in respect of the afore-mentioned questions. The study arrives at very useful results. It notes that higher import tariffs on edible oils lead to more variable domestic prices. This indicates that a fixed level of tariff even at a higher level is not useful in stabilizing oil prices. A system of variable levies which adjust to international price and domestic supply situation is what would be required. Tariff protection on oils mainly benefits the processing sector and the benefits to oilseed growers are relatively smaller. Tariff protection to growers by increasing tariffs on oilseed imports helps the producers of oilseeds, but at the cost of consumers and the processing sector. The distribution of benefits to different agents varies with the different alternative mechanisms used for price stabilization. As the bound rates of tariffs under WTO are fixed quite high for all edible oils with the exception of soy oil, there is enough room to adjust import duties for price stabilization purposes. The maximum import tariff rate required to stabilize prices within a reasonable price band is as low as 25 per cent. Further noting that India’s share in
world oilseed production is fairly large and that the growth in the volume of oilseed production has been remarkable in the last decade, the study takes note of the fact that until recently the government of India had discouraged imports of oilseeds as an incentive to domestic producers. As a consequence, the domestic processing industry having excess crushing capacity got adversely affected. But since the government had also been controlling the imports of edible oils that helped processors at the cost of consumers, it is apprehended that following the ongoing process of liberalization of trade in edible oils and oilseeds and the rapid growth in domestic demand, the import of vegetable oils was likely to witness a rise in the future. In view of highly volatile international prices and unstable domestic yields of oilseeds, the government has to devise ways to manage domestic price volatility. The study concludes that (i) higher import tariffs on edible oils lead to not only higher but more variable domestic prices; (ii) tariff protection on oils mainly benefits the processing sector and the benefits to oilseed growers are relatively smaller, and, (iii) the distribution of benefits to different agents varies with the different alternative mechanisms used for price stabilization. To put it pithily, the results of this study clearly reveal that although freeing of imports of edible oils could increase the vulnerability of domestic consumers and producers to fluctuations in world prices, yet a system of variable tariffs rather than erecting fixed tariff barriers is needed to be put in place with maximum rate required for any of the oils not exceeding 25 per cent. In the event of extreme fluctuations in world prices or sudden import surges, India must exercise its option to protect itself by invoking the special safeguard provisions under the World Trade Organization.

Focusing on estimating agricultural income uncertainties for a number of different household types in Ghana, Vietnam and Peru, an important paper by Rapsomanikis (2005) argues that the extent to which commodity price volatility affects the income of producing households and their vulnerability to poverty and food insecurity depends on household diversification patterns and the degree of their exposure to markets. It attempts to provide answers to the questions of whether increased exposure to international markets reduces the volatility of domestic market prices and improves the welfare of agricultural commodity households. Developing a theoretical framework that leads to explicit formulae for household income variance on the basis of covariate shocks, such as commodity price and yield uncertainties, and
estimating household income uncertainties combining household micro classifications for a number of different household types in the afore-mentioned three countries using the time series data, the paper attempts to estimate household class-specific income variability that emanates from price and production related market uncertainties to conduct simulation experiments on the extent to which complete exposure, rather than partial or no exposure to international market signals, affects commodity prices and hence agricultural income volatility. What needs to be underlined in particular is that almost all of the agricultural income variability of producers seems to be on account of domestic factors. While domestic prices for tradable commodities exhibit diverse patterns of price transmission from international prices, the impact of international prices on farmer income variability seems to be small, either on account of small transmission, or owing to small shares of farm income accounted for by the relevant price. Thus the empirical part of the paper offers mixed results regarding the impact on producer variability of total exposure to international prices. In general, the results suggest that, in the absence of effective price stabilization policies, in the countries under reference, increased integration with international markets may lead to a reduction in agricultural income volatility, with the possibility of international markets acting as ‘buffers’ absorbing large domestic supply and demand shocks in domestic markets. This nevertheless apart, with the exception of coffee producing households in Vietnam, any improvements in income variability associated with relatively larger integration with international markets are very small. Where price stabilization schemes are in vogue (as in the case of cocoa and rice in Ghana and Vietnam respectively), extended exposure to international markets may culminate in relatively higher income stream uncertainty, which, in turn, suggests that domestic policies in these countries are effective in reducing uncertainty that is attributable to both domestic and international factors. Furthermore, the extent to which households diversify their sources of income and production patterns was found to affect income uncertainty. In general, as expected, households whose income depends largely on a single commodity face higher income volatility in relation to households having a more extensive diversification pattern. The findings further indicate that the household classes in Vietnam that predominantly depend on rice and coffee face considerably higher agricultural income uncertainty, especially when opportunities for off-farm income are practically non-existent. Likewise, in Peru households that depend on rice and cereals face higher
uncertainties as compared to those who have come to enjoy a more diversified production pattern. As against these, the possibility still remains that high price and yield volatility may be discernible in cases (for example in Ghana) where both cash and food crops are raised. It points towards the fact that crop diversification strategies on their own or self-insurance may not prove to be effective to protect the farm producers from large income fluctuations. In view of such findings, notes the study, the government must assume the responsibility to establish a commodity insurance mechanism to protect the farmers against the various uncertainties and the variability attendant to them.

Yang, et al. (2005) in their paper seek to examine the lead-lag relationship between futures trading activity (volume and open interest) and cash price volatility for major agricultural commodities. The study uses Granger causality tests and generalized forecast error variance decompositions. Although the former show that cash price volatility may cause unexpected trading volume or unexpected open interest for a few commodities and unexpected open interest may cause cash price volatility for other commodities, these causal patterns are, nevertheless, not confirmed by forecast error variance decompositions. Furthermore, if the evidence from both the tests is combined, then it is plausible to argue that an unexpected unidirectional increase in futures trading volume leads to an increase in cash price volatility for most commodities, while there is weak causal feedback between open interest and cash price volatility. Another important point worth mentioning in respect of this study is that the sign of the causality running from unexpected futures trading volume to cash price volatility is typically positive, which suggests that an increase in unexpected trading volume causes an increase in cash price volatility. What needs to be underlined in particular in respect of this study is that its findings are not generally inconsistent with the destabilizing effect of futures trading on agricultural commodity markets.

Ramaswami and Singh (2006) in their study observe the exceptional success of the soya oil contract at the National Board of Trade (NBOT) in India. They seek to examine whether the NBOT contract exhibits the fundamental features of mature futures markets in terms of its use by hedgers. They are of the view that if the market offers significant arbitrage opportunities to hedgers then the activities of commercial firms should affect the returns to their hedging portfolio i.e., change in basis (the
difference between spot price of the hedged asset and the futures price of the contract). It has been revealed from the study that the NBOT contracts were comparable with mature exchanges regardless of the fact that the key market institutions such as certified warehouses and centralized spot prices were still non-existent in India. The study also reveals that the soya oil imports exert a significant impact on basis (the difference between spot price of the hedged asset and the futures price of the contract) and provide enough short-term volatility to make the contract attractive to both hedgers and speculators. The 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. Also, it has been pointed out in the study that open interest, which is assumed to be highly correlated with hedging positions, displays the typical pattern of mature exchanges – of rising steadily as the contract moves towards expiry, but peaking and falling rapidly in the time just before maturity. The study, however, reveals that the only count on which it falls short of developed country exchanges is that the NBOT contracts are open for trading for a much shorter time of three months or less. The NBOT exchange has thus emerged despite a soya oil spot market that would be regarded as underdeveloped by rich country standards and the market is fragmented as transactions are mediated through brokers who match suppliers with buyers. Furthermore, as against the failure of the contracts in soybeans and soymeal, the success of the soya oil contract is seen to be exceptional. Despite this, however, the soya oil contract has been liquid which underscores the role of imports in this regard. Imports have ensured a full marketing season for soya oil. Although imports reduce the impact of seasonality, they increase short-run volatility because of the sensitivity of the soya oil prices to world prices (for soya oil and its competitors like palm oil). Imports driven hedging has drawn traders from consuming regions spread across the country for which anonymous transactions backed by a clearing house would have been valuable.

Geyser and Cutts (2007) in their paper hold that price volatility in a given market may be caused by business fluctuations affecting all market places and commodities, i.e. a systematic market risk. The contention that underlies their reasoning is that there may be a specific price risk for a given commodity, independent of the general business cycles, i.e. a commodity price risk. Finally, there may be a unique risk for a given regional or local market, i.e. weather and the size of the market.
It is observed that decomposition of the price risk along these dimensions may substantially improve our understanding of the working of the commodity markets and the way the risks arise. Such improved understanding, in the opinion of the authors, may be of tremendous importance for market participants attempting to manage and reduce risk. Furthermore, a deeper understanding of the composition and characteristics of price risk may be crucial for politicians and Non-Governmental Organizations (NGOs) making decisions related to investments in infrastructure, food aid and market surveyance. The study found that daily maize prices at the South African Futures Exchange (SAFEX) were more volatile than their counterpart on the Chicago Board of Trade (CBOT) market. When compared at a production season level, it is clear that the South African market is more strongly affected by domestic stock levels and weather than the Chicago Board of Trade. Owing to the inherent variability of the African weather patterns, the South African market was found to have a stronger relationship with weather than the United States market. However regardless of the above, the fundamentals, such as, the Chicago Board of Trade, South African Rand and United States Dollar exchange rate, weather patterns and domestic stock levels seemed to determine the South African Futures Exchange (SAFEX) price levels, holds the study.

Lokare (2007) in his paper argues that commodity derivatives trading in India has, regardless of its long phase of turbulent historical sojourn, experienced a massive spurt in the recent period. It is estimated in the study that the total value of commodity derivatives trading accounts for about two-third of the overall Gross Domestic Product (GDP). It points towards the extent of depth that this market has gained in the economy. In India, however, it is largely the agricultural commodities, which are traded on the existing exchanges. The value of agricultural commodities traded as a proportion of overall Gross Domestic Product (GDP) amounts to around 37 per cent (70 per cent of the agricultural Gross Domestic Product (GDP) in the country while the share of bullion, oil and other metals is relatively low. The author observes that a close examination of the functioning of these markets, however, reveals that liquidity in respect of primary commodities was high only in the case of a few commodities such as castorseed, soybean oil, and to some extent cotton, while in the case of others, it was quite thin. On this basis, it can be observed that these markets in India have yet to achieve minimum critical liquidity that is capable of generating greater economies of
scale, minimum transaction costs and wider participation. It is further pointed out that in terms of tests of efficacy, while the contracts of most of the months in respect of pepper, mustard and gur throw up a strong evidence of co-integration between the spot and future prices, in the case of several others such as sacking, potato and castorseed, on the other hand, only contracts of few months showed such a co-movement. Even the evidence in respect of other commodities such as rice, wheat, sugar (S), cotton, sesame seed, gold, copper, lead, tin and bent crude oil, rubber, sesame oil, aluminum, zinc, silver and furnace oil, where the trading has been a recent phenomenon, does not elude the above trend. Only sugar (M) and nickel did not throw up any evidence of cointegration. In view of these findings, the study concluded that the trading in the commodity derivatives is, by and large, moving in the desired direction of achieving improved operational efficiency, \textit{albeit slowly}. It is further noted that except in the case of pepper, and to some extent, in that of cotton, in the case of others such as gur, castorseed, potato, rice, sacking and sugar, the variability in future price was substantially lower than that in the spot price, reflecting thereby an inefficient utilization of information in the market. While the contracts of few months in respect of pepper, castorseed, sugar and sacking revealed moderate speculation, others such as cotton, rubber, wheat and most of the metals; lead, copper, tin, gold and silver to some extent displayed wide speculative trading, an analysis of effectiveness of these markets in terms of their function of price risk management divulges that basis risk in respect of pepper, castorseed, rubber and to some extent silver was low. Hedging in the latter case of commodities proved to be an effective proposition observed in this study. As against this, however, moderate risk could be discerned in the case of several other commodities such as potato, sacking, sugar (M variety), sesame oil, sesame seed, rice, cotton (J-34 variety), aluminum, zinc and gold. Conversely speaking, hedging in the case of the basis risk was found to be less effective in respect of commodities like gur, mustard, wheat, sugar (S variety), cotton (S-06 variety), safflower oil, lead, copper and tin. While some basis-risk (the risk associated with imperfect hedging using futures) could be found in contracts of some months particularly in respect of pepper, gur, potato and rubber did reveal, the contracts of some months in the case of castorseed (April, June September), sugar (March and April), cotton (March), metals (February and March) proved effective in containing the price risk, in the opinion of the author. Further, he points out that this is an indicative evidence of the developing state of the
market. Notwithstanding several policy initiatives undertaken recently, some of the older exchanges have not been able to generate resources and, therefore, seemed to be bereft of the seriousness and flexibility to introduce the reforms. The author also emphasizes that several measures in the institutional, infrastructural and legal spheres are required to be introduced for the rapid development of these markets in the country. Furthermore, as the markets develop, it needs to be explored if the futures prices that contain useful information about the future demand and supply conditions could be used as an input for arriving at expected inflation and interest rates by the market participants and if the information content of futures prices could be factored in the future monetary policy formulation.

In his paper Singh (2007) examines the pricing performance and hedging effectiveness in soyoil futures markets in India. He proves that in case of different arbitrage opportunities across the three exchanges, the prices of soyoil futures tend to become equal due to the evidence of arbitrage activities across the three domestic exchanges, namely, the National Commodity and Derivatives Exchange (NCDEX), National Board of Trade (NBOT) and Multi Commodity Exchange of India (MCX). The three exchanges are quite similar except for their institutional ownership and management for trading of soyoil futures and the arbitrage trading amongst these exchanges ensures the futures prices to co-integrate across the domestic exchanges. Futures markets are considered to be informationally efficient if the changes in the level and volatility of futures prices reveal the new information. It has been widely accepted that the futures prices of similar commodity traded across different commodity markets reflect the presence of arbitrage in the short run but anticipates the evidence of co-integration in the long-run. The study observes that these exchanges provide relatively less hedging efficiency in comparison with the Chicago Board of Trade due to the fact that the domestic exchanges are inconspicuous of futures trading for soybean and soyoil contracts that inhibit the processors to lock in their margins. The study thus concludes that arbitrage across commodity exchanges could be responsible for cointegrating relationship among futures prices for soya oil contracts and domestic exchanges provide relatively inadequate hedging compared to international exchange.

In a survey by the Ernst and Young (2008) it has been observed that in India, the commodity risk management operations are not fully geared to protect margins.
According to the survey, more than 50 per cent of the respondents viewed hedging as a tool to lock-in input costs at a target level, some of them still used market views and expectations of future prices as a trigger of decision making. Interestingly, more than 68 per cent of the respondents had a hedging horizon of less than three months indicating that the full potential of hedging to protect long-term business cash flows was not being explored. It is further observed that the governance of commodity price risk management function is critical to ensure that risk management activities are always consistent with the risk philosophy and risk appetite of the participants. The survey argues that while the concept of commodity price risk management in India has steadily gained ground since the early part of this decade, with the increasing volatility and growth in markets, it seems appropriate for the participants to look at the commodity price risk management as an integral part of the strategy to manage the bottom-line. The main findings of the survey are:

First, the maturity of commodity price risk management operations appears to be greater among producers and processors;

Second, the hedging programmes are still generally short-sighted, driven to a large extent by market views and not always aligned with the risk philosophy of companies.

Third, while the companies understand the need for hedging as well as the instruments available, the finer aspects of hedging, such as basis risk and timing risk, which can significantly affect hedge cash flows, are often ignored.

Fourth, the instruments used for hedging tend to be plain vanilla, generally limited to futures and forwards. Further, the companies do not normally explore the use of customized instruments, depending on their exposure profile;

Fifth, the companies show an appreciation of the need for oversight. However, little is done to enforce sustainable oversight and governance;

Sixth, the cash flows from hedges and underlying exposures are generally viewed in isolation. The definition of position, for the purpose of assessing the underlying exposure, is generally vague. This may prevent holistic performance reporting,
Seventh, the mark-to-market remains the single most important measure used for performance measurement and reporting;

Eighth, investment in human resources to manage the function is still fairly low and most commodity price risk management functions are staffed by less than five persons;

Ninth, the operational risk is not perceived as a major issue. This has resulted in less than an optimal level of investment in streamlining operations and putting in place a robust control mechanism

And finally, there are continuing concerns relating to the accuracy of reporting and accounting for hedging operations.

The Expert Committee (2008) constituted by the Government of India to study the extent of impact of futures trading on agricultural commodities prices, placed on record that the adoption of liberal economic policies in India, since 1991, has given a fillip to the efforts at opening-up the futures trading and futures trading has undergone a metamorphosis by opening-up of state-of-the-art national level commodity exchanges in India. It is noted that the volume of futures trade has grown exponentially and agricultural commodities constituted a significant proportion of total value of trade till 2005-06. An empirical analysis in respect of 21 agricultural commodities, which account for about 98 per cent of share in total futures trade in agricultural commodities, further shows that the annual trend growth rate of prices accelerated after the introduction of futures trading in the case of many more of these commodities. The fact that agricultural price inflation accelerated during the post futures period does not, however, necessarily mean that this was caused by futures trading. The committee underlines that one reason for the acceleration of price increase in the post futures period was that the immediate pre-futures period had been one of the relatively low agricultural prices, reflecting an international downturn in commodity prices. Another reason for such acceleration in the post-futures period was observed to be the rebound / recovery of the past trend. Nonetheless, the period during which futures-trading has been in operation is too short to discriminate adequately between the effect of opening up of futures markets and what might simply be the normal cyclical adjustment. Admitting that the futures markets have the potential to bring about better price
stability over a medium to long term, the committee observes that the literature pertaining to the futures markets on the subject of price variability is rather divided. However, the Indian data analyzed in this report do not show any clear evidence of either reduced or increased volatility of spot prices due to futures trading. It was felt that although the volume of futures trading in India has increased phenomenally in recent years, its ability to provide instruments of risk management has not grown correspondingly, and has in fact been quite poor. This was due to high basis risk (because of the difference between the commodity whose price is to be hedged and the commodity underlying the derivative or a mismatch between the expiration date of the futures and the actual selling date of the commodity) in most contracts which kept out potential hedgers and led to greater dominance by speculators. The efficient functioning of the futures markets, in the opinion of the committee, was possible only by the existence of efficient spot markets. Further, it was underlined that the efficient spot markets would require integration of spot markets through development of rural communication, transport and storage infrastructure so that the existing infirmities in the physical spot markets can be reduced to the minimum. The committee recommended that the measures necessary to make futures markets accessible to farmers, need to be introduced for the purpose.

Kumar et al., (2008) in their study examine the hedging effectiveness of futures contract on a financial asset and commodities in Indian markets. In their view, in the context of an emerging market, the growth of capital and commodity futures market in India would depend on effectiveness of derivatives in managing risk. They estimate dynamic and constant hedge ratio for Standard and Poor’s CRISIL – National Stock Exchange’s index (more popularly known as S&P CNX Nifty, which represents for the leading index for large 50 companies, from 21 sectors of the economy, on the National Stock Exchange of India. It is used for variety of purposes such as benchmarking fund portfolios, index-based derivatives and index funds) futures, Gold futures and Soybean futures. The researchers used, in the study, the econometric models such as the Ordinary Least Squares (OLS), Vector Auto-Regression (VAR) and Vector Error Correction Model (VECM) for constant hedge ratio and Vector Auto-Regression –Multivariate Generalized Auto Regression Conditional Heteroskedasticity (VAR-MGARCH) for dynamic hedge ratios. They compare in-sample and out-of-
sample performance of these models in reducing portfolio risk and found that in most of the cases, VAR-MGARCH model estimates of time varying hedge ratio provide highest variance reduction as compared to hedges based on constant hedge ratio. The results of their study show that futures and spots prices are found to be co-integrated in the long run. Amongst the constant hedge ratio models, in most of the cases, VECM has been found to perform better than OLS and VAR models while time varying hedge ratio derived from VAR-MGARCH model was seen to provide highest variance reduction as compared to the other methods in both in-sample as well as out-of sample period for all contracts. The study however notes that VAR-MGARCH hedge ratio varies dramatically over time and calls for frequent changes in hedging positions. Besides, the transaction cost in implementing dynamic hedging using VAR-MGARCH may nullify some of the gains provided by it. The study concludes that both the stock market and commodity derivatives markets in India provide a reasonably high level of hedging effectiveness (90 per cent). It can, therefore, be maintained that the derivatives markets in Indian context provide a useful risk management tool for hedging and for portfolio diversification.

Nag and Goswami (2008) in their paper analyze different sources of commodity price fluctuations and their attendant macroeconomic implications for developing countries in terms of the over-(under) shooting hypothesis (the key insight of this model, developed by the economist, Rudi Dornbusch, is that lags in some parts of the economy can induce compensating volatility in others) under perfect foresight. The authors build a two-sector open economy macro-model to examine the effects of different shocks on commodity price, wage and employment under the flexible exchange rate regime. The paper emphasizes the twin role of agricultural sector in an emerging market economy – as a provider of wage goods and also as a supplier of foreign exchange for the industrial sector. Given this specific nature of sectoral inter-linkage, the paper attempts to identify the possible sources of commodity price fluctuations in an open economy set up. The different comparative static exercises attempted in this paper indicate that short-run and long-run effects of different policy prescriptions are significantly different. The short run expansionary effect of rise in money supply does not persist in the long run through an equal proportionate rise in the price of primary commodity, the nominal exchange rate and the industrial price level.
The striking result of the paper is in the context of agricultural trade liberalization. The paper clearly shows that short run inflationary outcome is purely a temporary phenomenon. The short run adverse effect on commodity price completely disappears once the economy draws away its transitional phase. In fact, in the long run, commodity price comes back to its initial level signifying an improvement in the real wage rate. Hence, the clear policy message is that the short run effect is not a reliable guide for designing the macroeconomic policy.

Noting that the effect of the introduction of futures trading on the spot market volatility has been widely documented in the financial literature, Sakthivel (2008) in his study undertakes to investigate the impact of introduction of index futures trading on volatility of National Stock Exchange Index (Nifty). The study employed Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH) model to capture the time varying nature of the volatility and volatility clustering phenomena using daily closing price of the Nifty. The results emanating from the study revealed that after the introduction of the futures trading, stock market volatility declined owing to improved market efficiency. Examining futures trading changes structure of spot market volatility using GARCH model, it is observed that the structure in spot market volatility seemed to change following the introduction of futures trading. The analysis specifically finds that the introduction of the derivatives contract improved the market efficiency and reduced the asymmetric information. It is concluded that futures trading reduces spot price volatility, by providing low contingent strategies and enabling investor to minimize the portfolio risk by shifting speculator from the spot market to the future market. The low margins, low transaction cost, standardized contracts and trading conditions attract risk taking speculator to the futures market. Hence, the futures are expected to have stabilizing influence as it adds more traders to the cash market, making it more liquid and therefore less volatile, underlines the study.

Schnepf (2008) in his study points out that prices for nearly all major the United States agricultural programme crops such as corn, barley, sorghum, oat, wheat, rice, and soybeans have registered extreme price volatility since mid-2007, while rising to record or near-record levels in early 2008 pointing towards dire consequences for the world’s vulnerable populations, particularly in import-dependent, less developed countries. According to the author, these high commodity prices have resulted in
continuous increase in the farm income in the United States, and thus the government farm programme costs have significantly decreased. Simultaneously however, these rapidly rising prices have also stimulated food price inflation, which resulted in surging the costs for livestock producers and food processors. Besides, increasing the risk and costs associated with grain merchandising, these high and unexpectedly volatile prices have, in particular, dramatically increased the cost of routine hedging activities (i.e., pricing commodities for purchase, delivery, or use at some future date) at commodity futures exchanges. Consequently, forward-contracting opportunities for grain and oilseed producers who are eager to take advantage of record high market prices have become diminished. While in the case of some crops (particularly for wheat and rice), the price increases are likely to be relatively short-term in nature and are due to weather-induced crop shortfalls in major producer and consumer countries, a weak United States dollar that has helped spark large increases in the United States exports. Further, it is being maintained that the new equilibrium prices will be significantly higher than that has traditionally been observed during periods of market balance when commodity supplies would eventually recover and prices moderate from current high levels.

In the light of the ban imposed by government of India on May 07, 2008, on futures trading in four agricultural commodities, namely chickpea, potato, rubber and soy oil and the subsequent debate whether or not futures trading contributed to the increase in prices, Srinivasan (2008) in her paper has sought to examine the rationale behind the ban and study how logical the decision to impose it is. Noting that the ban was intended to control inflation, the author found that of the four banned commodities, only potato experienced a decline in its price and that too on account of the bumper crop in respect of this commodity. The study observes that the ban resulted in a huge loss of trading volumes for the futures exchanges (about Rs.15000 crore a month in three national exchanges alone), but didn’t impact food prices significantly. The rising inflation rate, pegged at 11.42 per cent for the week ended June 14, 2008, could be attributed to a number of factors, including the 56 per cent increase in global food prices over the past year, record crude oil prices (over $140 a barrel), the diversion of land for bio-fuel production, loose monetary policy in emerging economies, and the adoption of an expansionary fiscal policy by the Government. An analysis of spot and
futures prices of the four banned commodities shows a high degree of positive correlation in the prices of the two markets. The prices were found to be interdependent in that while the futures markets were seen giving signals to the spot markets on the direction in which prices will move in the future, the futures prices, on the other hand, were found getting determined on the basis of the conditions in the spot markets. Speculation was observed driving prices further up, but a speculator expected prices to rise due to the market conditions, and was not seen arbitrarily betting on a price rise. The data pertaining to food prices and inflation showed that the ban did not help to control the price rise. The author concluded that banning futures was an illogical solution because it seemed to stultify the development of a mechanism to regulate unhealthy speculation. In her opinion, while higher food aid to the poor is essential to minimize the impact of the food crisis in the short run, in the long run; on the other hand, the Government must, in stead of implementing misguided schemes like the farm loan waiver, invest in developing agriculture and in providing better infrastructure in terms of storage and transportation, and the organization of spot markets. The study noted that the tightening of the monetary and fiscal policy in India, coupled with removal of bio-fuel subsidies in the United States and the European Union will help ease food prices. Furthermore, the extent to which the two markets influence each other depended on the level of integration of the two markets, which in turn, depended upon the development of the spot markets along with the futures markets and the growing participation of the farmers in these markets. In the opinion of the author, the debate over the futures ban becomes irrelevant, particularly when the participation by consumers and producers of agricultural commodities in the futures market is low.

Wight and Laffan (2008)\textsuperscript{21}, in their paper, note that the prices for most agricultural commodities rose sharply through 2007 and early 2008. The increases have been driven by a combination of structural and short term factors. These include rising demand driven by economic growth in developing countries; increased production of biofuels which has reduced the availability of crops for food and feed, and a series of poor seasons for a number of major agricultural producers which severely affected global supplies. Global stock rebuilding will be slow and global demand is expected to remain strong. Consequently, international prices are expected to stay high by historical standards for at least a few years. The recent rise in the prices of global agricultural
commodities has been substantial and could signal an upward shift in the long-run average prices and an historic change from a century-long downward trend. These high prices, contend the authors, are benefiting Australia directly as a major exporter of many agricultural commodities. However, Australia’s ability to capitalize on the higher prices for agricultural commodities has so far been limited by the drought. Increased global production should ease the tight supply situation and world prices are forecast to fall slightly, assuming no further disruptions. However, the rebuilding of global stocks will be slow and global demand is expected to remain strong, meaning that international prices are expected to remain high by historical standards for years to come. The best opportunity for the world to address long-term food security and the effects of high prices on developing countries is through removal of market distortions and not the imposition of new ones.

Badhani, et al. (2009)22, in their paper, attempt to identify the structural breaks in the volatility dynamics of 21 stocks using the cumulative-sum-of-squares (CUSUM) procedure. It is believed that the derivatives contribute in efficient price discovery of underlying assets and reduce the volatility in their prices. This hypothesis has been tested by many researchers for Indian stock market and most of them conclude that the volatility of stock prices has come down after the introduction of the derivative trading in the market. The use of a dummy variable as an additional regressor with Generalized Auto-Regressive Conditional Heteroskedasticity (GARCH) specification of conditional volatility, however, is not capable to isolate the effect of derivative trading from the impact of other market reforms on the volatility of stock prices. The researchers do not find any conclusive evidence suggesting that the introduction of derivative trading has caused a reduction in the volatility of the prices of underlying stocks. Therefore, on the basis of these results, the study concludes that the introduction of derivative trading has no definite implication for the volatility of underlying stocks.

An important paper by Jacks et.al. (2009)23 is motivated by the common observation that the poor countries are more volatile than rich countries, and that this volatility impedes their growth performance. Furthermore, it appears that roughly half of this excess volatility can be explained by the fact that poor countries experience, in comparative terms, bigger and more frequent aggregate shocks than the economically advanced countries. Finally, the origin of the shocks can be traced to commodity price
volatility. Against such a backdrop, the paper sets out to explore price data for primary products (commodities) and manufactures over the past three centuries to answer three questions: *First*, has commodity price volatility increased over time? The answer to this question, according to the authors, is unambiguously in the negative. In particular, the analysis finds no evidence of the trend since 1700. *Second*, have commodities always shown greater price volatility than manufactures? The answer, according to the authors, is unambiguously in the affirmative. In support of this answer, it is emphasized that higher commodity price volatility is not some Prebisch-like modern product of asymmetric industrial organization – monopolistic and oligopolistic manufacturing versus competitive commodity markets – that only appeared with the industrial revolution. Rather, it seemed to prevail deeply into the 18th century. And *finally* to the question, if globalization and world market integration breed more or less commodity price volatility, the answer according to the authors, is less. To substantiate their viewpoint, they hold that it is possible to imagine a tug of war between two countervailing forces. It becomes evident from the fact that while the impact of supply shocks in commodity-exporting countries is diminished by the integration of small local markets with large world markets on the one hand; the commodity exporting countries expose themselves to world demand instability generated by cyclical booms and busts in the industrial countries by their integration into world markets, on the other. A close look at the past three centuries of history makes it abundantly clear that economic isolation caused by war or autarkic policy has led to much greater commodity price volatility. In contrast, world market integration associated with peace and pro-global policy seems to have been associated with less commodity price volatility. Given specialization and comparative advantage, globalization has made a positive contribution to the growth in poor countries to the extent that it has reduced commodity price volatility. There is however no denial to the fact that specialization, far from being given, is endogenous to policy regimes. It can, therefore, be concluded that globalization has increased poor country specialization in commodities when the world went open after the early 19th century; but it did not do so with the Third World shifting to labor intensive manufactures after the 1970s.

Kumar and Chaturvedula (2009) observed that the traditional approach of analyzing the inter-linkages between spot and futures market concentrates on
examining causality dynamics in returns and volatilities. The said approach, however, does not address the extent of price discovery either in the spot market or in the futures markets. In their study the authors followed the Information Shares Approach which takes into account the variability of the innovations in each market’s price. They considered intra-day data of one-minute and five-minute duration of 46 National Stock Exchange Index (Nifty) constituent stocks spot and futures segment during Jan 2004 to March 2007. The study reveals that the spot and futures prices are co-integrated and mutually adjusting. This evidence, *prima facie*, sounds counter-intuitive, as traditionally it is felt that the informed investors trade in futures (derivatives) segment which offer them the leverage benefits and the trades of informed investors cause permanent shifts in prices and hence more price discovery in futures segment. The authors probed further to know why futures segment was not found to be the leader in price discovery. Taking a look at the trading parties’ involvement in futures trading vis-à-vis spot market trading, the study found that in view of the fact that institutional participation was minimal in derivatives owing to the regulations prevalent in Indian stock market, informed traders prefer spot market. Hence, the spot segment seems to enjoy price leadership over the futures segment.

Sadath and Kamaiah (2009) in their study investigate the effects of individual stock futures expiration on the underlying stock market in the National Stock Exchange of India by using daily data of 42 sample stocks of high market capitalization. It is important to mention that the introduction of financial derivatives like stock futures is considered to be one of the most important financial innovations that have taken place in respect of the financial markets in the last few decades. The authors observe that the primary objective of such a structural change in the financial market is to contain the risk involved in the financial investment strategies. It is further noted, that the increased acceptance of stock futures as an effective investment instrument has raised many a question regarding the possible impact of stock futures trading on markets for other securities, especially on the market for underlying stocks. The expiration day effect has been defined as the effect on securities prices and volume as traders adjust their positions shortly before expiration of options and futures contracts. This effect, noted the authors, can arise from several sources. For example, in the *first* instance, it can arise from the arbitrageurs who unwind arbitrage positions in the stock market due to
the deviation of the futures price from its fair value stipulated by the cost-of-carry relationship. If many arbitrageurs liquidate at the same time and in the same direction, price effects are possible. Second, the market price manipulation has been pointed out as another source of expiration day effect. The investors with positions in the futures market may have concerns with respect to the settlement price and will try to manipulate the underlying market price in a favorable direction. And finally, the stock market procedure, it has been noted, also leads to the expiration day effects. The severity of price effects on expiration day depends in part on the stock market procedures for accommodating order imbalances that may arise when arbitrage positions are unwound. The study points out that if unjustified price effects were known to occur, knowledgeable investors would stand ready to buy underpriced stocks and sell overpriced stocks-actions that would normally limit price effects to fall within the bounds of transaction costs. In addition, if market mechanisms are not well designed to offset sudden imbalances, the price effects may be substantial. The study, thus, shows that futures expiration has resulted in the positive price and volume effects during the periods leading to the expiration date. This result is at variance with the findings of studies on the United States where negative price effect before the expiration day was found. The study reveals that the reported expiration day effects may be due to the unwinding of arbitrage positions in the spot market. It has been reported in the study that the unwinding of arbitrage positions on an enormous scale in the same direction would stimulate price and volume effects.

Zoli (2009) in his paper has studied the role of international commodity price shocks, cyclical fluctuations, catching-up and transition-related factors—such as price liberalization and price convergence—in driving inflation in 18 European emerging economies. It finds that international food and oil price shocks have a significant impact on domestic inflation, and explain, on an average, about 19 per cent of the variation in headline inflation. Cyclical fluctuations, while contributing to inflation, explain a relative small share of inflation variability. Inflation inertia, changes in consumption tax rates, nominal effective exchange rates movements, interest rates and price convergence are also significant determinants of inflation. The empirical analysis in the study suggested that in view of the fact that drops in international fuel prices affect inflation significantly and rapidly, inflation was expected to fall in emerging
Europe in the wake of the ongoing sharp decline in world fuel prices. The recent slowdown in international food prices, on the other hand, may not have such a quick effect, as the inflationary impact of world food price shocks is rather persistent, and the response to falls in international food prices is not very strong. The analysis noted that since oil and food prices were expected to increase again in the next few years, the possibility of inflationary pressure from international commodity prices resurfacing in the medium-run cannot be ruled out altogether. The study further observed that as the spillovers from shocks to domestic food and energy inflation tend to be persistent in emerging Europe, the possible second-round effects from the recent surge in domestic food and energy inflation continue to remain a potential source of concern in the short-term, even as commodity prices moderate. It is also noted that although the econometric analysis seemed to suggest that headline inflation response to downturns was not very large, the ongoing economic slowdown was, nevertheless, bound to certainly moderate inflationary pressure. It argued that convergence related factors were likely to remain a source of price pressures in the medium term. While price liberalization and relative price movements in the tradable and non-tradable sectors did not seem to be a contributing factor to inflation in emerging Europe, price convergence was estimated to add nearly three percentage points to headline inflation for the average country whose price level is about 50 per cent relative to the EU-15 (the groups of 15 countries, viz., Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portuguese, Spain, Sweden and the United Kingdom of the European Union) average. In addition, international food prices were likely to be less affected by the global slowdown as they were not expected to decline as sharply as the decline in fuel prices.

A cursory look at the foregoing review of the studies points towards the important conclusions, namely (a) almost all the studies accept and emphasize the importance of examining the phenomenon of hedging mechanism more intensely; (b) almost all the studies attempt to correlate the phenomenon of hedging mechanism to the prevailing price volatility, which is caused by the inter-face among the sections of the various agents operating in the agricultural commodity markets; (c) almost all the studies included in our review invariably argue for the adoption of a multi-pronged strategy to cope up with the problems of food security and improving the living
standards of the vulnerable and hitherto neglected segment of the population and (d) not only that various studies cover different agricultural commodities, they also use various quantitative techniques for examining the phenomenon of price volatility and make a case for hedging in respect of these commodities. On close examination however, it becomes abundantly clear that none of these studies seems to have gone into the issue of hedging mechanism in the case of agricultural commodities exhaustively. While some of the studies have had a narrow coverage, there are others which suffer from lack of theoretical underpinnings. Consequently, a deeper analysis of the issue of hedging mechanism in respect of agricultural commodities in spite of its tremendous importance from the viewpoint of appropriate policy formulation continues to be as elusive as ever before. The phenomenon of hedging mechanism needs to be examined more deeply in comparison to what has hitherto been the case. There thus exists an important research gap. The present study is a modest attempt in this direction.

In sum, the preceding discussion makes it fairly obvious that while the issues pertaining to hedging mechanism for farm products through commodity exchanges has fascinated researchers elsewhere, the empirical investigations from the perspective of futures and commodity exchanges in the emerging scenario in India continues to be amiss even now. Consequently, only a disjointed bit of evidence is discernible in respect of the issues related to the theme under consideration. As a result, adequate information is not as yet available concerning the development of commodity exchanges for agricultural commodities which, to reiterate again, continues to be an important area for research. This, in our opinion, is an important research gap. The present study is an important attempt to fill this research void.

NOTES AND REFERENCES


