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**IMPACT OF PROPOSED COMMODITY
TRANSACTION TAX ON FUTURES
TRADING IN INDIA**

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Foreword

In the union budget 2008-09, the government has proposed a commodity transaction tax (CTT) of 0.017% which would increase total transaction cost of futures trading in commodity markets. In this context, the objective of the paper is to assess the relationship between trading activity, volatility and transaction cost. Further, the paper also attempts to examine the nexus between inflation and futures trading for five major commodities traded on futures exchange. The findings of this paper, it is hoped, will contribute to the general debate on the welfare implications of future commodity markets. This is an exploratory study examining the impact of CTT on certain dimensions such as trading volume and volatility only for top five commodities traded in one futures exchange. These results need to be reinforced by further research undertaken for a larger number of commodities and other futures exchanges. ICRIER is planning to take up such research in the near future.



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Abstract

Trading in commodity derivatives on exchange platforms is an instrument to achieve price discovery, better price risk management, besides helping macro-economy with better resource allocation. Since the inception (2003) of national online trading on multi-commodity exchange platforms, the trade volumes have grown exponentially. In the union budget 2008-09, the government has proposed to impose a commodity transaction tax (CTT) of 0.017%. Though the stated rationale for imposing higher taxes is to contain price rise and volatility, to generate revenue, and to increase transparency, these arguments are debatable and not much rooted in the available literature. In this context, we examine the relationship between trading activity, volatility and transaction cost using a three-equation structural model for five top selected commodities namely Gold, Copper, Petroleum Crude, Soya Oil and Chana (Chickpea). Results suggest that there exists a negative relationship between transaction cost and liquidity, and a positive relationship between transaction cost and volatility. Therefore, if the government imposes CTT, it would lead to higher volatility and lower trading activity affecting market efficiency and liquidity. However, agricultural commodities such as refined Soya oil and Chana are least affected in terms of volume and volatility in response to the imposition of transaction tax. Increased volatility may lead to more speculative activity and fail to achieve the price discovery and resource allocation objectives of the commodity markets. Further, the granger causality results reveal the efficiency of futures markets but do not provide any conclusive evidence about the nexus between price rise and futures trading.

Key Words: *Commodity Transaction Tax, Futures Market, Liquidity, Volatility.*

JEL Classification: *G19, G13, G14, L71, Q40*

IMPACT OF PROPOSED COMMODITY TRANSACTION TAX ON FUTURES TRADING IN INDIA

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I. Introduction

A commodity exchange is defined as a market where multiple buyers and sellers trade commodity-linked contracts on the basis of terms and conditions laid down by the exchange (UNCTAD, 2007). Commodity exchanges offer spot trade for immediate delivery and forward contracts which result in future delivery¹. Since the commodity exchanges provide a forum for trading commodity-linked contracts, they reduce the transaction cost associated with finding a buyer or seller. Further, most importantly, the hedging and price discovery functions of future markets promote more efficient production planning, storage, marketing, rationalization of transaction costs & better margins for producers (Gilbert, 1985; Varangis and Larson 1996; Morgan, 1999; World Bank 1999). Since the inception of economic reforms in India in 1991, there have been efforts to open up futures trading in commodity markets which led to withdrawal of its prohibition in 2003. The volume of futures trade grew² exponentially in agricultural commodities till 2005-06, but the trade in bullion and other metals has overtaken it since 2006-07.

Participants of Commodity Exchange & Futures Market³ can be broadly classified into investors, brokers, hedgers, speculators and arbitrageurs. While a broker executes and facilitates trading, a hedger engages in the futures trading to protect himself

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¹ Commodity trading could be in the open-outcry mode whereby traders gather to auction lots of produce or it could be in electronic form.

² See Table-1 and Table-2 in Appendix at the end. All the tables are given in Appendix at end.

³ In general, participants in the Commodity Exchange & Futures Market may include financial institutions, farmers, grain merchants, brokers, multinational corporations, food processors, and speculators.

against the risk of unfavourable price changes. However, the efficiency of the futures markets depends on the speculators who use liquid markets to move prices to get higher return and on the arbitrageurs who equalize prices across different markets for the same commodity by simultaneously trading to profit from a temporary discrepancy in prices across different exchanges.

Economic Rationale for the Futures Market: Futures markets facilitate discovery of price expectations at a future date on the basis of information collected by many stake holders. Efficient functioning of future markets arguably results in many benefits for optimal decision making and resource allocation such as (i) Price Discovery—which is determined in this competitive market on the basis of estimated, current and future, supply and demand. However, efficiency of price discovery depends on the continuous flow of information and transparency⁴ (UNCTAD 2007). Price discovery in futures market guides producers to make decisions on the timing of trade and farmers in making cropping decisions etc. Overall, price discovery reduces the so-called “cobweb effect” of inter-seasonal price fluctuations. (ii) Risk Reduction—futures markets allow market participants such as farmers, traders, processors etc to hedge their risk against price volatility by offering trade in commodity forwards, futures and options. The price discovery in futures markets, which facilitates in stabilizing prices of commodities, can potentially offset losses or price risk by hedging (Morgan, 2000). Hedging can bring greater certainty over the planting cycle, confidence to invest, adjust cropping patterns, diversify risk profile and opt for higher-risk but higher-revenue crops⁵. (iii) Risk Sharing - future commodity markets allows for risk sharing among various market participants⁶. Thus, overall, future markets promote more efficient production planning, storage, marketing and better margins for producers by providing a mechanism for risk management and price discovery (Gilbert, 1985; Varangis and Larson 1996; Morgan 1999; World Bank, 1999).

⁴ Factors such as natural calamities, political instability, climate change etc, can all have a major effect on supply and demand and, as a result, the present and future price of a commodity.

⁵ See UNCATD, 2007 for details.

⁶ For example, farmers can sell in futures to ensure remunerative prices. A manufacturing firm can buy in futures to hedge against volatile raw material costs. An exporter can commit to a price to his foreign clients. A stockist/supplier can hedge his carrying risk to ensure smooth prices of seasonal commodities round the year.

However, futures markets have also been criticized for several reasons namely (i) futures trading drives up prices as speculators use liquid market to manipulate prices⁷, which works against the interest of growers and consumers; (ii) futures trading drives up volatility though the existing limited empirical evidence does not support this view⁸ (Naik, 1970; Dasgupta, 2004); (iii) futures market is not transparent, though the transparency depends upon information symmetry and level of infrastructure.

Government of India has proposed to impose transaction tax by 0.017% in the 2008-09 budget almost increasing the total transaction cost by more than 950 percent (see Table-3). The stated rationale for imposing CTT is to contain price rise, volatility in future markets and to bring in more transparency. But this rationale is not much rooted from literature. Given the benefits of the futures markets as briefly discussed and the nascent stage of commodity exchange in India today, this study makes an attempt to assess the impact of proposed transaction tax on liquidity, volatility, prices and efficiency of commodity derivative markets in India. The findings of this paper, it is hoped, will also contribute to the general debate on the welfare implications of future commodity markets.

The rest of the paper is structured as follows: Section-II describes the development of commodity futures market in India; Section-III explains the commodity transaction tax; Section-IV deals with the global experience with Commodity Transaction Tax (CTT); Section-V explains the methodology and empirical analysis of CTT on liquidity, volatility, prices and efficiency. Section-VI presents the conclusions and the policy implications.

II. Development of Commodity Futures Market in India

India is one of the top producers of agricultural commodities and a major consumer of bullion and energy products. Given the importance of commodity production and consumption in India, it is necessary to develop the commodity markets with proper

⁷ For example, in case of some bad news about the future, the speculators start hoarding the commodities & hence, artificially drive up the prices. But in case of some negative news about future, the prices are going to go up irrespective of whether futures market is there or not.

⁸ Contrary, Naik (1970) finds that the fluctuation in prices of commodities was higher when there were no futures trading as compared to prices when there were futures trading

regulatory mechanism for efficiency and optimal resource allocation. In this section we review the growth and performance of commodity markets in India.

Origin of Commodity market: The history of organized commodity futures market in India goes back to the nineteenth century when the cotton trade association started futures trading in 1875 followed by derivatives trading in oilseeds in Bombay (1900), raw jute and jute goods in Calcutta (1912), wheat in Hapur (1913) and bullion in Bombay (1920). However, many feared that derivatives fuelled unnecessary speculation and the Government of Bombay prohibited options business in cotton in 1939. Further, forward trading was prohibited in oilseeds and some other commodities including food-grains, spices, vegetable oils, sugar and cloth in 1943. Post independence, the Indian constitution listed the subject of “Stock Exchanges and Futures Markets” under the union list and a legislation called Forward Contract Act 1952 was enacted, on the basis of recommendations of the Shroff Committee providing legal framework for organized forward trading. The first organized future trading was by the India Pepper and Spices Trade Association (IPSTA) in Cochin in 1957. However, futures trade was prohibited in most of the commodities thereafter. Since then both the Dantawala Committee (1966) and the Khusro Committee (1980) have recommended the revival of futures trading in agricultural commodities⁹.

After the 1991 reforms, the Government set up a Committee in 1993 headed by Dr. K.N. Kabra to examine the role of futures trading. The committee recommended that futures trading in 17 commodities be permitted. Further, National Agricultural Policy (2000) and the expert committee on strengthening and developing Agricultural Marketing (2001, Guru Committee) supported commodity futures trading. In February 2003, the government revoked the ban and accepted most of these recommendations allowing futures trading in 54 commodities in bullion and agricultural sectors. Responding positively to the favourable policy changes, several Nation-wide Multi-Commodity Exchanges (NMCE) were up since 2002, using

⁹ See the Report “The Impact of Future Trading on Agricultural Commodities”, 2008, for more on history of future trading in India. Now onwards Expert Committee Report, 2008 (EC, 2008). Brief Review of the EC report has been given in Appendix.

modern practices such as electronic trading and clearing. The Forward Markets Commission (FMC) regulates these exchanges¹⁰.

Structure of Commodity Market in India: Trading in commodity market takes place in two distinct forms such as the Over-The-Counter (OTC), which is basically spot market and the exchange-based market. Further, as in equities, there exists the spot where participation is restricted to people who are involved with that commodity, such as the farmer, processor, wholesaler, etc. and the derivatives segments where trading takes place through the exchange-based markets like equity derivatives.

At present, there are 23 exchanges operating in India and carrying out futures trading activities in as many as 146 commodity items (see Fig-1). As per the recommendation of the FMC, the Government of India recognized the National Multi-Commodity Exchange (NMCE), Ahmedabad; Multi Commodity Exchange (MCX) and National Commodity and Derivative Exchange (NCDEX), Mumbai, as nation-wide multi-commodity exchanges. NMCE commenced in November 2002 and MCX in November 2003 and NCDEX in December 2003. Unlike the stock markets, the commodity markets in India have a single product (only futures) and a single user¹¹ (only traders including corporates).

Growth of Commodity Futures Market: The volume of trade has increased exponentially since 2004-05 to reach Rs. 40.65 lakh crore in 2007-08. Almost 95% of this is now accounted for by the two national exchanges viz., Mumbai (MCX), with around 75 % share and NCDEX, with 20 % share (see Figure-2). There are more than 3000 members registered with the exchanges. More than 20,000 terminals spread over more than 800 towns/cities of the country provide access to the trading platforms (EC, 2008). Gold, silver and petroleum crude recorded the highest turnover in MCX; while in NCDEX, soya oil, guar seed and soyabean was dominant; in NMCE, pepper, rubber and raw jute were the most actively traded commodities. Though in India, agricultural products dominate the commodity sectors, trading in non-agricultural

¹⁰ At present, there are three tiers of regulations of forward/futures trading system in India, viz., Government of India, Forward Markets Commission and Commodity Exchanges.

¹¹ The stock markets in India have options and indices meeting the needs of people with various risk taking ability. Further, unlike in stock markets, commodity markets are not open to banks, mutual funds, and foreign institutional investors.

commodities has been dominating particularly, from 2006-07 onwards. The trading volumes of non-agricultural commodities have shot up almost twice that of agricultural commodities during the same period. Overall, the Indian commodity market has shown tremendous growth in terms of both value and the number of commodities traded in the last five years. As the largest commodity futures exchange during 2006-07, both in terms of turnover and number of contracts, the growth of MCX is comparable (see Figure-3) with some of the international commodity futures exchanges such as Dow Jones AIG Commodity Index (DJAIG) and Reuters/Jefferies Commodity Research Bureau (RJCRB). A comparative picture of the volume of trade in major commodity derivative market is reported in Table-4.

Performance of Indian Commodity Derivatives Market: There are few empirical studies on the performance of Indian commodity derivatives market. A study by Lokare (2007) finds that although Indian commodity market is yet to achieve minimum critical liquidity in some commodities (sugar, pepper, gur and groundnut), almost all the commodities show an evidence of co-integration between spot and future prices revealing the right direction of achieving improved operational efficiency, *albeit*, at a slower pace. Further, hedging proves to be an effective proposition in respect of some commodities. However, in a few commodities, the volatility in the future price has been substantially lower than the spot price indicating an inefficient utilisation of information. Several commodities also appear to attract wide speculative trading. One of the reasons for low volumes could be attributed to some of the measures that FMC undertook in the recent period such as daily mark to market margining, time stamping of trades, demutualisation for the new exchanges, *etc.*, with a view to promote market integrity and transparency. The exchanges have attributed subsequent fall in the volume of trade to introduction of these measures¹²(Kolamkar, 2003). Thomas (2003) reports that major stumbling blocks in the development of derivatives market are the fragmented physical/spot markets. Supporting this view, Lokare (2007) suggests that national level derivative exchanges cannot be founded on fragmented localized cash markets. Because of fragmentation, prices of major commodities vary widely across *Mandis*. These differences arise

¹² The exchanges like Bombay Commodity Exchange and Kanpur Commodity Exchange, which implemented most of these reforms, were literally deserted by all the traditional players (Kolamkar, 2003).

because of poor grading; differential rates of taxes and levies, and inadequacy of storage facilities (Bhattacharya, 2007). Similarly, Raizada and Sahi (2007) found that commodity futures market is not efficient in the short-run and social loss statistics also indicate poor price discovery in the commodity market. Spot price leads the futures price determination and the futures markets are not performing their main role of price discovery. There were also doubts that the growth of commodity futures market volume has an impact on the inflation level in India. Though EC (2008) report does not find any conclusive evidence between futures trading in agricultural commodities and their price level. The change in price level and volatility in top ten agricultural commodities are shown in fig-4 and fig-5. The analysis of the EC report does not show any clear evidence of either reduced or increased volatility of spot prices due to futures trading. Further, the fact that agricultural price inflation accelerated during the post futures period does not, however, necessarily mean that this was caused by futures trading. 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 (see Appendix for Brief Review of EC Report, 2008).

IV. Commodity Transaction Tax in India

The government has proposed to impose CTT in budget 2008-09 in line with the Securities Transaction Tax (STT) thereby bringing the futures market under the net of service tax. CTT shall be charged in respect of every taxable commodities transaction. The sale of an option in goods or an option in commodity derivative or sale of any other commodity derivative would attract 0.017% of CTT, which is payable by the seller and is calculated on the basis of option premium and selling price respectively. This entails a rise of total transaction cost from Rs. 2.00 per lakh to Rs. 19.25 per lakh – more than 950 percent increase on an average (see Table-3 and Table-5). Increase in CTT is contrary to the observation in the Economic Survey, 2007-08, “Direct participation of the framers in the commodity futures markets is somewhat difficult at this stage as the large lot size, daily margining, high membership fees etc., work as deterrent for framers’ participation in these markets” and the increase in CTT will further increase the cost¹³. Though Agricultural Produce Marketing Committee

¹³ There is also no evidence of imposition of CTT in other exchanges in the rest of the world.

(APMC) Act makes provision that no tax, cess or *mandi* fee is payable by the farmers, they will pay CTT as it is proposed to be levied on sellers. It implies that a farmer, who sells a futures contract to protect himself against price risk will be required to pay CTT¹⁴.

Generally, commodity derivatives are based on global asset class and investors can choose between MCX, NCDEX, NMCE, or NYMEX (New York), CBOT (Chicago) TOCOM (Tokyo), SFE (Shanghai) for trading. Therefore, Indian commodity exchanges have to match the transaction costs applicable at their international peers to attract investors. Any increase in the transaction tax beyond the international level may drive the volume to international exchanges or unofficial *dabbas*. Hence, applying CTT means exporting our market to other global exchanges as CTT is not levied in these leading exchanges (Table-5). It is clear that the transaction cost for trading value of Rs. 1 lakh will be the highest in the world after the levy of CTT and service tax.

CTT has been proposed on the lines of Securities Transaction Tax (STT), its levy should not affect commodity futures market like STT (Sahu, 2008). However, equity markets in India are mature and large in size compared to commodity futures market. Further, the basic purpose of commodity market is hedging against price risk which is considered as an insurance instrument (World Bank, 1996). Therefore, CTT is simply a tax on insurance policy, thereby sending a negative signal to the potential hedgers insuring against price risk. The difference between stock market and commodity derivative market is summed up in table-5.

The Argument for CTT: The rationale for levying CTT may have been guided by the following argument. (i) generating revenue- one of the motives for levying CTT is to generate tax revenues. However, actual realization of revenue from CTT may not be significant if the volume of trading falls in response to the CTT. Further, traders may migrate their investment to foreign exchanges in order to seek lower transaction tax and retain profit (Umlauf, 1993). (ii) tracking information for better tax

¹⁴ Some of exchanges also claim that the commodity before it comes for trading in commodity exchanges is already charged to the tune of almost 12 per cent with taxes such as *mandi* tax, the cess, the handling cost and warehousing charges.

compliance: CTT may have been designed as an anti-evasion measure. But, all national commodity exchanges have world class surveillance systems with proper auditing and are regulated by FMC. Hence, tracking is always possible even without imposition of CTT. (iii) reducing excess volatility: proponents believe that the transaction tax could act as a fundamental function to reduce excess volatility by reducing noise trading. However, there is also the possibility that increase in transaction tax may not necessarily check price volatility (see Roll, 1989; Kupiec, 1991; Grundfest and Shovel, 1990).

IV. Impact of Transaction Tax: Global Experience

There have been considerable debates on the costs and benefits of imposing transaction taxes on the securities and derivatives markets. In general, proponents of a transaction tax argue that it would generate revenues (see Kiefer, 1990) and discourage speculative trading. Transaction taxes can also help reduce noise trading, a significant source of price fluctuations, and hence decrease the return volatility (see Stiglitz, 1989; Summer and Summer, 1989).

Opponents argue that the benefits of a transaction tax are likely to be outweighed by its potential costs, because it would increase the cost of capital (Amihud and Mendelson, 1993), reduce market liquidity (i.e., decrease in trading volume and increase in bid-ask spreads), not necessarily reduce excess price volatility (Kupiec, 1991; Grundfest and Shoven, 1990), and bring down securities' values (Amihud and Mendelson, 1990). Recently, Lo, Mamaysky, and Wang (2003) developed a theoretical model showing that fixed transactions costs would induce large "no-trade" regions, decrease securities' liquidity and result in a significant illiquidity discount in asset prices.

Edwards (1993) examines the rationale for extending tax on security markets futures to commodity markets futures in the USA and analyzes the potential effect. His findings reveal that tax on futures market will not generate substantial tax revenues and it will increase bid-ask spread and may shift trading volume to overseas markets weakening the international competitiveness of US futures markets. Further, a transaction tax would generate indirect costs for hedgers as they need to pay higher risk premiums to speculators due to the reduction in trading volume.

On the effect of transaction tax on trading volume, Ericsson and Lindgren (1992) analyze the cross-sectional data for twenty three exchanges in twenty two countries. They find that an increase in the transaction tax would reduce average turnover (measured as trading volume/shares outstanding). Wang and Yau (1994) examine the relations between trading volume, bid ask spread, and price volatility in four US futures markets. Inferring that a transaction tax would have the same effects as wider bid-ask spreads, they find that such a tax will reduce trading volume, increase price volatility and generate moderate increase in tax revenues. Baltagi *et al.* (2006) find that an increase in the Chinese stamp tax rate by 0.2 percentage points reduces the trading volume by one third.

Roll (1989) examines whether countries with transaction taxes have a lower volatility, and finds the answer to be negative. Similarly, Umlauf (1993) finds that the introduction of, or increase in, the Swedish transaction tax would lead to an increase in stock market price volatility. Examining the effect of changes in transaction taxes in four Asian countries, Hu (1998) finds insignificant impact of transaction taxes on price volatility, but significant negative impact on stock returns in some countries. Saporta and Kan (1997) investigate the effect of the UK stamp duty on the volatility of continuously compounded 15-minute returns over daily, weekly and monthly time periods. The results reveal that there is no evidence of any kind of effect, positive or negative, on the volatility.

There is also empirical evidence that imposition of /increase in STT would decrease return. Hu (1998) finds that upon the announcement of the tax, the average return fell 1.57 per cent in Taiwan and by 0.55 per cent in Korea. Umlauf (1993) estimates that the Swedish All-Share equity index fell 2.2 per cent when the 1 per cent tax was announced in 1983 and by 0.8 per cent when the tax rate was increased in 1986. In the UK, Saporta and Kan (1997) report that the equity index declined by 3.33 per cent on the announcement of an increase in stamp duty rate from 1 per cent to 2 per cent. When the stamp duty was decreased from 2 per cent to 1 per cent and then from 1 per cent to 0.5 per cent, the index increased by 0.558 per cent and 1.054 per cent respectively.

Potential revenue and ease of collection from imposition of a transaction tax are attractive to governments. However, Umlauf (1993) reports that the decreased levels of trading in response to transaction tax resulted in decreased capital gains revenue in Sweden. Table 7 presents an international comparison of direct revenues from transaction taxes in the mid 1980s. The table includes a wide range of seemingly contradictory entries. Switzerland, with a tax rate not much different from that of Germany, raised twelve times as much revenue in relation to the size of the economy. Italy, with a relatively low tax rate, generates an impressive amount of revenue. The UK tax, which also brings in an ample amount of revenue, taxes away 0.01% of the market value of equity, far out of line with the tax in other countries, such as Germany, that raise less revenue. Recently, a study by Schulmeister, Schratzenstaller, and Picek (2007) estimates the transaction tax revenue of different countries. It is seen that the revenue from transaction tax varies between 0.01 for France to 1.7 for Spain, depending on the tax rate (see Table 8).

Chou and Lee (2002) provide interesting empirical evidence on the effect of the transaction tax on liquidity and market efficiency. They demonstrate that after the tax reduction on the Taiwan Futures Exchange (TAIFEX), the TAIFEX assumed a leading role over the Singapore Stock Exchange (SGX) in the price discovery process for the index futures contracts. Supporting Chou and Lee, Hsieh (2004) also notes that the information advantage of SGX has diminished as the TAIFEX lowered its transaction tax. Finally, in a review article by Habermeier and Kirilenko (2003), they conclude that transactions taxes have a significant impact on the transformation of investor demands into transactions. Transaction taxes are found to delay the price discovery process, increase volatility, and reduce market liquidity.

Using futures market data, Aliber *et al.* (2003) find a positive relationship between transaction costs and volatility and a negative relation between trading volume and transaction cost in the foreign exchange futures market for the British Pound, Japanese Yen and Swiss Franc (against the U.S. Dollar). Constantinides (1986) and Hegde and Miller (1989) show that increases in transaction costs cause investors to reduce the frequency and volume of trading. Another study by Aitken, Duffy and Frino (1994) documents a decrease in trading activity by 15% due to increase in transaction fee by \$1 per contract for the case of Austria. Similarly, Chou and Wang

(2005) found that following the reduction in transaction tax, the trading volume had increased and the bid-ask spread had decreased.

Futures Market and Inflation: Empirical literature on Futures Market and inflation compare spot market volatility before and after the introduction of futures trading and investigate the impact of futures activity on spot volatilities. Kamara (1982) finds that the introduction of commodity futures trading generally reduced or at least did not increase the cash price volatility. Further, Singh (2000) investigated the *hessian* cash (spot) price variability, before and after the introduction of futures trading (1988-1997) in Indian markets using the multiplicative dummy variable model and concluded that futures trading had reduced the price volatility in the *hessian* cash market. However, Yang *et al.* (2005) showed that an unexpected and unidirectional increase in futures trading volume drove up the cash price volatility.

On the other hand, the study by Nitesh (2005) reveals that futures trading in soya oil futures was effective in reducing the seasonal price volatilities, but not the daily price volatilities in India. Similarly, Sahi (2006) finds that the nature of volatility did not change with the introduction of futures trading in wheat, turmeric, sugar, cotton, raw jute and soya oil. Nevertheless, a weak destabilizing effect of futures on spot prices was found in case of wheat and raw jute. Further, the results of granger causality tests indicated that the unexpected increase in futures activity in terms of rise in volumes and open interest caused an increase in the cash price volatilities in all the commodities listed. Nath and Reddy (2007) find that futures activity leads to price volatilities in the case of *urad dal* but not in the case of gram and wheat. Therefore, the study concludes that the belief that futures trading contributes to rise in inflation (WPI) appears to have no merit in the present context.

A study by the Indian Institute of Management, Bangalore (IIMB) in 2008 explains that changes in fundamentals (mainly from the supply side) along with government policies were causing higher post-futures price rise and the role of futures trading remained unclear. EC (2008) while analyzing the impact of futures trading on commodity prices found that out of 21 commodities, price volatility increased in 10 commodities, remained unchanged in two, and declined in 9, after the introduction of

futures trading¹⁵. However, the committee could not find any strong conclusion on whether introduction of futures trade is associated with decrease or increase in spot price volatility. Looking at price growth and price volatility of top ten agricultural commodities consisting major future trade, it is not clear whether future trading contributes to price rise or price volatility.

Migration to Overseas Market: Empirical evidence (Umlauf 1993; Edwards 1993; Habermeier, and Kirilenko 2003) suggests that when a government levies or increases transaction tax on local markets, investors shift their trading to overseas markets. For example, the Euro-dollar market developed in response to American government's attempts to control capital exports and place other regulations on the banking system. Euro-dollar market grew from US \$20 billion in 1964 to over US \$3 trillion in gross size by 1988. Switzerland, a world banking centre, also suffered from financial migration. Its stamp duty also caused the mutual fund business to migrate to Luxembourg and the Eurobond and equity business to go to London. By 1993, 22% of trading in Swiss companies was taking place in London, up from 16% only two years earlier. In 1993, the Swiss government abolished the 15% stamp duty on a wide variety of securities to stem such migration.

The impact of transaction tax on the location of financial transactions was also felt in Germany and France. In 1989, before the elimination of Germany's taxes, 30% of trading in German government bonds and 50% of trades in other DM-denominated bonds took place in London. Moreover, about one-third of the trading in French and German public companies took place in London, where almost one-half of the daily volume of trade is in shares of foreign companies. In the case of Sweden, Umlauf (1993) reports that when the STT was increased to 2 per cent in 1986, 60 per cent of the trading volume of the 11 most actively traded Swedish share classes migrated to London, where there was no transaction tax. This was equal to 30 per cent of the total trading volume. By 1990, the volume had increased to 50 per cent.

V. Empirical Methodology

Following Aliber, Chowdhry and Yan (2003) and Chou and Wang (2005), we examine the effects of transaction costs, due to imposition of CTT, on volatility and

¹⁵ See Fig-5 and Fig-6 for top ten commodities taken out these 21 commodities.

volume of trading. Following previous empirical literature and assuming that imposition of CTT would increase the transaction cost which is proxied by the bid-ask spread, we estimate the relationship between trading volume, volatility and transaction cost in commodity futures market¹⁶ in a three-equation structural model framework. The empirical structural model is specified as follows:

$$IV_t = a_1 + b_{11}BAS_t + b_{12}TV_t + b_{13}IV_{t-1} + b_{14}VSP_t + e_{1t} \quad \dots\dots\dots (1)$$

$$TV_t = a_2 + b_{21}BAS_t + b_{22}IV_t + b_{23}TV_{t-1} + b_{24}OI_t + e_{2t} \quad \dots\dots\dots (2)$$

$$BAS_t = a_3 + b_{31}BAS_{t-1} + b_{32}IV_t + b_{33}TV_t + e_{3t} \quad \dots\dots\dots (3)$$

Where IV_t is the daily price volatility defined as

$$\sigma_t = \sqrt{\sum_{i=1}^n (r_i)^2} \quad \dots\dots\dots(4)$$

Where r_t is the return series calculated as $\log(P_t/P_{t-1})$. P_t is the future price at period t and P_{t-1} is the future price at period $t-1$. n_t is the number of trading days. TV_t is the trading volume of the futures market on the t^{th} day and BAS_t is the intraday effective bid-ask spreads on the t^{th} day. Effective Bid-Ask spread is defined as $BAS_t = (\text{Ask} - \text{Bid}) / (\text{Bid} + \text{Ask})$. OI_t is the open interest and VSP_t is the spot price volatility defined in equation-4. IV_t is intraday price volatility on the t^{th} day.

In equation 1, volatility in future price (IV_t) is a function of trading volume in futures contracts (TV_t), the effective bid-ask spread (BAS_t), the lagged volatility (IV_{t-1}) and the Spot Price Volatility (VSP_t). Admati and Pfleider (1990) argue that the informed traders are more likely to trade than the liquidity traders¹⁷ (who bring volume to the market). This suggests that higher volume in futures will lead to higher volatility, and hence, there exists a simultaneity relationship between volatility and volume. Similarly, Aliber *et al.* (2003) found a positive relationship between transaction costs (BAS_t) and volatility for foreign exchange market. In equation 2, trading in futures

¹⁶ The trading volume and trading volatility is calculated for five commodities traded in MCX, which is the major commodity exchange market.
¹⁷ They are mostly speculators.

contract (TV_t) is modeled as a function of the effective bid-ask spread (BAS_t), price volatility (IV_t), lagged trading volume (TV_{t-1}) and open interest (OI_t).

The bid-ask spread represents a major component of the transaction cost, which is expected to have an adverse impact on the trading volume. Higher transaction cost would reduce the opportunity for market participants to make profitable trades, thereby forcing them to search for alternative trading vehicles with lower transaction cost. Hence, trading volume is expected to be negatively related to the size of the bid-ask spread (Constantinides, 1986; Hegde and Miller, 1989; Aliber *et al.*, 2003). Open interest is the total number of outstanding futures contracts. It is expected to have a positive impact on trading volume because higher open interest generates more trading volume.

Following prior research, Aitken and Frino (1994) argue, that an increase in the price volatility of a security causes market participants to place larger bid-ask spread, owing to increased information risk, whilst higher trading activity causes narrower spreads, as the waiting time to trade decreases. This further suggests a third equation which models transaction costs (bid-ask spread) in appropriate order, to properly catch the simultaneity in the relationship between transaction costs, volatility and trading activity.

At this point, a note on the lagged variables in equations (1), (2) and (3) (i.e., TV_{t-1} , BAS_{t-1} , and IV_{t-1}) is warranted. A partial adjustment model is specified in each equation to take into account the distributed lag (persistence) effect in the dependent endogenous variable. Thus, the lagged term of the dependent endogenous variable in each equation is entered as an explanatory variable in the model.

To take account of the potential simultaneous equation bias, we use the Two Stage Least Square Method (2SLS) to correct endogeneity problem. Lag of independent and exogenous variables are used as instruments. Number of instruments used is equal or more than independent variables in each equation. All three equations in the system developed above are exactly identified. Then, to avoid any spurious relationship among the variables due to the presence of a unit root in the time series, the Augmented Dickey-Fuller test (ADF) is applied to test for stationarity.

Data Source: The intraday and daily futures data on spot price, future price, bid-ask quotes, trading volume, and open interest are obtained from the Multi-Commodity Exchange (MCX). For the purpose of our study, we select five commodities mostly traded from four commodity categories namely, Gold from precious metals, Copper from basic metals, Petroleum Crude from energy, Refined Soya Oil and Chana (Chick pea) from agricultural commodities. The share of five commodities together in MCX total trading and in respective total (five commodities together) in all commodity exchanges are around 63% and 88 % respectively. All these commodities selected are in the top ten traded commodities in the MCX. The sample period covers May 1, 2006 to April 30, 2008.

Result Analysis: The empirical results of the ADF tests are reported in Table-10. We find that the time series of trading volume, bid-ask spreads, price volatility (future and spot) and open interest are stationary at level. Based on these results, we estimate our three-equation model in the level form for all variables. The results reveal that there exists a negative relationship between bid-ask spread (transaction cost) and trading volume. The negative and significant coefficient of the transaction cost variable suggests that increase in transaction costs causes a decrease in trading activity. Results for five commodities are reported below in Table-I to Table-V.

The coefficient of the daily realized price volatility (IV_t) is positive and statistically significant for all except Chana. This result is expected and consistent with the empirical findings of Tauchen and Pitts (1983), Bessembinder and Seguin (1993) and Wang, Yau and Baptiste (1997) and Chou and Wang (2005). In addition, the result is consistent with the theory that an increase in price volatility changes the reserve price of speculators and increases the demand for risk-transfer by hedgers. Both effects are presumed to lead to a higher trading volume. The coefficient of open interest (OI_t) is positive and statistically significant for all except Chana, indicating that an increase in open interest will result in an increase in trading volume, a result that is consistent with our expectation.

The empirical estimates of volatility equation indicate that the coefficients for both trading volume (TV_t) and bid-ask spreads (BAS_t) are positive and significant. From the estimated price volatility equation, we can trace the sources of change in the observed

price volatility into two components: (1) the information component approximated by trading volume (TV_t) and (2) the intraday liquidity component represented by the bid-ask spreads (BAS_t).

It is interesting to note that the coefficient of spot price volatility (VSP_t) is positive and significant at the 5% level. Current physical volatility is included in the model as there is an arbitrage relationship between the future price and the spot price (Siegel and Siegel, 1990). It is often argued that derivatives market attracts informed traders who cause market activity in the derivative market to lead that in the physical commodity markets.

In the bid-ask spread equation, the coefficient of trading volume (TV_t) is negative and statistically significant. This result is consistent with those of Wang and You (2000) and Chou and Wang (2005). The coefficient of price volatility (IV_t) is significantly positive. An increase in price volatility implies higher risk for the market maker, as mentioned previously. The coefficient of the lagged bid-ask spreads (BAS_{t-1}) is statistically significant. Therefore, this result supports our specification of partial adjustment in the bid-ask equation.

Table I: Empirical results on trading volume, bid-ask spreads and price volatility of Gold Futures

Variable	TV_t	IV_t	BAS_t
Constant	14.45** (3.59)	0.017 (0.54)	0.009** (15.34)
TV_t		0.001# (1.68)	-0.001** (-6.31)
TV_{t-1}	0.14** (3.09)		
IV_t	32.61** (4.95)		0.006** (7.29)
IV_{t-1}		0.35** (8.92)	
OI_t	0.55# (1.76)		
BAS_t	-619.88** (-6.38)	9.48** (5.50)	
BAS_{t-1}			0.08 (1.22)
VSP_t		0.16** (4.47)	
R^2	0.26	0.29	0.24

Numbers in parentheses denote *t*-statistics. **, * and # denote significance at the 1%, 5% and 10% levels, respectively.

Table II: Empirical results on trading volume, bid-ask spreads and price volatility of Crude Futures

Variable	TV _t	IV _t	BAS _t
Constant	5.47* (1.98)	-0.03 (-0.73)	0.018** (14.10)
TV _t		0.04** (5.90)	-0.001** (-7.75)
TV _{t-1}	0.28** (6.26)		
IV _t	21.02** (3.18)		0.015** (8.54)
IV _{t-1}		0.26** (7.28)	
OI _t	1.52** (6.68)		
BAS _t	-367.32** (-4.17)	9.99** (8.58)	
BAS _{t-1}			0.16** (4.34)
VSP _t		0.09** (2.99)	
R ²	0.37	0.27	0.39

Numbers in parentheses denote *t*-statistics. **, and * denote significance at the 1%, and 5% levels, respectively.

Table III: Empirical results on trading volume, bid-ask spreads and price volatility of Copper Futures

Variable	TV _t	IV _t	BAS _t
Constant	23.01** (4.84)	-0.25** (-4.42)	0.016** (8.80)
TV _t		0.006** (7.46)	-0.002** (-4.67)
TV _{t-1}	0.24** (6.47)		
IV _t	14.64** (5.83)		0.005** (7.54)
IV _{t-1}		0.32** (9.43)	
OI _t	0.65** (3.21)		
BAS _t	-412.95** (-4.12)	17.47** (7.38)	
BAS _{t-1}			0.25** (5.86)
VSP _t		0.23** (8.05)	
R ²	0.31	0.38	0.38

Numbers in parentheses denote *t*-statistics. **, and * denote significance at the 1%, and 5% levels, respectively.

Table IV: Empirical results on trading volume, bid-ask spreads and price volatility of Ref Soya Oil Futures

Variable	TV _t	IV _t	BAS _t
Constant	0.17 (1.52)	-0.02 (-0.73)	0.020** (7.18)
TV _t		0.05** (4.26)	-0.012** (-6.41)
TV _{t-1}	0.35** (9.15)		
IV _t	0.78** (3.14)		0.05** (4.62)
IV _{t-1}		0.15** (4.61)	
OI _t	0.41** (7.54)		
BAS _t	-5.04** (-4.30)	0.99* (2.80)	
BAS _{t-1}			-0.12* (2.81)
VSP _t		0.78** (17.3)	
R ²	0.43	0.51	0.18

Numbers in parentheses denote *t*-statistics. **, and * denote significance at the 1%, and 5% levels, respectively.

Table V: Empirical results on trading volume, bid-ask spreads and price volatility of Chana Futures

Variable	TV _t	IV _t	BAS _t
Constant	0.11** (3.16)	-0.04(-0.62)	-0.07 (-3.34)
TV _t		0.23* (2.45)	-0.12**(3.21)
TV _{t-1}	0.60** (16.63)		
IV _t	0.05 (0.85)		0.12* (2.21)
IV _{t-1}		0.28** (7.62)	
OI _t	0.11 (1.07)		
BAS _t	-0.20* (2.41)	0.17* (2.13)	1.36** (21.35)
BAS _{t-1}			
VSP _t		0.50** (11.54)	
R ²	0.42	0.35	0.27

Numbers in parentheses denote *t*-statistics. **, and * denote significance at the 1%, and 5% levels, respectively.

Simulation Results: Having seen the basic relationship among the variables, we simulate the results of the imposition of CTT on the commodity futures market. As previously mentioned, Aitken, Duffy and Frino (1994) and Chou and Wang (2005), explain that when CTT is imposed, the transaction cost (bid-ask spread) would increase at least by that much percentage¹⁸. So, we give external shocks to the bid-ask spread in equation-1 and equation-2 to derive the simulation results. We have three alternative scenarios. First, we assume that when 0.0125% of CTT is imposed¹⁹, the

¹⁸ The increase in cost may be more than the CTT due to increase in other costs.

¹⁹ Recently it has been reported in print media that government is planning to impose CTT between 0.125 to 0.017%.

transaction cost is increased by 0.0125% (scenario-1). Second, we assume that with the imposition of 0.017% tax, the transaction cost is increased by 0.17% (scenario-2). Third, we assume that with the imposition of 0.017% tax, the transaction cost is increased by 0.17% (scenario-3). The simulation results of trading volume and daily volatility because of imposition of CTT for five commodities are presented in Table-VI (also see simulations from fig-6 to fig-15). It is clear that with the increase in transaction tax by 0.0125%, trading volume will decrease for all commodities within the range starting from 24.34% for Gold, to minimum 2.22% for Chana. As a result, it will have a negative impact on the market efficiency. Similarly, daily volatility will increase within the range starting from 26.24% for gold to minimum 2.16% for Chana. Therefore, if the government imposes the transaction tax of 0.017%, liquidity of the commodity futures market will decrease and volatility will increase. The negative impact on trading volumes and positive impact on volatility increase in case of scenario-2 and scenario-3 when transaction cost increases by 0.017% and 0.02% respectively due to imposition of CTT.

Table VI: Simulated Result of the Impact of Increase in Transaction Tax on Liquidity and Volatility

	Trading Volume			Volatility		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Gold	-24.34	-31.93	-37.71	26.24	31.25	34.5
Crude	-16.43	-24.62	-27.31	20.22	25.63	30.13
Copper	-17.33	-24.79	-29.82	13.56	19.54	24.76
Ref Soya Oil	-5.42	-6.23	-7.27	4.35	6.16	7.87
Chana	-2.22	-3.25	-4.75	2.16	3.71	4.58

Notes: In scenario 1, transaction cost increases by 0.0125%, in scenario 2, transaction cost increases by 0.017% and in scenario 3, transaction cost increases by 0.02%.

Futures Price and Inflation: The functioning of futures markets came under scrutiny during 2006-07 and the government ordered delisting of futures contracts in agricultural commodities like urad, tur, wheat and rice in early 2007, on the suspicion that futures trading in these commodities had been contributing to the rise in spot prices. Similarly, the Government of India banned futures trading in chana, potato and soya oil in May 2008, in an attempt to contain the price rise in essential commodities and curb the spiraling inflation rate in the country. In this section, we present evidence

about the role of futures market in inflation by carrying out Granger causality test between trading volume and spot prices for five commodities. It has been argued, that futures trading in commodities leads to higher inflation as speculators drive the prices up beyond the fundamental value. If trading volume leads the spot price, then it is assumed that inflation is caused by futures trading. On the other hand, if spot price causes futures price, there is no evidence against future market leading to higher inflation.

Given that our price series are stationary, we use granger causality test to examine whether futures trading influences spot prices. The granger causality test is carried out at levels and the results are presented in Table-VII. Results show that out of five commodities, we have only one case (crude) where causality runs from volume to spot prices. All other four cases, there is no causality from volume to spot prices. Therefore, we do not have sufficient evidence to support that futures market leads to higher inflation.

Table VII: Granger Causality between volume of trading and Spot Prices

Commodity	Null Hypothesis	F-Statistics	P-value
Gold	Volume does not Granger Cause Spot Price	0.87	0.58
	Spot Price does not Granger Cause Volume	3.44**	0.001
Crude	Volume does not Granger Cause Spot Price	2.43*	0.04
	Spot Price does not Granger Cause Volume	2.87*	0.02
Copper	Volume does not Granger Cause Spot Price	1.13	0.34
	Spot Price does not Granger Cause Volume	0.89	0.49
Ref Soya Oil	Volume does not Granger Cause Spot Price	0.67	0.71
	Spot Price does not Granger Cause Volume	3.17*	0.02
Chana	Volume does not Granger Cause Spot Price	0.57	0.79
	Spot Price does not Granger Cause Volume	0.96	0.46

*** denotes the rejection of Null hypothesis at 1% level, * denotes the rejection of Null hypothesis at 5% level. Optimal lag length is selected on the basis of AIC Criterion.*

Futures Trading volume and Spot price: Having found inconclusive evidence regarding whether futures trading granger causes spot prices, we proceed further to examine the efficiency through price discovery mechanism by doing causality analysis between future prices and spot prices. Since both spot and future return series are I (0), we carry out granger causality at levels. The results (Table-VIII) reveal that in all five commodities future prices granger cause spot prices. Previous literature also suggests that when there is causality running from future return series to spot return series, the market is efficient. This implies that the commodity futures market is efficient for the five commodities.

Table VIII: Granger Causality between Future Prices and Spot Prices

Commodity	Null Hypothesis	F-Statistics	P-value
Gold	Spot does not Granger Cause Future	1.66	0.14
	Future does not Granger Cause Spot	117.56**	0.00
Crude	Spot does not Granger Cause Future	0.721	0.66
	Future does not Granger Cause Spot	125.34**	0.00
Copper	Spot does not Granger Cause Future	1.48	0.11
	Future does not Granger Cause Spot	380.43**	0.00
Ref Soya Oil	Spot does not Granger Cause Future	2.51*	0.02
	Future does not Granger Cause Spot	7.96**	0.00
Chana	Spot does not Granger Cause Future	1.82*	0.05
	Future does not Granger Cause Spot	5.38**	0.00

*** and * denotes the rejection of Null hypothesis at 1 % and 5% level respectively. Optimal lag length is selected on the basis of AIC Criterion.*

Cointegration and causality test results indicate that there exists a cointegrating relationship between future prices and spot prices for all commodities. Results from causality test indicate as follows: (1) Trading volume does not granger cause Spot price in four commodities except Crude; (2) Future price granger causes spot price for

all the commodities. There, we don't find the enough evidence to conclude that futures trading causes inflation. Further, the futures markets are efficient.

VI: Conclusion and Policy Implications

Commodity derivatives and futures are instruments to achieve price discovery and price risk management. After withdrawal of prohibition on futures trading in 2003, the volume of futures trade increased exponentially in agricultural commodities till 2005-06 but the trade in Bullion and other metals over took it in 2006-07. Overall, Non-agricultural commodities have been dominating the futures markets in India. International experience shows decrease in trading volume due to either increase or imposition of security transaction tax. Further, we do not find any commodity transaction tax in other major commodity futures trading markets. After imposition of tax by 0.17%, transaction cost would increase substantially and may be highest in world.

The empirical results for five top selected commodities namely Gold, Copper, Crude, Soya Oil and Chana suggest that there exists a negative relationship between transaction cost and trading volume, and a positive relationship between transaction cost and volatility. Therefore, any increase in transaction cost would lead to lower trading activity and higher volatility. Having seen the basic relationship among the variables, we simulated the variables because of increase in transaction cost due to imposition of CTT by the amount of 0.0125%, 0.017% and 0.02%. It is clear that with the increase in transaction tax by 0.0125%, trading volume will decrease for all commodities within the range starting from 24.34% for copper, to minimum 2.22% for Chana. As a result, it will have negative impact on the market efficiency. Similarly, daily volatility will increase within the range starting from 26.24% for gold, to minimum 2.16% for Chana. The negative impact on trading volumes and positive impact on volatility increases in case of higher transaction cost due to imposition of CTT by 0.017% and 0.02% respectively. Increased volatility may also lead to more speculative activities and fail to achieve price discovery and resource allocation objectives of the commodity markets. However, agricultural commodities such as refined Soya oil and Chana are least affected in terms of volume and volatility in response to the imposition of transaction tax. This may be due to fact that

agricultural commodities are traded domestically, while the other three products are traded internationally. Also, the forward trades in agricultural commodities are for very short periods, whereas for the other three commodities, forward trades are for distant periods.

The issue of future trading leading to inflation is examined by using granger causality between futures trading and spot prices. Results show that out of five commodities, we have only one case (crude), where causality runs from volume to spot prices. In the other four cases, there is no causality from volume to spot prices. Therefore, we do not have sufficient evidence to support that futures market leads to higher inflation. Further, the cointegration and causality analysis results support that futures markets for these five commodities are efficient. Any increase in transaction tax, as proposed, would increase the transaction cost and may keep farmers and hedgers out of the market, an outcome which would fail to achieve the objectives of commodity futures markets. However, this is an exploratory study examining the impact of CTT on certain dimensions such as trading volume and volatility for five commodities in one exchange. The results need to be established by further research on larger commodity base and exchanges in a comprehensive manner.

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Appendix

Brief Review of the report “The Impact of Future Trading on Agricultural Commodities”, 2008.

The expert committee headed by Prof Abhijit Sen has been set up by government of India to (i) study the extent of impact, if any, of futures trading on wholesale and retail prices of agricultural commodities and to suggest ways to minimize such an impact; (ii) make such other recommendations as the Committee may consider appropriate regarding increased association of farmers in the futures market/trading so that farmers are able to get the benefit of price discovery through Commodity Exchanges.

Findings and Explanations

1. There has been an exponential growth in futures trading after complete liberalization of industry in 2003 and with the setting up of three national level exchanges. Agricultural commodities constituted a significant proportion of total value of trade till 2005-06. This place was taken over by Bullion and other Metals in 2006-07. Further, there has been a gradual fall in agri-commodity volumes during 2007-08 over the previous year. Negative sentiments have been created by the decision to de-list futures trade in some important agricultural commodities.
2. The fact that agricultural price inflation accelerated during the post futures period does not, however, necessarily mean that this was caused by futures trading. One reason for the acceleration of price increase in the post futures period was that the immediate pre-futures period had been one of relatively low agricultural prices, reflecting an international downturn in commodity prices. A part of the acceleration in the post futures period may be due to rebound/recovery of the past trend. 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.
3. Indian data analysed in the report does not show any clear evidence of either reduced or increased volatility of spot prices due to futures trading. In contrast

to the view that futures markets cause increases in prices, the bulk of the existing literature on the subject emphasizes that such markets help in price discovery, provide price risk management and also bring about spatial and temporal integration of markets. Futures markets have the potential to bring about better price stability over a medium to long term, although, the literature on futures markets itself is rather divided on the subject of price variability.

4. 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. The reason for this is high basis risk in most contracts which keeps out potential hedgers and lends to greater dominance by speculators. This is a serious area which should be addressed by both, the exchanges and the regulator.
5. There is no indication of any unambiguous direction of impact of causality between futures and spot prices. For some commodities, post futures price inflation appears to have accelerated, while for some, it has slowed down. Similarly, the direction of causality also does not emerge in an unambiguous manner. It must also be kept in mind that this behaviour in the spot market is also subject to significant influence of supply factors.
6. With progressive opening up of the economy including trade in agricultural commodities, Indian markets cannot be insulated from global factors. It is illogical to argue that futures markets are a channel for global factors to influence the domestic spot markets. In an open economy, global supply-demand related factors will impact on the domestic markets whether futures trading are permitted or not. There are of course weaknesses in the functioning of the futures market, but it needs improvement rather than banning.

Policy Recommendations

1. The proposed FC(R) Amendment Bill to upgrade the regulation and to improve the capabilities of the regulator need to be pursued vigorously.
2. Exchanges should act as self regulatory organizations capable of administering fair play, objectivity and customer orientation.
3. There should be a consultative group both in FMC, as well as in the exchanges comprising persons with proven domain knowledge of commodity sector.

4. At the apex level, a Committee on Commodity market, akin to the HLCC in the Capital Market, should be constituted with Deputy Chairman, Planning Commission or one of the Members of the Planning Commission as its nominee Chairman.
5. Collections from the transaction tax, if and when imposed on futures markets, should be earmarked exclusively for development of the required physical market infrastructure and to improve farmers' access to it.
6. Conditions should be created so that farmers can use agri futures market to transfer their price risks. The contract designs should be tailored to meet the needs of the physical market.
7. Efficient functioning of futures markets pre-supposes the existence of efficient spot markets. Reforming spot market should also be a top priority.
8. Setting up of national spot electronic exchanges by the national commodity exchanges is an attempt to create a national integrated market. National integration of the markets should be promoted.
9. Model APMC Act - operationalizing the same by appropriate set of rules and regulations needs to be expedited.
10. Banks and Financial Institutions which are at present not permitted to trade on Commodity Markets should, subject to approval by the Banking Regulator, be allowed to trade up to limits required for the purpose of devising customized OTC products suited to the needs of small and marginal farmers.
11. National Exchanges are launching a pilot scheme of Aggregators' who will collect retail produce of the farmers and hedge it on the platform of exchanges on behalf of the farmers. Farmers Groups, Co-operative institutions, RRBs, CCBs, NGOs, State Agricultural Marketing Boards, Warehousing Corporations, Commodity Development Boards which work in the rural areas and thus, have a close association and trust of farmers, should be allowed and encouraged to act as aggregators. The rules and procedures of futures trade in Exchanges should clearly lay down conditions to enable these entities to access the markets on behalf of the farmers.
12. It is of prime importance to create structure which enables dissemination of prices to the remotest corners of the country. This will ensure that benefit of price discovery of exchange platforms reach the farmers.

13. In case of agri commodities, only simple options may be allowed for some time till market attains maturity in operations and regulations, and farmers attain adequate understanding of the market and of technique to use them. Farmers should be encouraged to participate in these put options for which FCI can be the options writer.
14. There is a need to have a strong and resilient agriculture sector attracting investment for raising production and productivity. For this, it is necessary to make agriculture a remunerative option. The vibrant agriculture markets including derivatives markets are the frontline institutions to provide early sign of future prospects of the sector. Vibrancy in these markets gives signal about commodities which deserve flow of investment. These markets deserve to be promoted for giving such signal.
15. Banning futures trading in agricultural commodities including basic food grains is not a desirable policy action. Policies to improve spot market functioning, enhance farmers' knowledge of and access to futures markets, augment availability of adequate storage and financing against warehouse receipts and ensure transparent functioning of futures markets, are certainly warranted.
16. An efficient futures market requires government and markets working together in a synergistic manner. Both the government and markets, have to recognize the important role played by each other. Governments can provide the legal, regulatory and infrastructure support to enable markets to function without manipulation and 'excessive speculation'. On the other hand, markets need to provide the government with efficient mechanisms to achieve its objective of 'inclusive growth'.

Figure 1: Structure of the Commodity Market

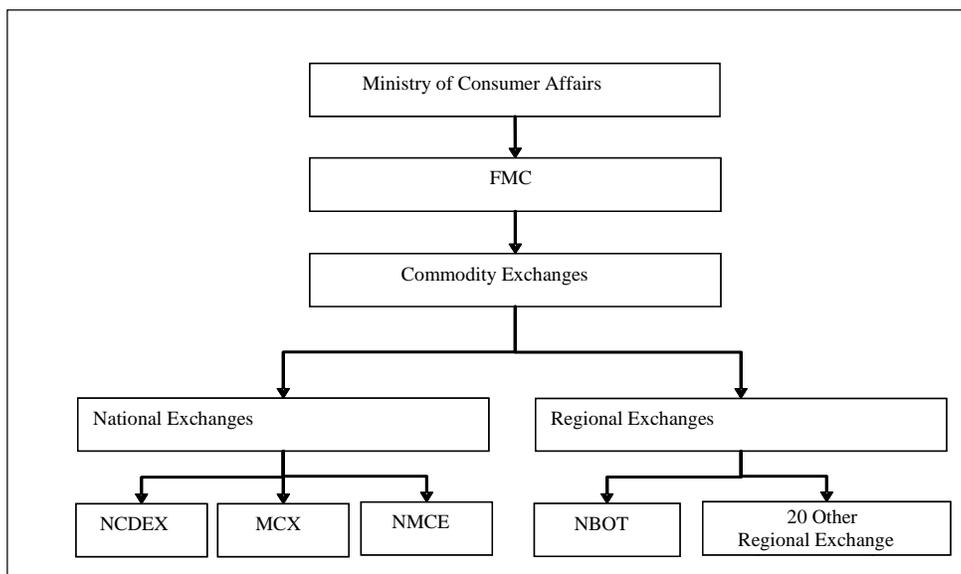


Figure 2: Share of the Main Commodity Exchanges in India

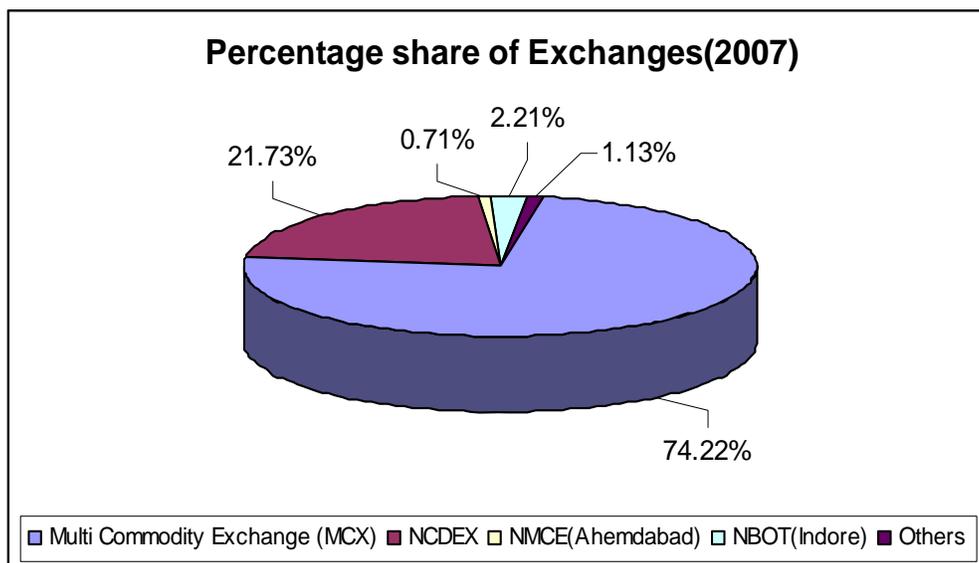
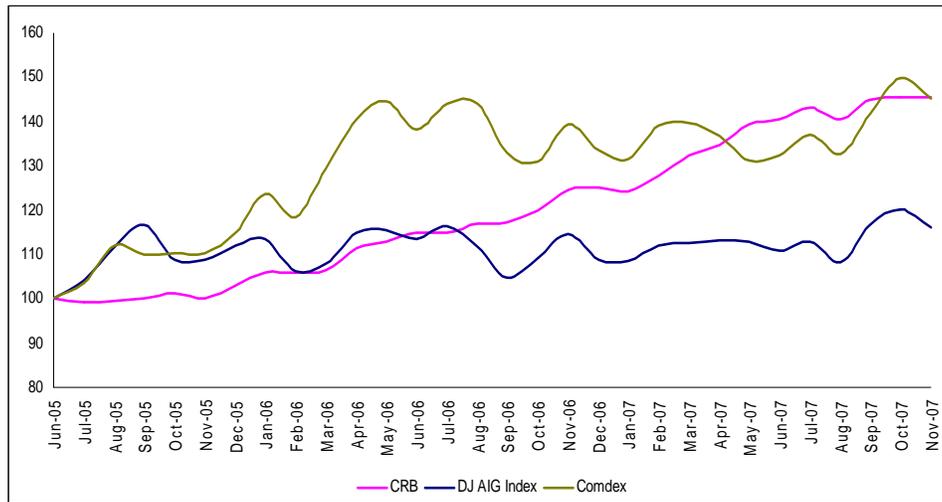


Figure 3: MCX COMDEX vs. Other Global Indices



Note: After converting to the same base period of all the indices to 100 from June 2005 (base unit, days and major unit, months on X-axis).

Figure 4: Monthly Trend Growth Rate and Volatility of WPI of Selected (Top Ten in terms of Value) Agricultural Commodities in which Futures are traded

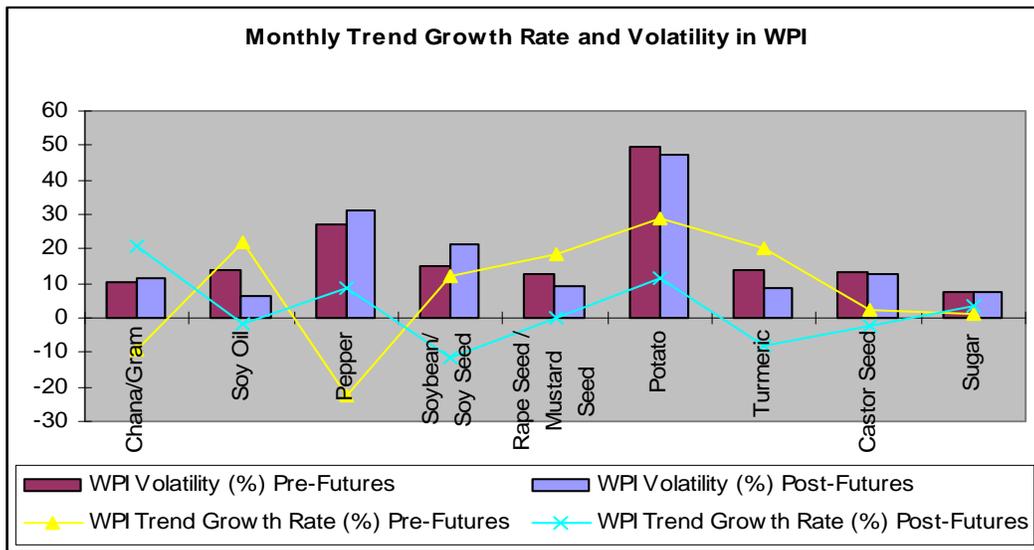


Figure 5: Daily Volatility in Major Agricultural Commodities

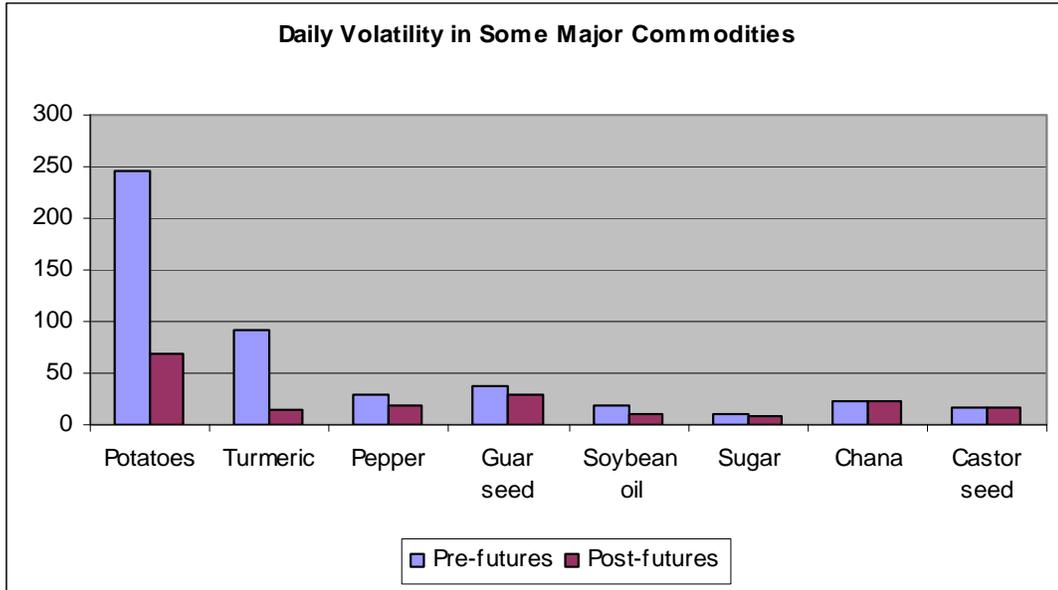


Figure 6: Simulated Trading Volume (liquidity) of Gold

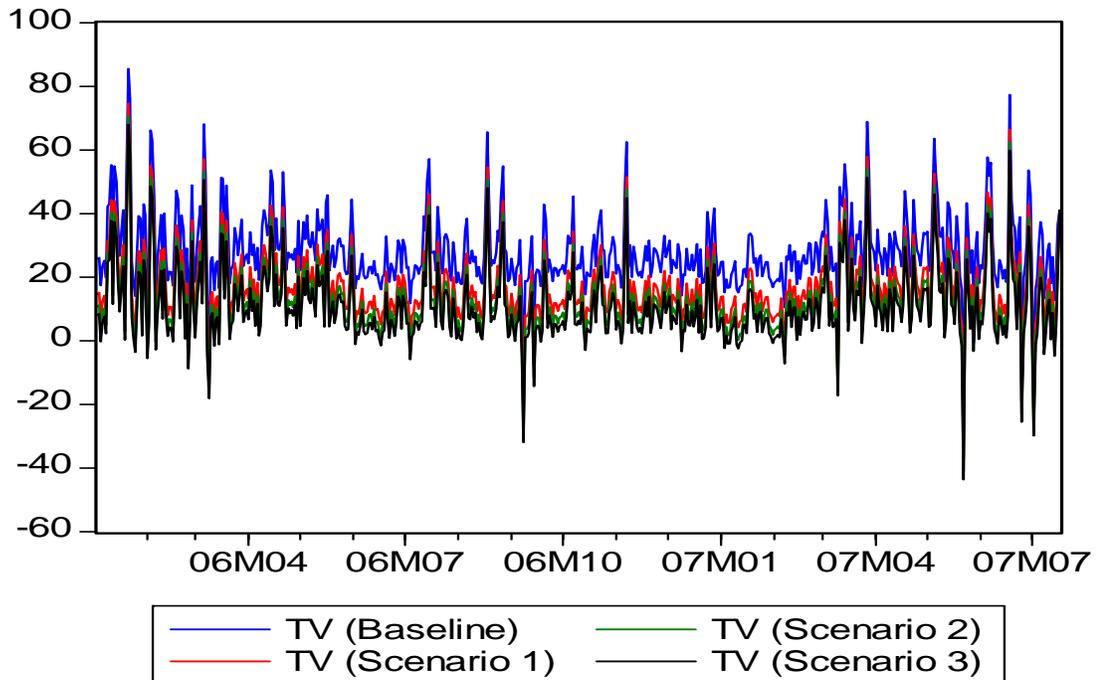


Figure 7: Simulated Trading Volume (liquidity) of Crude

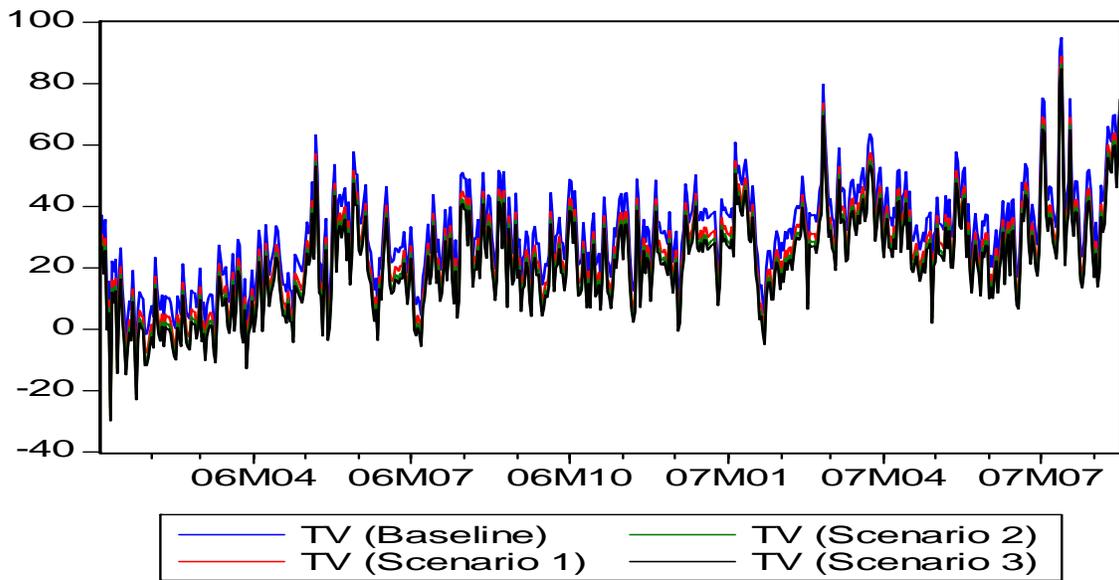


Figure 8: Simulated Trading Volume (liquidity) of Copper

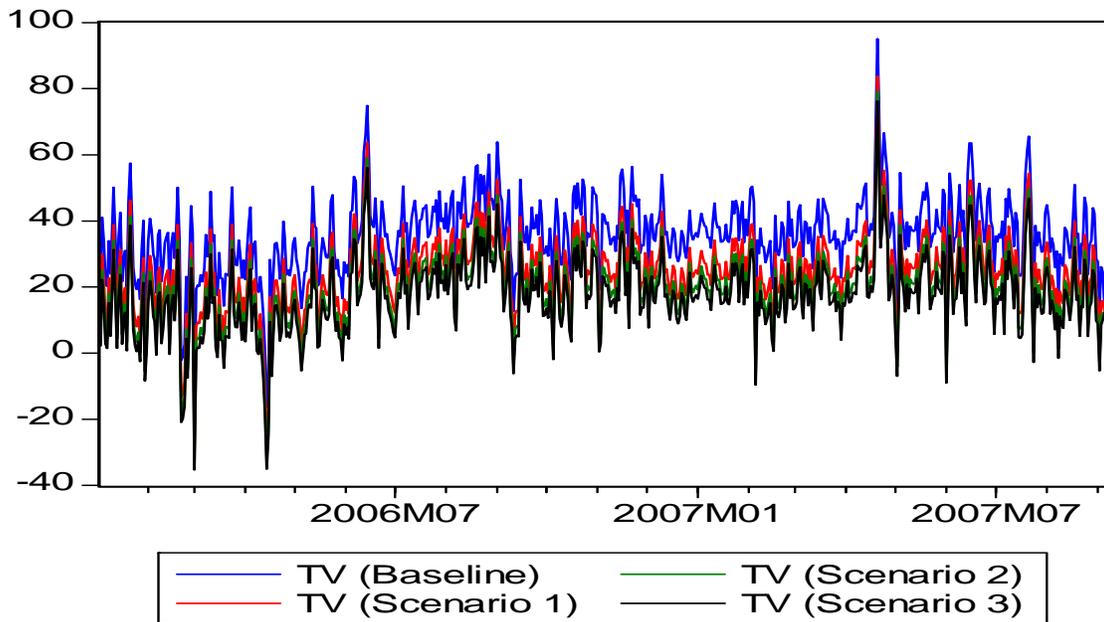


Figure 9: Simulated Trading Volume (liquidity) of Ref Soya Oil

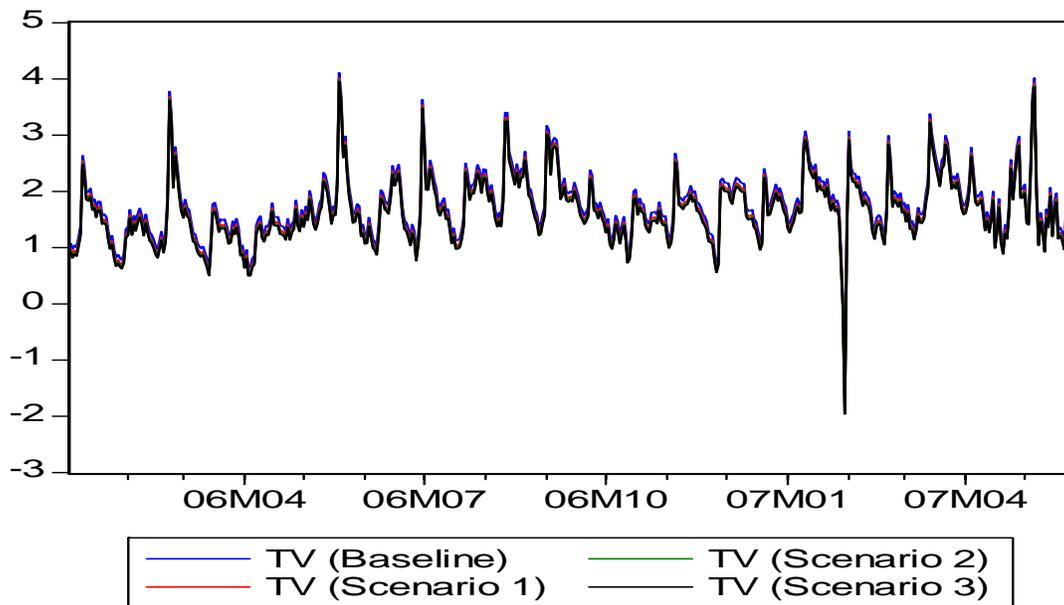


Figure 10: Simulated Trading Volume (liquidity) of Chana

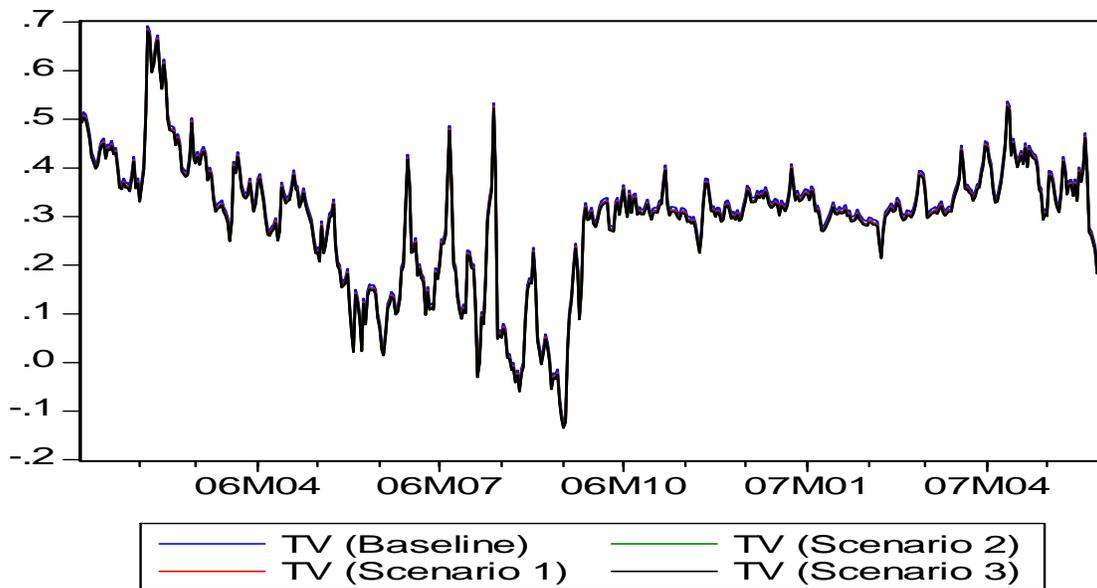


Figure 11: Simulated Daily Volatility of Gold

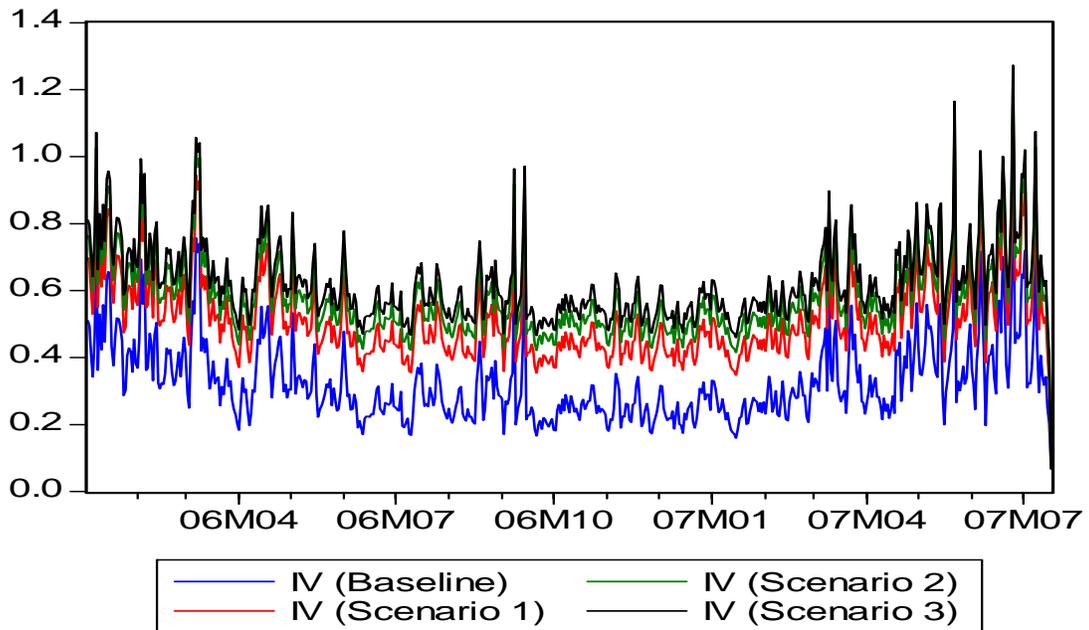


Figure 12: Simulated Daily Volatility of Crude

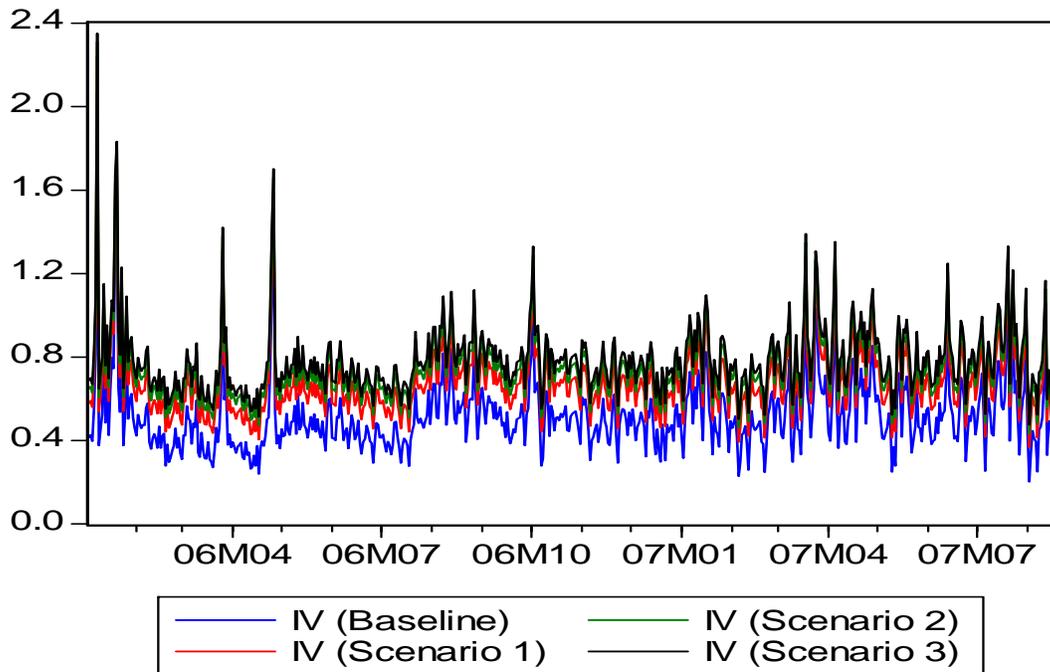


Figure 13: Simulated Daily Volatility of Copper

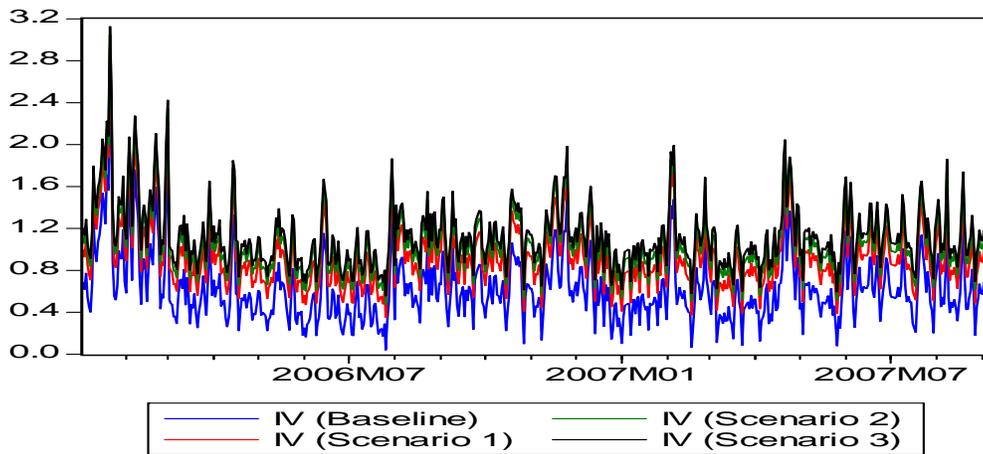


Figure 14: Simulated Daily Volatility of Ref. Soya Oil

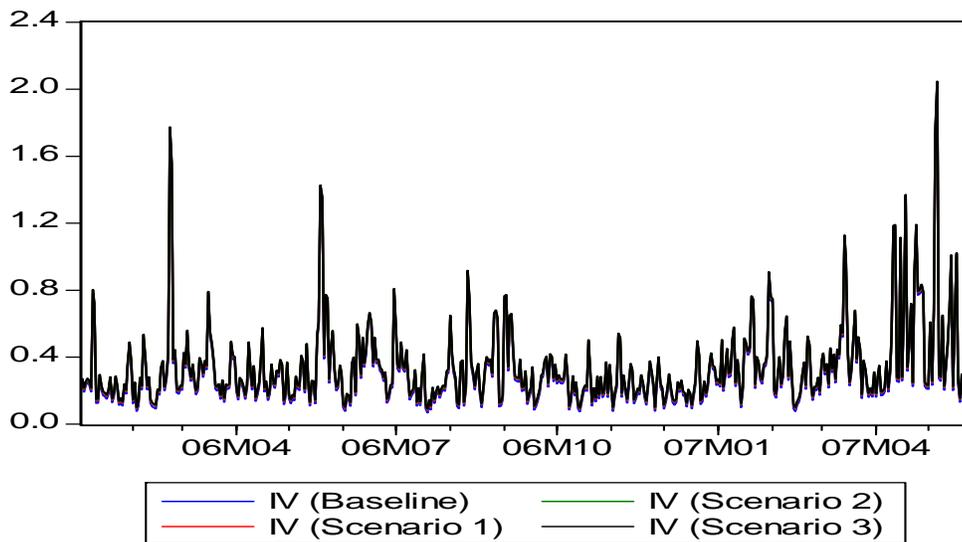


Figure 15: Simulated Daily Volatility of Chana

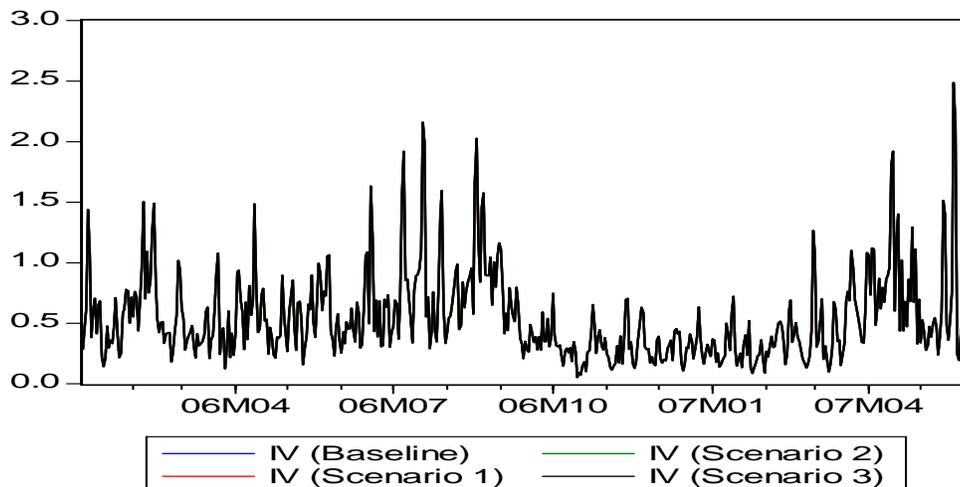


Table- 1: Commodity Group-wise Value of Trade*(Rs. Lakh Crores)*

Commodity Groups	2004-05	2005-06	2006-07	2007-08
Bullion and other metals	1.80 (31.47)	7.79 (36.15)	21.29 (57.90)	26.24 (64.55)
Agriculture	3.90 (68.18)	11.92 (55.31)	13.17 (35.82)	9.41 (23.15)
Energy	0.02 (0.35)	1.82 (8.45)	2.31 (6.28)	5.00 (12.30)
Others	0.00 (0.00)	0.02 (0.09)	0.001 (0.00)	(0.00) (0.00)
Total	5.72 (100.00)	21.55 (100.00)	36.77 (100.00)	40.65 (100.00)

Note: Figures in parenthesis indicate percentage to total value. Adopted from EC (2008) report.

Table- 2: Turnover in Commodity Futures Market (Rs. crore)

Exchanges	2004	2005	2006	2007
Multi Commodity Exchange (MCX)	165147	961,633	1,621,803	2,505,206
NCDEX	266,338	1,066,686	944,066	733,479
NMCE (Ahmadabad)	13,988	18,385	101,731	24,072
NBOT(Indore)	58,463	53,683	57,149	74,582
Others	67,823	54,735	14,591	37,997
All Exchanges	571,759	2,155,122	2,739,340	3,375,336
% of GDP	18.3	61.0	90.0	

Source: www.fmc.gov.in

Table- 3: Impact of Commodity Transaction Tax (CTT) on Transaction Cost

Cost Components	Present Cost	Transaction cost after CTT
Exchange transaction fees	Rs. 2 to 3 per Rs. 100000	Rs. 2 per Rs. 100000
Service Tax	Nil	Rs. 0.25 (@of 12.5% Service Tax)
CTT	Nil	Rs. 17 per Rs. 100000
Total Cost	Rs. 2 per Rs. 100000	Minimum of Rs. 19.25 per Rs. 100000

Source: Forward Market Commission

Table- 4: Volume of Trade in Major Commodity Derivative Market

Major Exchanges	2003-04	2004-05	2005-06	2006-07
New York Mercantile Exchange (NYMEX)	163.15	204.6 (25)	276.2 (35)	353.3 (28)
Dalian Commodity Exchange (DCE)	88.3	99.17 (13)	120.7 (19)	185.5 (54)
Chicago Board of Trade (CBOT)	599	674.6 (12)	805.8 (19)	945.7 (20)
Tokyo Commodity Exchange (TOCOM)	74.4	61.8 (-17)	63.7 (3)	47.7 (-26)
London Metals Exchange (LME)	71.9	78.3 (9.3)	86.9 (11)	92.5 (7)
Shanghai Futures Exchange (SHFE)	40.57	33.7 (-16.7)	58.1 (72)	85.5 (48)
Multi Commodity Exchange (MCX)		20.4	45.63 (122)	68.9 (51)
National Commodity & Derivatives Exchange (NCDEX)		51.5	53.27 (4)	34.5 (-34)
Chicago Mercantile Exchange (CME)	805	1090.3 (35)	1409 (29)	2804 (50)

Source: Futures Industry Association, Various years.

Notes: Figures in the Bracket are % change.

Table- 5: Transaction Cost: A Global Comparison (Cost Comparison of a Sale of Rs. 100000)

Exchanges	Exchange Fee	Service Tax	Regulatory Fee	Stamp Duty	CTT	Others charge	Total Cost
MCX	2.00	0.25	Nil	1.00	17.0	Nil	20.25
NYMEX	0.74	Nil	0.07	Nil	Nil	Nil	0.81
CBOT	2.93	Nil	0.25	Nil	Nil	Nil	3.18
ICE	0.82	Nil	Nil	Nil	Nil	Nil	0.82
TOCOM	1.23	Nil	Nil	Nil	Nil	0.06	1.29
CZCE	4.76	Nil	Nil	Nil	Nil	Nil	4.76
NYBOT	2.41	Nil	0.40	Nil	Nil	Nil	2.82
CME	2.66	Nil	0.18	Nil		Nil	2.84
DCE	3.64	Nil	Nil	Nil	Nil	Nil	3.64
MDEX	2.89	Nil	Nil	Nil	Nil	Nil	2.89
WINNEPEG	5.62	Nil	Nil	Nil	Nil	Nil	5.62

Source: Author's compilation

Table- 6: Main Differences Between equity Derivative Markets and Commodity Derivative Markets

Particulars	Equity Derivative Markets	Commodity Derivative Markets
Size and Stage of growth	Large volumes of trading and high depth.	Relatively smaller and in its nascent stage
Underlying	Shares	Physical commodities
Settlement	Cash settled	Can be settled by physical delivery
Instruments	Futures (including index) and options	Only futures
Participation	Wider participation; FIIs, Mutual funds, Banks, and Indian Financial Institutions, etc.	Retail participation-proprietary/ client trades and some corporate participation
Assets Class	Local (migration is generally not possible)	Global and hence migration is possible.

Source: Source: Author's compilation

Table- 7: Transactions Taxes and Revenues

Country	TAX (in basis points)	TAX REVENUE AS A PERCENTAGE OF		
		TOTAL REVENUE	GNP	MARKET VALUE OF EQUITY
FRANCE	30 & 15	0.26%	0.12%	1.19%
GERMANY	25	0.14%	0.04%	0.28%
ITALY	15	1.10%	0.38%	6.10%
JAPAN	18 & 55	1.42%	0.17%	0.34%
NETHERLANDS	50 on small trades	0.63%	0.32%	1.17%
SWEDEN	100	0.87%	0.36%	1.55%
SWITZERLAND	15 & 30	2.33%	0.48%	0.94%
UNITED KINGDOM	50	0.80%	0.30%	0.01%
UNITED STATES	various state taxes	0.17%	0.03%	0.08%

Source: L.H. Summers and V.P. Summers, "When Financial Markets Work Too Well: A Cautious Case For a Securities Tax," *Journal of Financial Services Research*, Vol. 3, 1989, p. 275.

Table- 8: Tax Rates and Tax Revenues in Different Countries

COUNTRY	Tax Rate (%)	Tax Revenue % of GDP (2005)
Austria	1	0.03
Belgium	0.5 (abolished in 2006)	0.053
France	0.3	0.01
Greece	1	0.8
Ireland	0.5 (abolished in 2006)	1.6
Spain	1	1.7
U.K	0.5	0.8
Japan	0.7	0.2
Portugal	0.4	0.0
Italy	0.009 - 0.14	0.4
Finland	1.6	0.4
Luxembourg	1	0.6
Tawian	0.1 -0.3	N.A
China	0.3	N.A
Hong Kong	0.1	N.A

Source: Schulmeister, Schratzenstaller, and Picek “A General Financial Transaction Tax – Motives, Revenues, Feasibility and Effects” WIFO Working Paper, 2007.

Table- 9: Impact of STT on Financial Market: A Global Experience

Studies	Impact of STT			
	Price Volatility	Liquidity and Volume	Market Efficiency	Others
Umalauf 1993	Increased	reduced		Migration of Volume
Amhud and Mendlson 1993		reduced		
Edwards 1993		reduced		Migration of Volume
Wang and You 1994	Increased	reduced		Migration of Volume to Overseas market
Marion G Wroble 1996		reduced		
Jones and Seguin 1996	reduced			
Saporta and Kan 1997	insignificant			
Hu 1998	insignificant	insignificant		
Chou and Lee 2002		reduced	Negative effect	
Chou and Wang 2005	Increased	reduced		
Habermeier, and Kirilenko 2003	increased	reduced		Migration of Volume

Source: Author’s Compilation.

Table- 10: ADF Unit Root Test

	ADF TEST				
	TV	IV	BAS	OI	VSP
GOLD	-6.48**	-7.23**	-6.45**	-3.27*	-4.47**
Crude	-5.46**	-6.24**	-5.27**	-4.32*	-4.91**
Copper	-4.79**	-6.134**	-7.57**	-3.35*	-5.24**
Ref Soya oil	-6.44**	-8.37**	-6.71**	-5.47*	-5.22**
Chana	-5.32**	-7.29**	-5.43*	-5.43*	-6.65**

*** indicates the rejection of null hypothesis of unit root at 1% level, * indicates the rejection of null hypothesis of unit root at 5% level. The critical values of the ADF unit root test at the 1% and the 5% levels are -3.382 and -2.594 .*

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