Derivatives And Price Risk Management: A Case Of Indian Commodity Cotton Futures And Spot Prices In India

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Abstract

By using indications given by the commodity markets, farmers, growers, or producers can minimize the price risk and avoid a supply gut. The consumers of the output can minimize the price risk and ensure that the demand pressure is appropriately capped. In India National Commodity Derivatives Exchange of India (NCDEX) is an online professionally managed multi-commodity exchange. The study aims to study the volatility and caused effect between cotton futures price and cotton spot price from the period 2019 to 2022 daily data were collected from Multi Commodity Exchange (MCX). This study also analyzed the Johansen cointegration between the cotton spot price and cotton futures price from MCX. The study employed statistics tools such as descriptive statistics, unit root test (ADF test), cointegration test. The study found that existence of normality and absence of unit root in time series data, also risk was higher than the mean return of cotton futures and spot price. There was low positive correlation between cotton futures price and cotton spot price. Produced very low and least positive impact of cotton spot price on cotton futures price whereas low and positive impact of cotton futures price on cotton spot price.

Keywords: commodity markets, futures, price discovery, risk management, NCDEX.

Introduction

In the current economy, farmers and agribusiness companies face high risks due to the emergence of specific new factors, such as increased volatility in input and output prices, climate change, restrictions on international trade, US-China trade war, new and more stringent food safety standards, and public awareness about the environment and halal guarantees. India is the land of agriculture and agricultural commodities and its trading have an enormousimportance as far as the Indian economy is concerned. Futures market has been established to provide price stability reduce poverty and ensure growth to the economy. Future derivatives also provide an opportunity to investors to hedge the risk of their various positions in cash market.

Many developed and developing countries of the worldare using derivatives like futures, options, forwards, swaps etc. for hedging the risk in agriculture commodities. However, there utilization has been limited in India. The production, supply and distribution of many agricultural commodities are controlled by the government and only forwards and futures trading are permitted in certain commodity items. Hedging involves transactions costs due to aggregation, margin costs and brokerage costs. The production of an individual farmer in most cases may not be comparable to the contract sizes specified in the futures contracts. So there might

be a need to aggregate the produce informally or through formal means like marketing cooperatives in order to hedge in futures markets. This paper analyses the risk and return analysis with reference to cotton futures in India.It will investigate the risk management of cotton futures listed in NCDEX India. This paper is an attempt to identify the problems and prospects of the future markets with reference to price risk management in India. We use secondary data in this research which is extracted by National Commodity Derivative Exchange of India (www.ncdex.in). Secondary data is also extracted from reports and research papers published in various journals.

Review of Literature

Broll et al. (2013) state that farmers and agribusiness companies face a high level of risk in the current economy due to certain new factors, such as higher price volatility for inputs and outputs, climate change, and restrictions on international trade, and new food safety standards and tighter. This development coincided with a significant shift in the foundations of the agricultural market. The farm sector's current critical problem is price risk, which often creates losses among producers (farmers). It is not uncommon for farmers to incur losses and debt burdens due to high commodity price volatility, especially falling prices during the harvest season (Elumalai, 2009)

Instruments to buy or sell an asset at a particular time and price differentiates commodities trading. Forward contracts and swap contracts use specific instruments primarily in currencies, and futures contracts focus on commodity goods. Simultaneously, options can cover almost all commodities, including stocks, bonds, currencies, and futures contracts (Hull, 2015). One alternative to solving this problem is to carry out risk management through futures contract trading. Today, futures contracts have a very strategic role as a means of determining prices and implementing hedges. Futures contracts help commodity prices on the market become more stable and reduce the probability of high volatile prices (Dewi et al., 2011). Futures trading can provide economic benefits in the form of the

transfer of unwanted risk through hedging activities.

(Khoza et al 2019) analyzed factors influencing small farmer's decision to participate in the agro-processing companies in Gauteng province, South Africa. Primary data collected from 102 small holder farmers through structured questionnaire. Study found that only 19% farmers are participating agro-processing in Gauteng province. It also reveals that factors influencing positivelylike educational, land, training and development etc. to participate in agro processing. Study also recommended that governments should bring new innovative technology and effective training to agro processing farmers in the country. Analyzed farmers risk towards attitudes strong with the self-assessment regarding the own way managing the risk in commodity markets. Study found that the application of specified risk managing tools by other country farmers and their potential impact on income drop and risk level increases.

Inderpal Singh (2015) validated the market perceptions of different bodies on the usefulness and suitability of future contract in Indian Agriculture Commodity by incorporating various econometric models like GARCH, ADF test and Dunkin Watson Statistics etc. Mohan, Gemech, Reeves and Struthers (2014) assessed the welfare gain from eliminating coffee price volatility in Indian coffee producers by using GARCH model and by using empirical estimated from the coefficient of relative risk aversion drawn from the literature.

In practice, derivatives are commonly used as a tool to manage risk, primarily due to price fluctuations that tend to be difficult to predict. Asset prices are often risk-controlled, including agricultural commodities (CPO, olein, cocoa, tobacco, coffee, and others), mining commodities (gold, coal, nickel, tin, oil, and gas), stocks, bonds to foreign currencies (Dewi et al., 2011). Uncertainty in these assets' price movements often creates investment risk and high business risk that can potentially harm investors or commodity producers (Bodie et al., 2014). Investment managers, hedge funds, speculators,

and commodity producers often use derivatives as a risk control tool.

The increasing volatility of the international market is driving the use of derivative instruments in controlling financial risk. Risk management is the main focus of activities in the derivatives market, which can be used by actors (participants) to reduce various kinds of risks. Different derivative instruments have emerged, such as futures contracts for agricultural production factors, such as fertilizer and environmental damage prevention (Mukherjee, 2011; Gilbert, 2010).

Research Methodology

An efficient future market is one which sends price signals to the spot market immediately and eliminate supernormal profits from arbitrage price differences on maturity and then future prices become equivalent to spot prices with a marginal variation of transaction costs. According to Fama (1970) an efficient agricultural market is one in which the spot market fully reflects the available information. According to cost-of carry model with no arbitrage profit expectation, the efficiency of Indian agricultural markets can be represented by equation. , the efficiency in Indian agricultural futures markets can be represented by following equation:

$F_{t, t-k} = S_{t, t-k} + dt$

Here dt is the carrying cost, $F_{t, t-k}$ is the future price at the time T for the delivery at time t-k and S_{t-k} is the expected spot price at the maturity i.e. time t-k. If the cost of carry is found to be zero or stationary, then the arbitrage model is implied, hence the spot and future markets are integrated. Important criteria must be met for the long term efficiency of Indian cotton future markets i.e. S and F must be integrated (stationary) to the same order and they must also be co-integrated otherwise S and F can drift apart with time. Present study primary data collected from the period 2019 to 2022 daily data were collected from Multi Commodity Exchange (MCX).

Objectives

1. To analyze the stationarity and cointegration between cotton future and cotton spot prices

This paper uses descriptive research design. Data will be collected by secondary sources through journals, paper publications and websites. Data on future prices and spot prices and volume traded is extracted from www.ncdex website. Data is analyzed by descriptive statistics and trend analysis by graphs and charts. Secondary data on futures prices and volume of daily transactions etc. on all trading days will be obtained for the period of 3 years i.e. April 2019 to March 2022.

Data Analysis and Interpretation

Descriptive Statistics of Cotton Futures Price and Cotton Spot Price

	Cotton Futures	Cotton Spot
Mean	0.9011	1.0171
Std. Dev.	-0.0811	0.8012
Skewness	1.7198	31.9016
Kurtosis	9.3212	11.0912
Probability	0.0000	0.0000

(Source: own computation)

From the above table depicts results of descriptive statistics. Mean return of Cotton futures was positive 0.9011 and the value of standard deviation -0.0811 is lower than the mean return, which reveals that association of risk is bit lower than the returns of cotton futures. The value Cotton spot returns is positive 1.0171 and

standard deviation is 0.8012. It indicates that risk is higher and a return is negative during the study period. The probability value of cotton futures and cotton spot are significant at 1% level which means both probability values are (0.000) and (0.000) less than the 1% (0.01) level respectively. Thus the results revealed that existence of

normality in selected time series data, during the
study period.

ADF Test of Cotton Futures Price and Cotton Spot Price of MCX

ADF test Results		Cotton Futures		Cotton Spot	
		t-Stat	Prob.*	t-Stat	Prob.*
Augmented Dickey-Fuller test statistic		21.9871	0.000	16.6081	0.000
Test critical values:	1% level	-3.4389		-3.4389	
	5% level	-2.8652		-2.8652	
	10% level	-2.5688		-2.5688	
*MacKinnon (1996) one-sided p-values.					

(Source: own calculation)

The table exhibited the results of ADF test of selected variable of cotton futures price and cotton spot price to test stationary. The t-statistic value of cotton futures price (21.9871) and cotton spot price (16.6081) are lower than the critical values. This indicates that the time series data of cotton futures price and cotton spot price are significantly stationarity during the 3 years of the study period.

Analysis of Johansen Cointegration between Cotton Spot Price and Cotton Futures Price

Series: cotton spot and cotton future price				
Lags interval (in first differences): 1 to 4 Unrestricted Cointegration Rank Test (Trace)				
Hypothesized				
No. of CE(s)	Eigen value	Trace Statistic	Critical Value	Prob.** 0.05
None *	0.180433	201.2910	15.49471	0.0001
At most 1 *	0.006115	6.912923	3.841466	0.0343
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigen value)				
Hypothesized				
No. of CE(s)	Eigen value	Max-Eigen Statistic	Critical Value	Prob.**
None *	0.180433	201.2910	14.2646	0.0001
At most 1 *	0.006115	6.912923	3.841466	0.0343
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

(Source: own calculation)

The above table shows the results of Johansen cointegration test between cotton future price and cotton spot price. The value trace value of future price and cotton spot price (201.2910) and (6.912923) are higher than the critical value (15.49471) and (3.841466) respectively. The

value trace value of cotton future price and cotton spot price are higher than the critical value respectively. In addition, the probability value of cotton future price and cotton spot price (0.0001) are less than the 1percent and 5percent significant level. This indicates and evidenced that commodity market are highly regulated, standard and least market correction. The investors who's trading and investing in cotton futures and spot commodity market in long term, may have consider the price movements to agriculture the investment strategy and analysis which assist the portfolio of the investors. The both trace test and maxeigen test value evidences that the existence of long run relationship between cotton futures price and cotton spot price during the study period of the last 3 years.

Conclusion

Innovation of derivatives have redefined and revolutionized the landscape of financial industry across the world and derivatives have earned a well-deserved and extremely significant place among all the financial products. Derivatives are risk management tool that help in effective management of risk by various stakeholders. Derivatives provide an opportunity to transfer risk, from the one who wish to avoid it; to one, who wish to accept it. The study results of descriptive statistics mean return reveals that association of risk is bit higher than the returns of cotton futures and cotton spot price during the study. The results found that existence of normality in selected time series data, during the study period. The further analyses would be more reliable in this study. Also exhibited that the time series data of cotton futures price and cotton spot price are significantly stationarity during the study period. The both trace test and max-eigen test value evidences that the existence of long run relationship between cotton futures price and cotton spot price during the study period. Thus, the cotton future price and cotton spot price are co-movement and price changes are interconnected. This indicates and evidenced that commodity market are highly regulated, standard and least market correction. The investors who's trading and investing in cotton futures and spot commodity market in long term, may have consider the price movements to agriculture the

investment strategy and analysis which assist the portfolio of the investors.

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