



## Effect of Volatility and Causal Movement between Cotton Futures Price and Cotton Spot Price in Indian Commodity Market

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**Abstract-** This study examines the market and price behavior is the supreme problem of commodity investors and trader. The present study spotlights the price behavior/movement and market behavior/volatile in Indian agricultural commodity market (MCX). The study aims to study the volatility and caused effect between cotton futures price and cotton spot price from the period 2017 to 2019 daily data were collected from Multi Commodity Exchange (MCX). This study also analyzed the correlation and cointegration between the cotton spot price and cotton futures price in Multi Commodity Exchange (MCX). The study employed statistics tools such as descriptive statistics, unit root test (ADF test), correlation test, OLS regression test, cointegration test, granger causality test, and GRACH 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. The GARCH test evidenced that low volatility secured both cotton futures price and cotton spot price and absence of cause and effect during the study period. The investors have to consider the high volatility commodity futures price which make effective in trading and investments in the aspect of price discovery. The result replicates that each commodity traded or invested in exchange has different price effectiveness concept and the investors and trader should recognize the commodity to hedge price risk.

**Keywords:** Commodity Exchange, Spot Market, Futures Market, Commodity Market, Price Discovery.

### I. INTRODUCTION

In India, Agriculture area is the critical area and spine of the economy of a nation. In commodities commodity market, three exchanging stages are National Commodity and Derivative Exchange and furthermore Multi Commodity Exchange in India. In Agriculture commodity market is extremely early and successfully in India, yet quietly ranchers are confronting numerous dangers and most significant thing and testing part is value danger of commodity. The Indian Agriculture creation agriculturework has run over a colossal change in the agribusiness area in the wake of embracing new strategies of government towards the value impact and advancements to improve the creation level. India has a long history of exchanging commodities. In 1875 the Bombay Cotton exchange Association was shaped. Notwithstanding, exchanging on futures contracts turned into a test because of value variance. In 1947, significant arrangement choices were forced to contribute decidedly to the advancement of the futures and forward business sectors in the nation.

In 2003 India commodity trade was allowed to do exchange futures contracts. Item exchanging India had phenomenal development particularly for rural commodity. In 2007-08 Indian government confined exchanging on certain commodity as a piece of its enemy of Inflationary measure. Indian commodity market has progressed multiple times in a time of 5 years for example from INR 665 billion out of 2002 to INR 33,753 billion of every 2007 enlisted a CAGR-Compounded Annual Growth Rate. The monetary market has run over different kinds of difficulties which improved the market to settle and prepare the monetary instrument to beat the danger. What has really changed is the degree of danger and the supporting instruments in the monetary agriculture work. There are numerous subordinate instruments created in the market to support the danger and to moderate the danger in monetary market. The dealer's premium to broaden the danger has improved the subsidiary market. Those financial specialists who needed to shield themselves against the value variance subsidiary market were their foundation to exchange. The serious issue face by maker,

producer and broker is value change on the lookout. The rural item cost is impacted by powers like irregularity underway, accessibility of stock, request and supply, notions of storm, accessibility of stockroom offices, irregularity in utilization, trade import arrangements of India and friend nations, government intercessions, for example, least help costs, and so on

Agriculture market as an unpredictability impact because of unequal market and indistinguishable items exchanged the market. The purpose behind the value impacts can be a few, for example, calamities, surprising normal, misuse of impending assets, public and worldwide political adequacy, change in the economy and change in industry strategies and so forth. By exchanging into the futures market to make income, examiners capital is needed to expand liquidity in the commodity market. Futures markets permit examiners commitment in a more controlled climate where checking and perception of the members is conceivable. Consequently, futures guarantee straight forwardness. Futures additionally help in normalization of commodity quality, item amount and season of conveyance, since these factors are settled upon by the dealers and determined in the futures contract. The effect of value instability in horticulture commodity not just influences the makers in the commodities area yet additionally on different areas of the economy who use agribusiness items for their creation. Commodity Exchange assumes a tremendous part to keep up the value strength in the commodity market since value assumes a colossal job in item trade.

## II. REVIEW OF LITERATURE

The considering of different investigation done on the issues of commodity price connection or price discovery between spot and futures market. A review of the literature regarding the matter uncovers the accompanying:

Athma, P., and Rao, K. V. G. (2013). An endeavor is made to examine the transient connection between the Spot and the Futures costs of the Commodity Market by breaking down the information of the Comdex. Different factual apparatuses are utilized like Augmented Dickey-Fuller Test Statistic, Multiple Regression, Johansen Co-Integration Test, Vector Error Correction Model and Granger Causality Test are utilized to investigate the arrangement. The examination uncovers that the business sectors are commodity in the value arrangement and transmission of data between futures cost and spot cost. The Comdex mirrors that the normal Futures costs are more prominent than the Spot costs because of the way that the Comdex is a blend of both durable commodity and transient commodity. The Futures market demonstrated the administration in the business sectors which is seen in the CCF plot and is additionally upheld by the Multiple Regression where the futures had a superior impact in anticipating the Spot costs and comparable results were found in the Vector Error Correction Model and the Granger Causality test. Aggarwal, N., Jain, S., and Thomas, S. (2014). This paper attempts to analyze value revelation (price discovery) and supporting viability of the chose commodity futures and assists with overseeing hazard proficiently. The paper contemplates the perspective of the hedger to guess what components may advance supporting viability. There is an immense settlement costs brought about by conveyance focuses and a conniving of distribution center receipts, a bungle between the evaluation determined in The outcomes mirrors that while the item futures markets play out the job of value revelation sensibly well, their job in viably lessening the danger in commodity openness isn't as solid. There is a variety in value disclosure just as supporting viability changes across commodity. Notwithstanding, other than for commodity like sugar and gold, the normal data share (IS) of futures is consistent across the full time agriculture or the later period after 2010. Bansal, R., Dadhich, V., and Ahmad, N. (2014). The examination presents a review of the Indian commodity market. The current investigation centers around the turn of events and execution of the commodity market. The investigation uncovers that Indian commodity markets have as of late opened up another road for merchants to take interest item subsidiaries. For that broker who needs to enhance their portfolios past offers, bonds and land, commodities are the most ideal choice. For financial specialists might have done almost no to really put resources into commodities, for example, gold and silver or oilseeds. Bhagwat, D. S., Maravi, A., Omre, R., and Chand, D. (2015). The examination center around agro-based commodity markets. The primary motivation behind this examination is to know current situation of item futures market in India. The commodity market gives exchanging to exchange items of fluctuated types. This current investigation uncovers to which degree the item approaches and administrative structure. The current advancement India will before long arise as a significant part in the global market regarding item utilization, creation and exchange. Subsequent to acquiring the extensive

standing, the significant commodity trades in India has begun the futures contract in different commodity year back, which can serve ideally to fence the danger because of affliction of expected costs of commodity other than the value revelation instrument. The futures contracts exchange significant commodity trades are normalize in nature. In this paper they inspect the commodity futures market in India, contemplating the historical backdrop of commodity futures market. What's more, after that it has examined the system of exchanging, sections and administrative structure of commodity market in India. The information is gathered through optional source. Auxiliary information gathered from books, diaries, and magazines sites of Forward Market Commission. Guglani, R. K. (2016). This study attempts to comprehend the cost and amount instability of chose horticultural items in Indian market and underline the variables answerable for such vacillations, the components liable for value changes in the spot and futures markets and to look at the value disclosure system through provincial trades and their connection with the public level commodity trades. It is in this manner not irrelevant to bring up that the futures markets give a stage to chance alleviation, value revelation, exchange and clearing and settlement. It has been seen that the partners, in particular, the ranch makers, purchasers, processors and brokers support their situations in the item futures with the aim of shielding themselves from the dangers of likely unfriendly value changes in horticultural commodity. The data relates to chosen futures contacts spread over the time of four years somewhere in the range of 2006 and 2009. The investigation noticed that the value spread and decrease in value unpredictability could be seen during the lapse times of the basmati rice futures traded in Indian commodity markets. Additionally, in the Indian setting, the non-cost estimates, for example, giving essential agriculture work, backing and augmentation benefits alongside sufficient credit for expanding rural yield are unquestionably more significant corresponding to the minimum uphold costs and different motivations including subsidies. Rajan, Hariharan and Reddy, K. (2018). Commodity market is a market which includes purchasing and selling of Hard and delicate commodity. Commodity market exists over a century. India has encountered great advancement in the item subsidiaries markets since 2003. After Government endorsement for activity of different trades, the trade climate has become exceptionally serious market for item improvement and business techniques. Private area activities, trying to tap the possible estimation of rural exchanging, have become key advertisers in this cycle. Jena, P. K. (2016). This paper made an endeavor to observationally look at the financialization of Commodity market in India The paper examinations the job of hypothesis in commodity markets and the connection between stock costs and item cost. This investigation utilizes month to month information for both item cost and stock cost from the period January 2001 to June 2012 (i.e., test period is 138 months) for which time arrangement strategies is utilized. The investigation uncovers that item file cost is exceptionally connected with the stock record cost during the examination time agriculture. The causality test uncovers that commodity value Granger causes to the stock cost in India. This examination experimentally looks at the commodity markets in India by utilizing the time arrangement strategies of causality test and the instability overflow tests. The current examination uncovers that the relationship of stock cost with commodity value, it is discovered that normal stock value return was more than the item value return, yet contrasted with the commodity value instability, the stock cost was more unpredictable than commodity cost. The unequivocal connection test, communicates that item value lists were exceptionally associated with the stock costs in three periods. Along these lines, there is no solid proof on the financialization of commodity markets in India. .Kaur, H. P., and Anjum, B. (2013). Commodities item futures in India-a writing audit. The motivation behind this paper is to give a review of Agricultural Commodity Futures in India by considering the fluctuation of experimental aftereffects of some chose concentrates on agrarian commodity futures. This paper depends on survey of observational consequences of studies on agrarian item futures for the 2001-2013 periods. These examinations have been ordered in three areas: Growth and execution of the commodity futures market, connection between agrarian commodity futures market and spot market and value hazard the board through commodities item futures. The paper shows the development in item futures market alongside distinguishing proof of issues that are influencing the exhibition of horticultural commodity futures in India.

### III. OBJECTIVES OF THE STUDY

Following are the research objectives:

- To examine the normality and stationarity of spot and futures— market for selected cotton future price and cotton spot price of agriculture commodities in Multi Commodity Exchange (MCX) India.
- To analyze the impact and correlation between cotton future price and cotton spot price of agricultural commodity futures and spot markets in MCX India.

- To examine the direction of causality and long term relationship between cotton future and cotton spot prices of selected commodities traded in MCX.
- To study volatility of cotton future and cotton spot prices of selected commodities traded in MCX

#### IV. HYPOTHESES OF THE STUDY

Hypotheses are framed based on the objective of the study.

- NH1: There is no normality and stationarity of spot and futures— market for selected cotton future price and cotton spot price of agriculture commodities in Multi Commodity Exchange (MCX) India.
- NH2: There is no impact and no correlation between cotton future price and cotton spot price of agricultural commodity futures and spot markets in MCX India.
- NH3: There is no direction of causality and no long term relationship between cotton future and cotton spot prices of selected commodities traded in MCX.
- NH4: There is no volatility of cotton future and cotton spot prices of selected commodities traded in MCX

#### V. SOURCE OF THE DATA

Agricultural commodity is traded in MCX (Multi Commodity Exchange). The commodity which was selected cotton futures price and cotton spot price based on the concept theory and previous literature. The cotton is consider as most and major agriculture commodity product. The daily data were used in this study from 1<sup>st</sup> Jan 2017 to 31<sup>st</sup> Dec 2019 from MCX. On this basis commodity has been selected from MCX (Multi Commodity Exchange). The data is retrieved from Multi Commodity Exchange (MCX) website commodity is considered for the present study (Cotton traded in MCX).

#### VI. TOOLS USED FOR ANALYSIS

The statistical tools are assisting and employed to test objective of the study.

- Descriptive Statistic (to test normality)
- Unit Root test (ADF Test) (to test stationarity)
- Correlation Test (to test co-movement)
- OLS Regression Test (to test impact)
- Cointegration Test (to test long run)
- Granger Causality Test (to test cause and effect)
- GRACH Test (to test volatility)

#### VII. ANALYSIS AND INTERPRETATION

**Table – 7.1 Descriptive Statistics of Cotton Futures Price and Cotton Spot Price**

	Cotton Futures Price	Cotton Spot Price
<b>Mean</b>	<b>0.0018</b>	<b>-0.0013</b>
<b>Std. Dev.</b>	<b>0.0111</b>	<b>0.0373</b>
Skewness	-0.5077	-26.0676
Kurtosis	14.1087	699.2588
Jarque-Bera	3837	15031076
<b>Probability</b>	<b>0.0000</b>	<b>0.0000</b>

Source: collected data from www.mcxindia.com and computed result in E-view 9.

From the above table 7.1 depicts results of descriptive statistics. Mean return of Cotton futures was positive 0.0018 and the value of standard deviation 0.0111 is higher than the mean return, which reveals that association of risk is bit higher than the returns of cotton futures. The value Cotton spot returns is negative (-0.0013) and standard deviation is 0.0373. It indicates that risk is higher and a return is negative during the study period. The cotton futures and cotton spot value of Skewness is negative (-0.5077) and (-26.0676)

respectively. This exhibited the measures the degree and direction of asymmetry distribution. The distribution of both cotton futures and cotton spot has a skewness of 0, and a distribution that is skewed to the left, it has a negative skewness. The probability value of Jarque Bera 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. The further analyses would be more reliable in this study.

**Table 7.2 Augmented Dickey-Fuller Test Statistics of Cotton Futures Price and Cotton Spot Price**

Lag Length: 0 (Automatic - based on SIC, maxlag=19)					
ADF test Results		Cotton Futures Price		Cotton Spot Price	
		t-Stat	Prob.*	t-Stat	Prob.*
Augmented Dickey-Fuller test statistic		-28.5899	0.000	-6.76375	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: collected data from www.mcxindia.com and computed result in E-view 9.

The table 7.2 exhibited the results of ADF test of selected variable of cotton futures price and cotton spot price to test stationarity. The t-statistic value of cotton futures price (-28.5899) and cotton spot price (-6.7637) are lower than the critical values of 1% level, 5% level and 10% level are -3.4389, -2.8652 and -2.588 respectively and also probability value is less than 1% (0.01). This indicates that the time series data of cotton futures price and cotton spot price are significantly stationarity during the study period. Hence, the results evidence that further analyse would be more reliable and accuracy.

**Table – 7.3 Analysis of Correlation between Cotton Futures Price and Cotton Spot Price**

.Correlation		
	CPO FUTURES	CPO SPOT
CPO FUTURES	1	0.145238
Probability	-----	0.0001
CPO SPOT	0.145238	1
Probability	0.0001	-----

Source: collected data from www.mcxindia.com and computed result in E-view 9.

The correction results showed in the above table 7.3. The correlation coefficient value is low (0.1452) and the probability value is 0.0001 which is less than 1% (0.01) significant level. It indicate that there is significantly positive and low /weak correlation existence relationship between crude palm oil futures price and crude palm oil spot price which implies that if increases in price of crude palm oil futures and increase in price of the crude palm oil spot, vice versa, during the period.

**Table – 7.4 Analysis of Impact of Cotton Spot Price on Cotton Futures Price**

Dependent Variable: COTTON FUTURES				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.00007	0.00041	0.18180	0.85580
COTTON SPOT	0.02070	0.01093	1.89402	0.05860
R-squared	0.00484	Mean dependent var	0.00005	
Adjusted R-squared	0.00349	S.D. dependent var	0.01109	
S.E. of regression	0.01107	Akaike info criterion	-6.16682	

Sum squared resid	0.09041	Schwarz criterion	-6.15437
Log likelihood	2283.72400	Hannan-Quinn criter.	-6.16202
F-statistic	3.58732	Durbin-Watson stat	2.09418
Prob(F-statistic)	0.058613		

Source: collected data from www.mcxindia.com and computed result in E-view 9.

The above table 7.4 represented that the results of ordinary least square test of cotton spot price on cotton futures price. The R square value is 0.00484, which is higher than the value of Adjusted R square at 0.00349 and it depicted that model is fit explain the relationship summary.

The value of R square signifies the 0.4 percentage variation in cotton futures price that is explained by cotton spot price. Here, 0.4% variation in cotton futures price is explained by cotton spot price.

The size of the coefficient for cotton spot price, gives the size of the effect that variable is having on cotton futures price, and the sign on the coefficient is positive which explains the parallel or same direction of the effect of cotton futures price on cotton spot price. In OLS regression, the coefficient value is 0.0207 it reveals that 0.0207 expected to increase in cotton futures price when that cotton spot price increases by one.

The Prob (F-Statistic) is used explain the overall significance of the study regression model. This is to appraise the significance level of cotton futures price and cotton spot price. The study null hypothesis is all the regression coefficients are equal to zero. The Prob (F-statistics) value (0.058613) which is lower than 10% (0.10) significant level and it depicted the probability of null hypothesis being true. As per the above OLS results, probability is significant. This implies that overall the regression is meaningful.

The value of durbin Watson is 2.09418, it represented that the value of durbin watson is close to the mid range value 2. This indicates there is no autocorrelation detected in the data set or sample during the study period. This result explains that previous day or yesterday cotton spot price fell couldn't affect the next day price.

**Table – 7.5 Analysis of Impact of Cotton Futures Price on Cotton Spot Price**

Dependent Variable: COTTON SPOT				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.00136	0.00137	-0.99470	0.32020
COTTON FUTURES	0.23373	0.12341	1.89402	0.05860
R-squared	0.00484	Mean dependent var	-0.00135	
Adjusted R-squared	0.00349	S.D. dependent var	0.03726	
S.E. of regression	0.03720	Akaike info criterion	-3.74260	
Sum squared resid	1.02099	Schwarz criterion	-3.73015	
Log likelihood	1386.76200	Hannan-Quinn criter.	-3.73780	
F-statistic	3.58732			
Prob(F-statistic)	0.058613	Durbin-Watson stat	1.01671	

Source: collected data from www.mcxindia.com and computed result in E-view 9.

The above table 7.5 displayed the results of ordinary least square test of cotton future price on cotton spot price. The R square value is 0.00484, which is higher than the value of Adjusted R square at 0.00349 and it depicted that model is fit explain the relationship summary.

The value of R square denotes the 0.004 percentage variation in cotton spot price that is explained by cotton futures price. Here, 0.004% variation in cotton spot price is explained by cotton futures price.

The size of the impact of cotton future price, gives the size of the effect that variable is having on cotton spot price, and the positive coefficient is explains the parallel influence or same direction of the effect of cotton future price on cotton spot price. In OLS regression, the coefficient value is 0.23373 and probability value is 0.05860 which is less than 10% significant level. It reveals that 0.2337 expected to increase in cotton spot price when that cotton futures price increases by 1.

The Prob (F-Statistic) is used explicate the overall implication of the study regression model. This is to value the significance level of cotton spot price and cotton futures price. The study null hypothesis is all the

regression coefficients are equal to zero. The Prob (F-statistics) value (0.058613) which is lower than 10% (0.10) significant level and it depicted the probability of null hypothesis being true. As per the above OLS results, probability is significant. This implies that overall the regression is meaningful. The value of durbin Watson is 1.01671, it shows that the value of durbin watson is less than mid range value 2. This indicates there is positive autocorrelation detected in the data set or sample during the study period. This result explains that cotton futures price fell previous day or yesterday it also likely that cotton spot fall the next day.

**Table – 7.6 Analysis of Cointegration between Cotton Spot Price and Cotton Futures Price**

Series: COTTON FUTURES & COTTON SPOT				
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	149.7325	15.49471	0.0001
At most 1 *	0.006115	4.477923	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	145.2546	14.2646	0.0001
At most 1 *	0.006115	4.477923	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: collected data from www.mcxindia.com and computed result in E-view 9.

The above table 7.6 exhibits the results of cointegration test between cotton future price and cotton spot price.

The value trace value of future price and cotton spot price (149.7325) and (4.477923) are higher than the critical value (15.49471) and (3.841466) 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.

The value trace value of cotton future price and cotton spot price (145.2546) and (4.477923) are higher than the critical value (14.2646) and (3.841466) 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.

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.

**Table – 7.7 Analysis of Pair wise Granger Causality Tests between Cotton Spot Price and Cotton Futures Price**

Pair wise Granger Causality Tests Sample: 1/02/2017 12/31/2019 Lags: 5			
Null Hypothesis:	F-Statistic	Prob.	Remark (Unidirectional or bidirectional cause effect)
COTTON SPOT does not Granger Cause COTTON FUTURES	0.37805	0.8639	No direction of cause and effect
COTTON FUTURES does not Granger Cause COTTON SPOT	1.13236	0.3416	No direction of cause and effect

Source: collected data from www.mcxindia.com and computed result in E-view 9.

The above table 7.7 represented the results of Granger Causality Tests. The probability values of cotton spot cause and effect to cotton futures is 0.8639 and the probability values of cotton futures cause and effect to cotton spot is 0.3416. It indicates that there is no direction of cause and effect between cotton futures and cotton spot. If any market and economic changes affected in cotton futures price doesn't cause the cotton spot price and vice versa, during the study. Thus, investor takes cautious about the investment in cotton futures and spot market price though it would not get caused by each other.

**Table – 7.8 Analysis of GARCH Test Cotton Futures Price**

Dependent Variable: COTTON FUTURES Method: ML - ARCH (Marquardt) - Normal distribution Sample (adjusted): 1/03/2017 12/31/2019 Included observations: 740 after adjustments Convergence achieved after 87 iterations Presample variance: backcast (parameter = 0.7) GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.0000494	0.000349	0.1414	0.8876
COTTON FUTURES(-1)	-0.02091	0.045394	-0.46055	0.6451
Variance Equation				
C	0.0001	0.0000049	17.08784	0.0001
RESID(-1)^2	0.383089	0.030901	12.39719	0.0001
GARCH(-1)	-0.02475	0.024023	-1.03027	0.3029
Volatility = (RESID(-1)^2 + GARCH(-1))	<b>0.358339</b>			

Source: collected data from www.mcxindia.com and computed result in E-view 9.

The above table 7.8 represented the volatility of cotton futures daily price. The total value of RESID(-1) and GARCH(-1) is 0.358339 and it indicate that the low volatility of cotton future price during the study. Therefore, existence of low volatility explains that price of cotton futures movement is vulnerable. The investors have to consider the high volatility commodity futures price which make effective in trading and investments aspect.



**Table – 7.9 Analysis of GARCH Test Cotton Spot Price**

Dependent Variable: COTTON SPOT				
Method: ML - ARCH (Marquardt) - Normal distribution				
Sample (adjusted): 1/03/2017 12/31/2019				
Included observations: 740 after adjustments				
Convergence achieved after 38 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000718	0.011943	0.060086	0.9521
COTTON SPOT(-1)	0.003185	0.127034	0.025072	0.98
Variance Equation				
C	0.000889	0.001196	0.743113	0.4574
RESID(-1)^2	-0.00218	0.0041	-0.53106	0.5954
GARCH(-1)	0.593957	0.54588	1.088072	0.2766
Volatility = (RESID(-1)^2 + GARCH(-1))	0.591777			

Source: collected data from www.mcxindia.com and computed result in E-view 9.

The above table 7.9 represented the volatility of cotton spot daily price. The total value of RESID(-1) and GARCH(-1) is 0.591777 and it indicate that the moderate volatility of cotton spot price during the study. Therefore, existence of moderate volatility explicit that price of cotton spot movement is less vulnerable. The investors have to consider the high volatility commodity futures price though cotton spot would be moderate volatile and investor could consider this cotton spot price and which make effective in trading and investments aspect.

#### VIII. CONCLUSION

The present study examines the volatility and shock of cotton futures and cotton spot price. The study used time series daily data were collected from www.mcxindia.com. 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. Hence, the results evidence that further analyse would be more reliable and accuracy. The correlation results evidenced that there is significantly positive and low /weak correlation existence relationship between crude palm oil futures price and crude palm oil spot price which implies that if increases in price of crude palm oil futures and increase in price of the crude palm oil spot, vice versa. The results of regression explained that the very weak impact of cotton spot price on cotton futures price whereas, low impact of cotton futures price on cotton spot price.

The changes in previous day or yesterday cotton spot price fell couldn't affect the next day price of cotton futures. Whereas, cotton futures price fell previous day or yesterday it also likely that cotton spot fall the next day. 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. It indicates that there is no direction of cause and effect between cotton futures and cotton spot. If any market and economic changes affected in cotton futures price doesn't cause the cotton spot price and vice versa, during the study. Therefore, existence of low volatility explains that price of cotton futures and cotton spot movement is vulnerable. The study concluded that there low and weak impact and volatility existence

between cotton futures price and cotton spot price. The investors have to consider the high volatility commodity futures price which make effective in trading and investments aspect.

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