

**FUTURES TRADE, PRICE DISCOVERY AND
RISK MITIGATION IN PLANTATION CROPS:
SOME FIRST ORDER LESSONS FROM
NATURAL RUBBER AND BLACK PEPPER**

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ABSTRACT

This paper seeks answers to three express questions germane to the role forward markets play in the price discovery-risk management in the context of two plantation crops, viz; black pepper and rubber. Quintessentially, forward markets are touted as an effective vehicle for realistic price discovery in an underlying asset; acting as a leveler by ironing out price volatility, the bane of commodity markets. Since futures price acts as a beacon, the prices in cash markets are posited to stay steady in the near-term 'if other things remain same' ensuring a win-win deal for both producers and consumers. An *a priori* price also minimise the risk associated with the trade since it is an insurance against any wild swings in prices capping both upside and downside risks. The study assumes importance in the context of the raging debate on the root cause of commodity inflation and the green signal given to the Forward Contracts (Regulation) Amendment Bill 2010, which promises to be a game changer by ushering in sweeping changes in commodity forward markets.

To put it succinctly, the answers elicited by the study from the published data paint a grim picture as far as the efficacy of forward market in price discovery and in its risk mitigation, roles were concerned. In all counts, the answers found by the study are in negative, in the case of both the commodities in question. These revealing answers have far reaching policy implications. The most important is that the government should not try to put the cart before the horse, and instead, approach the market reforms on a step-by-step fashion. Instead of hastily joining the reform bandwagon, a calibrated approach is the need of the hour. Learning from the past mistakes in other markets – equity, forex and foreign commodity markets – cautious gradualism should be the guiding principle leading the commodity markets reforms. Analytically, the study, so far, banked heavily on simple arithmetic measurements and visual presentation of the facts to arrive at its conclusions. A part reason for this is the difficulty in crunching the futures data which is beset with inconsistency and gaps. The study intends to take the analytics further forward by reconciling the time-series data, thereby surmounting the data deficiency and inaccuracy using relevant methods to give the early findings the much needed analytical rigor.

Introduction

Ever since the commodity markets started moving upwards since late last decade marked by the perennial story of price bubbles, bursts, more bubbles and more bursts, sending alarm bells ringing in the corridors of policy circles world over, there has been an ever growing body of literature - both in popular and academic space - that tried to get to the root of this problem. A dominant school of thought led by the Wall Street think tanks¹ propounds that the price rise was the sign of the beginning of a 'commodity super cycle' which would last longer than the earlier ones. The current upswing in commodity prices, according to them, has been driven by both demand and supply side factors and was not triggered by 'too much (speculative) money chasing too few commodities' through the futures and derivative windows. A host of factors such as a booming middle class with a higher disposable income and their changing consumption pattern in populous countries like India and China, and supply constraints were cited as the major reasons for the current phase of the commodity price cycle.

The other school of thought², however, counters this argument and postulates that the current spurt in commodity prices was a function of excessive speculation in the market place, sans any reasons fundamental to commodities. According to this school of thought, it is

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1. Wall Street biggies like Goldman Sachs, BoA Merrill Lynch, Morgan Stanley, Citi Financials *et al* periodically puts out numerous commodity outlooks disguised as 'research reports', which all converge on this singular point. Such 'research reports' often smacks conflict of interest since these aficionados of street smart finance are also major players in these markets. Multilateral agencies like IMF and India's Planning Commission too concur with this line of argument
 2. A host of multilateral agencies and institutions like Unctad, OECD, World Bank and the Asian Development Bank (ADB) had endorsed this line of thought.

the ‘financialisation’³ of the commodities market rather than any shift in fundamentals that had triggered the current ‘commodity bubble’⁴. Putting the blame squarely on the unfettered interest of ‘extreme money’ or ‘high finance’ in commodity futures and derivative products, they argue that the current phase of the ‘commodity bubble’ would be detrimental to the interest of public in general and genuine stake holders in particular with negative socio-economic implications.

In the Indian context, there are a few studies that tried to look into the role forward markets play in price discovery and risk management in commodities⁵. To put it succinctly, most of these studies, though differ from each other in method and approach, tend to converge on a singular point; that the futures market has nothing to do with the current phase of commodity price spiral. Some even went on to suggest that further

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3. Financialisation refers to an economic system that reduces value of any goods or services that is exchanged into a financial instrument or its derivative. It, therefore, reduces any product to an exchangeable financial instrument. In commodity market parlance, financialisation means treating any article of mass consumption including staples as an asset class which could be shuffled and reshuffled according to the choice of the fund manager. Such a treatment of commodities by pure play fund managers’ exposes commodity prices to excessive risk of volatility since it more often than not transmits chaos in other asset classes to the commodity markets. In such a scenario, meaningful price discovery in a commodity may not be possible since the market for the products is driven by exogenous factors rather than the fundamentals of the commodities.
 4. Economic bubbles occur when too much money is chasing too few assets, causing both good assets and bad assets to appreciate excessively beyond their fundamentals to an unrealistic and, hence, unsustainable level. This is often aided by an accommodative monetary policy by the Central bankers which help speculators making cost of fund to nil or close to zero. The low cost of capital helps speculators to leverage their positions in multiples of their net worth or capital. Markets reacts to this ‘over valuation’ of assets to an unsustainable or unrealistic levels by a sharp correction sending the asset prices on a downward spiral with investors scurrying for cover. This could also lead to a ‘contagion effect’ or a ‘domino effect’ since assets markets are increasingly become co-integrated.
 5. Sen, Abhijit et al., (2008) The Expert Committee to study the impact of future trading and Agriculture commodity prices.

liberalisation of the market by introducing more derivative products such as index and options is an imperative to enhance the breadth and depth of the market in terms of volume and value.

Taking a queue from these studies and reports, the Union cabinet in September 2010 put its stamp of approval to the amendments to Forward Contract Regulation Act (1952) (FCRA) by introducing Forward Contracts (Regulation) Amendment Bill, 2010 in Parliament. And in December 2011, a standing committee of the parliamentarians too gave their nod to the Bill. It goes without saying that the Bill, once enacted, is going to be a game changer for the commodity markets as it promises to open the flood gates of sweeping reforms⁶. On the one hand, it intends to arm the Forward Markets Commission (FMC) with more powers on the lines of the Securities and Exchange Board of India (SEBI) by providing autonomy and more regulatory teeth. On the other hand, the Bill would also pave way for the entry of new players such as financial institutions – both foreign and domestic - foreign individual investors *et al* besides introducing products like ‘options’ of all hues and colours. This, according to the Bill, would benefit various stakeholders including the farmers since they could avail the benefit of better ‘price discovery’ and ‘risk management’ for their products.

These studies, needless to say, are in a sense dated as they preceded the current turmoil in the commodity markets and the introduction of the new Bill. It is also pertinent to note here that these studies had looked only into the trends in select agricultural products and totally ignored the plantation crops. It is a truism that plantation crops provide

6. On the one hand it intends to arm the Forward Markets Commission (FMC) with more powers on the lines of the Securities and Exchange Board of India (Sebi). Besides providing autonomy and more regulatory teeth to FMC, the Bill would also pave way for the introduction of new products like ‘options’ in the commodity market. This, according to the Bill, would benefit various stakeholders including the farmers since they could avail the benefit of better ‘price discovery’ and ‘risk management’ for their products.

sustenance to millions of common men and women across the country. Volatility in the prices of these commodities would have major ramifications for their livelihood and, therefore would impinge on the avowed goal of inclusive growth which is top on the Government's agenda. Therefore, it is imperative to look into the role futures trade plays in price formation, containing instability and risk management in the context of plantation crops. This study makes a preliminary attempt to fill this knowledge gap in the literature.

It looks into the impact of futures trade in two plantation crops namely natural rubber and black pepper. The rest of this paper is devoted to outline the rationale of the study and its way forward. It is also significant that the current study is not only the first of its kind to look into the impact of futures trade in plantation crops, but also the first *ex ante* analysis against the backdrop of the new Bill. The study throws up a range of issues including the question of the plausible impact of the 'options' and 'index futures' on commodity prices and leave ample space for further research.

Futures Market Explained

Conventional wisdom tells us that a futures market is a central financial exchange where people trade standardised futures contracts with a commitment to buy or sell them at a future date at a pre-determined price⁷. Thus, futures contract means a contract between two market participants on a single trading platform to buy or sell specific quantities of a commodity at a predetermined price with delivery set at a particular time point at a future date.

According to the literature on futures trade⁸, market participants who need a certain quantity of a commodity at a particular date can

7. See Unctad, Price Formation in Financialised Commodity Markets: The Role of Information, New York & Geneva, 2011.

8. See for instance Unctad (2011)

either buy it in the spot (cash) market and store it, or buy a futures contract and take delivery when the contract expires. In the former case, the participants would have to bear the storage and opportunity costs because they might alternatively have invested the funds elsewhere at the ruling interest rate.

Therefore, futures price, it is assumed, would be equal to the spot price plus interest and storage cost often called as ‘cost of carry’ of a particular asset class. In simple terms, it is explained by the following equation:

$$F_0 = S_0 + I + W \quad (1)$$

Where F_0 is futures price at time $t = 0$,

S_0 is the spot price at time $t = 0$,

I is the prevailing interest rate, and

W is the storage cost

Thus, it is assumed that, if the futures price exceeds the sum of the spot price and the carrying cost, players have an incentive to buy the commodity in the spot market and take a short position⁹ in a futures contract. This would drive up the spot price and lower the prices in the futures market since arbitrageurs¹⁰ would be able to make a risk-free

9. Short selling refers to an obligation of a trader or market participant to sell an asset, which he/she does not often possess, at a later point of time. Large scale short selling often leads to a softening of prices of the traded asset which, in turn, would help the short seller to make a profit by buying the asset at a lower price than the level at which he/she sold the asset and square off his/her position when the futures contract expires.

10. Though there are different types of arbitrage trading, in its quintessential form, it refers to the opportunity for traders to make risk free profit taking advantage of the price differentials of a particular asset class in a market during a trading session. Arbitrage traders will buy or sell (short or go long) an asset at the same time point. They take advantage of the price or value differences in the spot and forward markets. In a perfectly competitive market, there would never be any arbitrage opportunity since the prices of an asset will be same in different markets leading to a ‘fair price scenario’.

profit as long as $F0 > S0 + I + W$, they buy the commodity in the spot market and sell a futures contract, till the prices have reached a 'new normal' by aligning the futures price to the spot price¹¹.

In the opposite case of a lower futures price, arbitrageurs can sell the commodity on the spot market, invest the proceeds at the prevailing interest rate and take a long position¹² in a forward market. This party is supposed to last till the prices in both markets are leveled and a 'fair price' or 'correct price' is arrived¹³.

Due to high liquidity and easily accessible information on futures prices, futures markets are posited to play a decisive role in effective price discovery and stability. This is based on the assumption of efficient market hypothesis or EMH¹⁴.

Survey of Literature

It may not be customary to open a section with a disclaimer. But the limitations of the current study force us to make a point of departure.

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11. See for detail, The Arbitrage Theorem, Asset Pricing Lecture 4 by Denis Pelletier, North Carolina State University, 2006.
 12. Long position refers to an obligation to buy an asset at a pre-determined price at a future time point.
 13. Fair or a correct price is arrived when value or price of an asset or similar assets in all markets are same leaving no scope for any arbitrage trade.
 14. The efficient-market hypothesis (EMH) is based on the core assumption that markets are informationally efficient. This means that market players cannot consistently achieve returns in excess of average market returns on a risk-adjusted basis. This is because the information on a particular trader asset is to all players in a symmetric manner at the same time point. As per the theory, participants bet on the market based on this information leading to perfect or informed hedges. There are at least three variants of EMH; weak, semi-strong, and strong. The weak-form of EMH claims that prices of a traded asset reflect all past publicly available information. The semi-strong-form of EMH claims both that prices reflect all publicly available information and that prices instantly change to reflect new public information. The strong version of EMH goes a step further to claim that prices instantly reflect even hidden or insider information or information privy only to insiders. The concept was developed by Prof Eugene Fama of the University of Chicago Booth School of Business in 1969.

This section takes a close look at the literature on futures trade in commodities. However, since the study has a penchant for policy related issues, the focus is on the review of previous studies which have policy implications. Therefore, it focuses mainly on major works done in the Indian context with policy implications. Nevertheless, this section also takes cognizance of other important studies done in the context of global market in general and India in particular.

At the outset, it may be pertinent to draw some generic inferences about the current body of literature. First and foremost, most of the studies were set against the backdrop of a rapid increase in food price inflation.

Second, most of the studies on the impact of futures trade on commodity prices remain inconclusive due to the information deficit on the subject. These studies failed to reach on any definitive conclusions following the dearth of data thanks to the nascent nature of forward contracts in most of the traded agricultural commodities. The present study makes a difference by banking on a longer time series data as the futures trade has come a long way since these studies were done.

Another common trait of these studies was their sole objective to find the empirical correlation between futures trade and price volatility in select commodities against the backdrop of food price inflation by culling out data for select commodities in which futures have been introduced and active. While some, like IIM (B)¹⁵ study, had argued that futures trading, leading to excessive speculative activities, did lead to volatility in prices of some commodities, others¹⁶ found it otherwise. However, all of them converge on one point - that forward markets have helped better price discovery and risk management.

15. Indian Institute of Management, Bangalore, *The Impact of Futures Trading In Some Important Agricultural Commodities*, 2009.

16. The Expert Committee to Study the Impact of Futures Trading on Agricultural Commodity Prices, 2006.

Fourth, it should also be noted that some works like the IIM (B)¹⁷ had empirically proved that setting up of modern commodity exchanges with a national foot print such as NCDEX was instrumental in spatial integration of commodity markets which other ways remained fragmented geographically.

Besides these studies, four other studies deserve special mention. The first study¹⁸ had unequivocally found a “conflict of interest when the trading privilege, ownership right and the management prerogatives were vested in the same person(s). There are some shortcomings in the day-to-day management of these exchanges. Structural solutions are required to strengthen the day-to-day governance”. The study had strongly argued in favour of ‘demutualisation’ of these exchanges which means the separation of ownership interest from the management interest.

The second study¹⁹ on the Commodity Transaction Tax (CTT) had found that CTT which is supposed to be an instrument to curb excessive speculation in fact is leading to volatility in prices. The study came to the conclusion that CTT only leads to higher volatility in the markets, but it had failed to explain why.

The third study²⁰ found that the “usefulness of Indian futures market is affected by the selective and restrictive implementation of the regulatory policy” and made a strong case for further liberalising the commodity markets by introducing more derivative instruments like options.

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17. Indian Institute of Management, Bangalore, *The Impact of Futures Trading In Some Important Agricultural Commodities*, 2006.
 18. *For the Transition of the Mutual form Exchanges to Demutualised Ones*, Indian Institute of Capital Markets, 2004.
 19. Pravakar Sahoo and Rajiv Kumar, *Impact of Proposed Commodity Transaction Tax on Futures Trading in India*, Indian Institute for Research on International Economic Relations, 2008.
 20. *Managing Price Risks in India’s Liberalised Agriculture: Can Futures Markets Help*, World Bank and United Nation’s Commission for Trade and Development (UNCTAD), 1985.

In a recent article, Frederick Kaufman²¹ points out that ever since the tech bubble burst in 2000, after a dream run riding the Y2K boom, there has been a 50-fold increase in dollars invested in the commodity index funds. “In 2003, the commodities futures market still totaled a sleepy \$13 billion. But when the global financial crisis sent investors running scared in early 2008, and as dollars, pounds, and euros evaded investor confidence, commodities - including food - seemed like the last, best place for hedge, pension, and sovereign wealth funds to park their cash. You had people who had no clue what commodities were all about suddenly buying commodities.... In the first 55 days of 2008, speculators poured \$55 billion into commodity markets, and by July, \$318 billion was roiling the markets. Food inflation has remained steady since”, the study observed.

No survey of literature on futures trade in recent times would be complete without mentioning the latest **UNCTAD**²² work which traces the role of information in commodity futures market. In a nutshell, the study finds a close correlation between increased ‘financialisation’ of commodity markets and the runaway inflation in commodity prices. It says ‘financialisation’ has strongly affected the way the commodity markets functions. “Due to the increased participation of financial players in those markets, the nature of information that drives commodity price formation has changed. Contrary to the assumptions of the efficient market hypothesis (EMH), the majority of market participants do not base their trading decisions based purely on the fundamentals of supply and demand. They also consider aspects which are related to other markets or to portfolio diversification. This introduces spurious price signals to the market”, it says.

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21. Frederick Kaufman, How Goldman Sachs Created the Food Crisis , Foreign policy April 27, 2011.
 22. The Financialised Commodity Market: the Role of Information, UNCTAD, 2011.

This paper makes a point of departure from the existing body of literature by focusing on the role of futures trade in price discovery and risk management in black pepper and natural rubber. The choice of these commodities is not incidental but intentional. For one, pepper has a long history of futures trade. Both these crops are the main source of income for millions of people and their price movements are very sensitive for their livelihood. Therefore, price formation in these commodities has a much wider socio-economic ramification.

Analytical Framework & Methodology

The study is set against the theoretical framework elucidated above. To put it succinctly, it seeks answers to three fundamental questions that form the kernel of forward markets theory. First is the foremost issue of price discovery. Are futures trade leading to a realistic price discovery? Second is the pertinent question of price stability; is the forward market helps containing price volatility or instability? Last, but not the least, is the issue of risk mitigation. Do futures trade help market participants insulate themselves from trading losses or basis risk?²³

Data Sources

The study makes use of the published data by different agencies such as Spices Board and Rubber Board, Forward Markets Commission, National Commodities and Derivatives Exchange Ltd (NCDEX), and National Multi Commodity Exchange.

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23. Basis risk here is defined as the risk associated with imperfect hedging using future contracts. It may be a function of the difference between the price of an asset which is to be hedged and the value of underlying asset of the contract, or because of a mismatch between the expiration date of the futures and the actual selling date of the asset. Under these conditions, it is said, the spot price of the asset, and the futures price, do not converge on the expiration date of the future. The amount by which the two quantities differ measures the value of the basis risk. In simple terms, it is defined as: $\text{Basis Risk} = \text{Spot price of hedged asset} - \text{Futures price of contract}$.

Price risk is the normal risk associated with any trade that a trader risk loses due to a fall in the value of an asset(s) below the current market price of the asset(s).

Of Flawed Logic & Forward Trade: A Strange Story of India's Commodity Futures Markets

Facts, as the old adage goes, are sometimes stranger than fiction. Going by the facts, this seems to be axiomatic in the case of India's commodity futures market, which gives credence to the 'financialisation' of commodity markets narrative. Consider this for starters. The budget estimates for 2011-12 fiscal had pegged country's overall economic size, measured by GDP, a tad lower than Rs 90 lakh crore. Against this, the total value of trades on the commodity futures bourses in the country – national and regional exchanges put together – touched the Rs 92.61 lakh crore mark during the first half of the fiscal! Table I provides the details. In plain speak, *ceteris paribus*, commodities futures market would outgrow India's real economy by a wide margin of 100%, if not more, by the end of financial year 2011-12.

More, the devil, as they say, lies in detail, even though details on the commodity futures markets so far remain sketchy thanks to poor disclosure norms. A single national trading platform, the Multi Commodity Exchange (MCX), Mumbai accounts for close to 90% of this astronomical trade volume, with NCDEX, promoted by the National Stock Exchange (NSE) garnering a share of a little over 9%. In sum, between the big two, they command over 97% of the Rs 93 lakh crore 'turnover' in the commodity derivative markets as of end September, 2011. It needs to be noted here that the total net-worth (capital and reserves put together) of these two exchanges is not even a fraction of the volume generated in these national trading platforms. These numbers, sure, give inkling about the way the country's commodity forward markets function and the course it may take in the future once the rules laid out in the new Bill kick in.

Table 1: Commodity Futures Market: Some Stylized Facts

GDP FY 12 (BE) &	Rs 89.81 lakh cr (BE)
Commodity Futures Turnover April-Sept FY 12	Rs 92.61 lakh cr
Of which	
MCX's share* (%)	88
NCDEX share (%)	9.16
BSE Turnover (Till Jan 2012)	Rs 25,479.55 Cr

Note: * Of this, 90% of trade is being controlled by half a dozen traders.
& both States and Centre put together.

Sources: FMC, BSE, Indiabudget.nic.in

Price-Risk Management in the Era of Dissonance: Some First Order Lessons from Black Pepper & Natural Rubber

Though the futures trade in black pepper and natural rubber (NR) commenced at different time points, for the sake of comparison the study makes use of fortnightly data on trade executed on the two trading platforms with a national footprint viz; NCDEX for black pepper and NMCE for natural rubber.²⁴

Like in many other commodities, the volume traded on the futures platform for pepper and rubber, more often than not, outstripped the total availability of the commodity in the domestic market. This is very much true in the case of pepper. Table 2 gives an idea about this trend.

24. The use of fortnight data, instead of daily trading numbers is intentional since it gives more analytical clarity. Every running contract expires on respective fortnights of the month for which the trade was executed.

Table 2: Growth in Futures Trade Volume

Date	Rubber In tons	Pepper In qntrs
15-01-06	8898	310861
15-01-07	15774	352622
15-01-08	1996	211748
31-01-09	17944	65359
15-01-10	3028	73849
15-01-11	5088	127467

Since the volume in futures market had outstripped supply in the case of both commodities, it could be expected to have an impact on prices in the spot market. An accepted way to elicit answer to this issue is to look into the behaviour of prices in spot and futures markets. A common tool used to capture this is to test the paradigm of convergence of prices in the two markets. Figures I-A and I-B provide the details.

It emerges from the graphs that spot and futures prices reveal a long-term tendency to move closer but still keep a distance in the case of both commodities. This not so converging trend in prices are suggestive

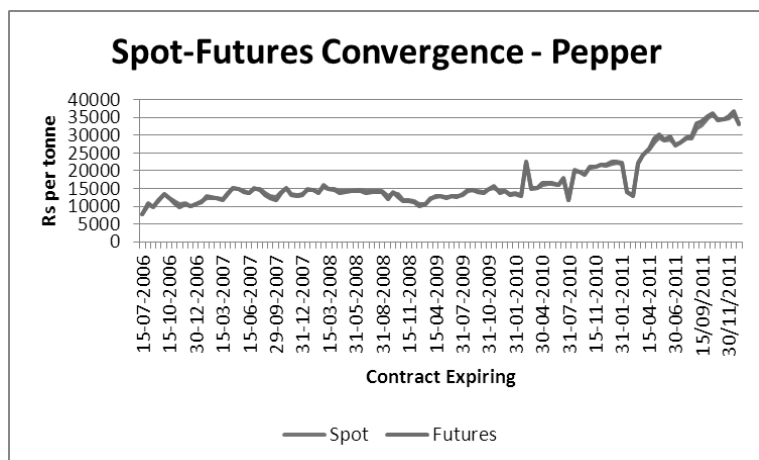
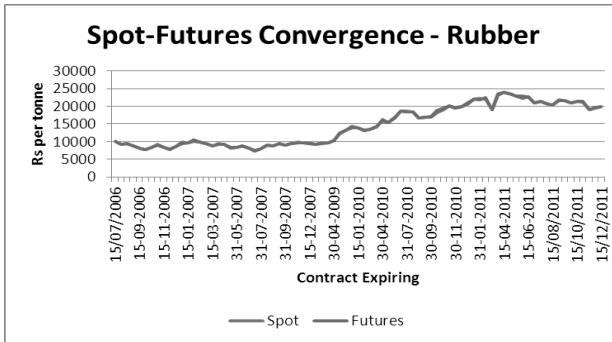
Figure I- A

Figure I-B

of differentials in the value of the underlying asset in spot and futures markets and the price discovered by the expiry date of the contract, need not be called as a ‘fair price’ or ‘correct price’ in the strict sense of the term. This dual price scenario keeps the field wide open for arbitrage players.

Also, a flip side of the tendency for spot-futures prices to converge is that it may transmit high volatility in the futures market to the cash market. Figures II-A and II-B lend credence to this hypothesis.

It is evident from the charts that the prices in the spot market for both the commodities tend to swing in a wide range as and when the contract ending dates near. This indicates that forward markets with its attendant features of arbitrage trading *et al* may be passing on volatility and instability to the cash market. Notably, the fluctuations are more pronounced ever since 2008-09 which was incidentally the beginning of the so called “commodity super cycle”.

Though it may be difficult to arrive at a definitive conclusion about the role played by speculators in creating such wild swings²⁵ in

25. The swings in prices can also stem, at least partly, from the practice of ‘volatility trade’ by day traders. Volatility traders or day traders are those non-serious, niche players who make a profit by taking advantage of the intra-day swings in prices of a particular asset class. They often buy in day’s ‘lows’ or ‘dips’ and sell in highs and pocket the margin and close their positions before the end of trade. Such trades, though legal, often causes wild swing in prices.

the absence of data on delivery-based trades and positions roll over, it can be argued that such roller-coaster ride in prices was due to heavy arbitrage trade by speculators leading to price distortions, rather than price discovery.

Figure II-A

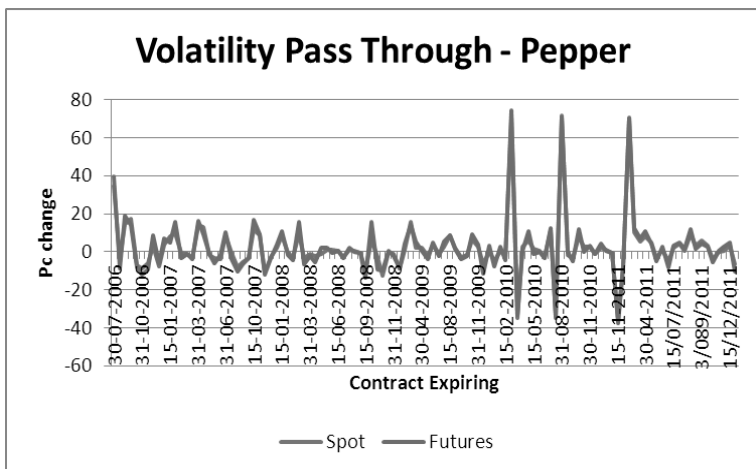
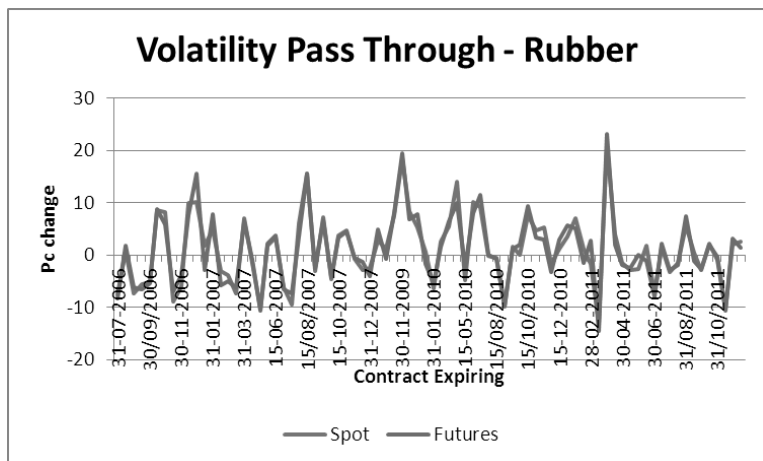


Figure II- B



The hypothesis of volatility pass through was further corroborated by computing standard deviation and CV for both the series. The results are presented in Table 3 and are on the expected lines.

Table 3: Trading Risk – Pepper

Spot Market			Futures Market	
Year	SD	CV	SD	CV
2006	1385.17	0.13	1401.71	0.13
2007	1138.38	0.08	1162.87	0.09
2008	1395.86	0.10	1497.30	0.11
2009	917.11	0.10	1010.72	0.07
2010	3328.44	0.19	3397.60	0.19
2011	6122.31	0.22	6351.44	0.22

Trading Risk - Rubber

Spot Market			Futures Market	
Year	SD	CV	SD	CV
2006	678.85	0.077	700.93	0.08
2007	673.98	0.074	677.57	0.07
2010	2261.81	0.132	2311.68	0.13
2011	1339.94	0.062	1367.43	0.06

The volatility figures tell a similar story for both the commodities with the instability measures of spot market moving in tandem with that of forwards markets sans any deviations as and when the contract expiry date nears. This once again lends credence to the theory that forward markets may be instrumental in perking up volatility in the cash market. This seems to be true in the case of both the commodities.

The inferences emerging from the above analysis is further confirmed by constructing instability indices²⁶ for both commodities for their respective spot and forward markets. The results are summarised in Table 4.

Table 4: Instability Indices

Black Pepper			Natural Rubber*		
Year	Spot	Futures	Year	Spot	Futures
2006	-4.632	-4.481	2006	-4.395	-4.302
2007	-3.547	-3.546	2007	-3.397	-3.397
2008	-3.250	-3.248	2010	-3.754	-3.672
2009	-4.234	-4.248	2011	-3.298	-3.344
2010	-3.585	-3.585			
2011	-3.228	-3.229			

Note: * Data is not available for the periods 2009 and 2010, since FMC had suspended futures trade in natural rubber.

Predictably, the results throw up no surprises. It underlines synchronised movements in instability indices of both spot and futures prices across the time span. In other words, volatility in both cash and forward markets prices tread the same path. Whenever instability in the futures market dips, instability in the spot market too follows suit and *vice-versa*. This is true in the case of both natural rubber and black pepper across the time span.

26. The measure of price instability is calculated using the following formula

$$\frac{1}{n} \sum_{t=1}^n [(| Y(t) - y(t) |) / y(t)] * 100$$

where

Y(t) is the observed magnitude of the variable.

y(t) is the magnitude estimated by fitting an exponential trend to the observed value

n is the number of observations.

This pronounced trend across time points were further verified by constructing Cuddy-Valle Index²⁷ for both the commodity across time. Here again, the indices tell us a similar story, movements in forwards get immediately transmitted to the cash market prices without lag, underlining the vulnerability of cash market prices to the vagaries of forward markets.

Table 5: Cuddy Valle Indices

Black Pepper			Natural Rubber*		
Year	Spot	Futures	Year	Spot	Futures
2006	0.13	0.13	2006	0.08	0.92
2007	0.08	0.09	2007	0.99	1.01
2008	0.08	0.09	2010	0.85	1.01
2009	0.09	0.10	2011	0.92	0.93
2010	0.14	0.14			
2011	0.15	0.16			

Note: * Data is not available for the periods 2009 and 2010, since FMC had suspended futures trade in natural rubber.

The strong correlations between the prices in both markets were also evident from the correlation coefficients given in Table 6.

Table 6: Correlation Coefficients

Pepper	0.987*
Rubber	0.999*

* Significant at 0.01 level (2-tailed)

27. Cuddy-Valle Index is another measure used for gauging the instability of a time series data set developed by two researchers Cuddy and Valle in 2009. The index is nothing but an adjusted CV with unexplained variation in a trend regression. The value of the index ranges from zero and the CV with zero implying no instability and vice-versa. Arithmetically, it is defined as follows:

$$I_x = \text{Root of } (1 - \text{adjusted } R^2).$$

As a corollary, the swings in prices in cash and futures markets could logically increase the risk profile of the market. This is more evident from the heightened risk in futures markets as revealed by a high 'basis risk'²⁸ than the cash risk. The details are presented in Charts III-A and III-B.

Figure III-A

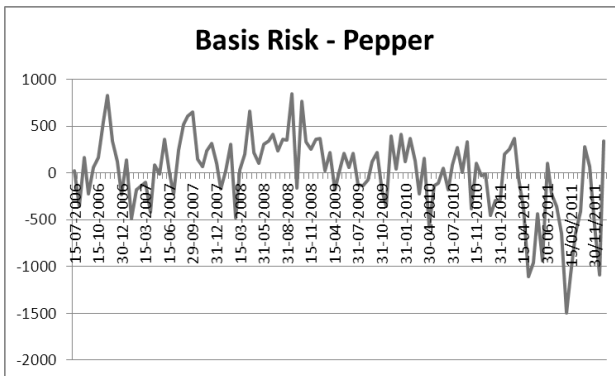
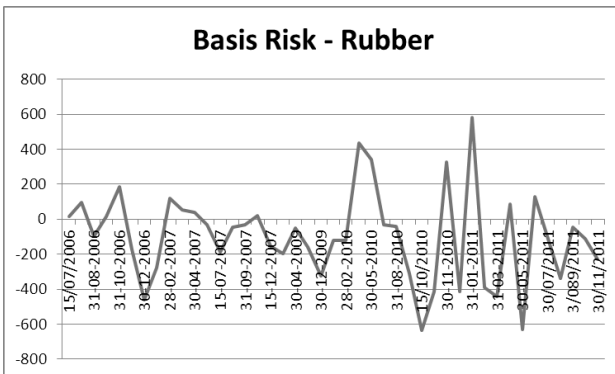


Figure III-B



28. Basis risk is the risk associated with imperfect hedging using futures. It could arise because of the difference between the asset whose price is to be hedged and the asset underlying the derivative or because of a mismatch between the expiration date of the futures and the actual selling date of the asset. Under these conditions, the spot price of the asset, and the futures price, do not converge on the expiration date of the future. The amount by which the two quantities differ measures the value of the basis risk. That is;
- $$\text{Basis risk} = \text{Spot price of hedged asset} - \text{Futures price of contract}$$

In fact, as the charts suggest, futures trade seems to be instrumental in increasing the basis risk than the price risk in most time points. This is true for both pepper and rubber across time points. This implies that players who take positions in the futures market need not be genuine buyers/sellers and were not acting ‘rationally’ on the basis of full information leading to misguided bets on the futures markets, an antithesis to Efficient Market Hypothesis (EMH). Also, in several time points basis risk had turned negative²⁹ indicating the imperfection of the markets giving traders an opportunity to make ‘free cash’ or risk free profits.

Higher basis risk over price risk for majority of the contracts across time points also suggests that futures markets were not helping the genuine market participants to ameliorate uncertainty associated with the trade. Rather, forwards had exposed genuine market players to heightened risks. Speculators were buying time or ‘postponing’ their risks by rolling over positions in periodic intervals. This is clear from the increasing number of open interest positions³⁰.

Figures IV-A and IV-B provide the detailed trend in the number of open interest positions and prices for both commodities from 2006 to 2011. Evidently, players tend to minimise their open positions whenever

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29. Basis risk in the context of hedging a portfolio is the difference between the value a specific portfolio or investments and an index used as the underlying asset for the hedge. The risk of basis run either ways or positive and negative. Positive basis exists when the index produces better results than the specific portfolio. Negative basis means that the results of the index fall below the results of the specific portfolio.
30. Open interest refers to the total number of derivatives or forward contracts that were not closed or delivered by the time of end of the contract. It is often used as a measure to gauge the liquid nature of an underlying asset. The concept is often used to confirm trends and trend reversals for futures and options contracts. An increase in open interest along with an increase in price indicates an upward trend. Similarly, an increase in open interest along with a decrease in price confirms a downward trend. An increase or decrease in prices while open interest remains flat or declining may indicate a possible trend reversal.

the price spikes and increase their open interests whenever the price dips. This trend is true for both the commodities.

Figure IV-A

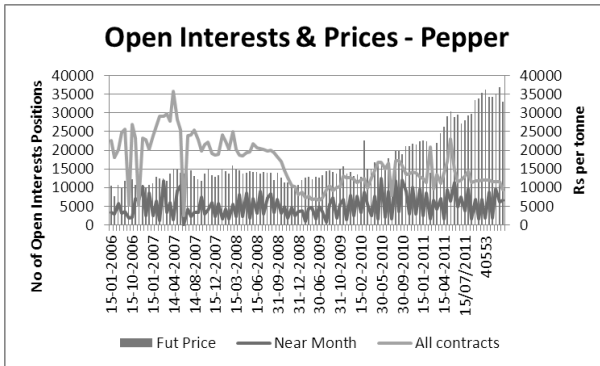
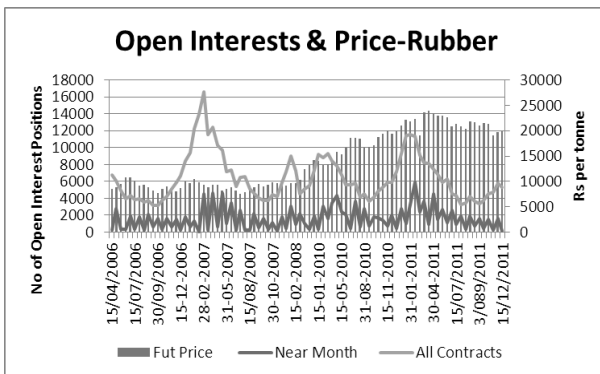


Figure IV-B



Summing Up

This section takes the discussion straight to the heart of the issue which forms the theme of this paper. That is, are the forward markets in plantation crops such as black pepper and natural rubber helping growers to get economic prices for their produce, as it is supposed to be, and mitigate their long-term risk by capping volatility? The answers emerging from the above discussion are in negative.

For starters, forward markets are supposed to be an effective platform to provide an efficient price discovery mechanism and a better risk mitigating tool for players. Forward markets were posited to play the role of a beacon and /or an advance warning system on price trends helping genuine buyers and sellers minimise risks. Stake holders are expected to make ‘informed hedges’ based on ‘rational expectations’ and, therefore, behave ‘rationally’.

However, going by the above analysis and discussion, this is evidently not the case for black pepper and natural rubber futures. Forward markets have literally failed to ensure price discovery. In spite of a linear and unidirectional trend, value of the asset in the spot and features markets show gaps leading to rampant arbitrage trade. The price thus discovered cannot be treated as a ‘fair price’ since the market goes through a roller costar ride before arriving at its ‘new normal’. This is because it transfers high degree of volatility in the forward markets to the cash market. Needless to say, volatility leads to uncertainty thus scaring genuine players away from the trading platform.

Similarly, futures trade did flunk the test of its other stated objective of risk mitigation. In fact, futures trade was instrumental in exacerbating basis risk than price risk in most time points.

Suffice it to say that forward markets are seemingly not leading to efficient price discovery or risk mitigation. However, this needs further empirical enquiry and infallible statistical testing and scrutiny. It is a tall order and lies beyond the brief of the current study.

Concluding Remarks and Some Policy Suggestions

This section winds up the study by presenting major findings from the foregoing analysis and makes some policy suggestion that may prove valuable in future policy making.

First and foremost, the forgoing analysis of the role futures plays in arriving at an efficient price discovery and risk management throws

up not so satisfactory a result. Despite divergence in the dynamics of black pepper and natural rubber fundamentals, futures market were found wanting when it comes to fulfilling its principal tasks of price discovery and risk mitigation. This had led to price distortions rather than price discovery. However, this in no way implies that futures trade in itself is paving the way for high degree of volatility in prices abetting overall market instability. It is the argument of this study that, to a greater extent, it is the maturity of the market and the regulatory environment that help futures market work efficiently.

Second, the paper could not address the moot question of who benefits from forward markets most. Though the commodity markets are still a forbidden area for financial players, brokerages and non-banking financial institutions often open their fund taps to players at a higher interest rate better known as 'badla' financing. This scenario is poised to change soon once the amended FCRA 2010 kicks in. How much the growers are benefitting from the forwards depends mainly on their holding capacity and their knowledge about market dynamics. However, this requires further enquiry including a visit to farm gate. This throws open scope for further bottoms-up research using primary data.

Third, there is no apple-to-apple comparison among different commodities and the role forwards play in shaping their course. However, the lessons learnt from the experience elucidated above help make some generalisations which are universal to all markets. These are provided in the policy suggestions given below:

1. It is imperative for the government and various institutions and commodity associations to take micro level and macro level studies to understand the dynamics specific to each commodities. This would provide an in-depth understanding of the nature and dynamics of a particular commodity and how forwards can help in better price discovery / risk mitigation. Since plantations are a virgin area of research, more emphasis should be given to this

sector. To achieve this objective, a concerted effort of a government-academia-commodity bodies-research institutions initiative is an imperative. This needs to be taken on a war footing before the amended FCRA kicks in.

2. A case-to-case approach to the working of futures contract in commodities is necessary. It is the view of this paper that a 'same size fits all approach' to commodity trade may not be feasible. To drive the point home, the volatility in one commodity might have caused by a climatic change, but in some other cases currency fluctuations could be a contributing factor. Seasonality is another factor that could move prices. Therefore, a case-by-case approach in the introduction of various regulatory tools including a CTT may be appropriate.
3. It is high time that the government and the regulatory agencies should think about introducing a volatility index (Vix) for the commodity markets in line with Vix introduced by the equity bourses. This should coincide with the introduction of the index and options trade as envisaged in the amended FCRA.
4. Since the aim of introducing futures trade is to enhance the breath of the market, it may be reasonable to draw some lessons from the equity markets' experience. Since all commodities could not command same weight and liquidity in an index, it may be prudent to introduce OTC exchanges and separate trading platforms for thinly traded commodities. This may help regulator to introduce market makers in the case of thinly and moderately traded commodities. This would also insulate genuine stake holders in such commodities from the high volatility in the heavily traded commodities.
5. To ensure better transparency in the market, the regulator should notify strict disclosure norms for brokers/traders. If a large trade

is executed, it should be made mandatory for the broker/trader to disclose the quantity and size of the deal at what prices and on whose behalf the deal was executed. Also the buyers name should be made public before the close of the trading day. This would not only help better transparency but also prevent any possible ‘circular trading’ leading to price rigging in the commodities concerned. This also helps better information dissemination so that other players can also take advantage of any trade based on private information.

6. It may be prudent to arm the regulator with more powers including search and seizure before the introduction of new products like options and index futures. It is better to cleanse the house before opening it up to new guests. In other words, to use a cliché, it is wise to put the horse before the cart than vice-versa.
7. Last, but not least, it may not be prudent for the government to allow high finance or extreme money to roil the commodities market. For one, they, with their financial mite, they could easily drive up the prices of a commodity and vice versa, as and when they chose, and simply wind up their positions when they deem fit. They are known for portfolio shuffling depending on which asset class suits them at a particular point of time. It would be like setting the cat among the pigeons. Also, this would expose the market to more complicated exchange rate movements and swap deals which would be detrimental to the growers, traders and genuine hedgers alike. These players could be given entry at a later point of time, after the market watchdog is armed with sufficient powers, but their exposure levels including roll-over and open positions may be capped at reasonable levels. This is particularly important when organisations like OECD had expressed serious concerns about the unbridled flow of financial capital into the commodities market driving the price – up and

down – crazy and call for measures to tackle the phenomenon. Therefore, it may be wise to take a wait and watch approach before taking a call on letting the financial sharks into the commodities market. Unlike equities, commodities represent the real economy and any wild swings in the market would hit multitudes where it hurt most.

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