JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

DYNAMICS OF SPOT AND FUTURE COMMODITY MARKET AND ITS IMPACTON INFLATION

[1] M. Naga Sulochana [2] Dr. K. V. Geetha Devi, [3] Dr. G. Someshekar
[1] Student, [2.] Assistant professor, [3] Associate Professor, SRM University
[1] Department of Management Studies,
[1] Madanaaplli Institute of Technology & Science, Madanapalli, India

Abstract

The Dynamics of Spot and Future Commodity Markets and its impact on Inflation. The selected period for this study is 2013- 2023. The study uses Descriptive Statistics for determined volatality of inflation and future prices, Regression analysis test for stationary and Garch model for price duscovery of long term compared to inflation and future prices. The analysis done by usingthe Yahoo Finance four major commodities are soybeans, wheat, coffee, cotton. The analysis explains how prices, rates of inflation, and inventory levels are interrelated and what is the impact of Commodity Futures Markets and its Impact on Inflationvariations with special references to Indian Agriculture and also explain the role and behaviour of commodity future markets, andthe relationship between future prices and inflation rates. The analysis also assess whether future commodity markets participants can successfully use future positions to minimize spot market price risk and analyze the impact of Commodity Future Market onInflation rates variations in India. They would glance into some uniqueness of future trading platform in futures market in order to review whether prices indicates efficient functioning of the market or otherwise and through light on inter-relationship betweeninflation rates and future commodity markets in India. In this study we have used the regression analyses to find out the impact of inflation on the future prices of the agricultural commodities and impact of future trading volume on GDP growth rate.

Key Words: **Agricutlural Commodities, Inflation rates, GDP**.

1. INTRODUCTION

Commodity Market refers to a place whereby buyers and sellers come in contact with each other and directly or indirectly to purchase or sell goods. There are two kinds of market: one isSpot Market and another is Futures Market. Spot transaction meansimmediate delivery of a commodity between buyer and seller, at which price the transaction is made is reffered the SpotPrice. These are traditional markets. Forwards Markets means a place where agreement are normally made to receive the commodities at a later date of future for a predetermined terms and conditions.

The backbone of Indian economy is Commodity market. Indian economy is on the broader sidea fairy tale of successful journeyover the centuires. In terms of the output growth, Indian's performance has been outstanding. India stands first under the Sun inthe productionof jute, fiber, milk and pulses, on second position in wheat, vegetables, fruits, sugarcane production, rice, cotton,and groundnut and it is a leading producers of spices, livestock, fisheries, poultryand plantation crops.

Early 80's Indian commodity future market was very popular. Commodity markets paly an essential play an essential role in theeconomies likes India where the contribution of agricultural production to GDP is mammoth. One of the largest producers of agricultural products is Indian where in farmers have to face price risk.

Commodity futures are only a small fraction of developed countries. In the past, politicians of many countries have created the market of the future. If they are not banned, their work will be rejected according to the rules. The country has recently begun to reduce restrictions on products. Moreover, the government-sponsored expansion of commodity futures is reversing the previous trend.Governments expect to benefit from better resource allocation, risk management and value discovery. The commodity futures landscape in India has improved and the National Commodity Exchange has made great progress since its inception with trading volumes increasing every year. According to Forward Business Council, Bureau of Economic Affairs, since the beginning of electronic commerce in 2003, the Indian packaging industry has grown 120 times (The Group, 2014).

2.Review of Literature

- **Dewbre (1981))** proposed an economic model by recognizing the role of reasonable expectations in determining future supply and price and finding its effect. This approach comes from addressing issues such as the direction and size of the transition area. Futures prices appear as changes in financial information. Through their analysis, they look at the risk of prospects and the role of similar businesses.

- **Garbadeand Sibler (1983)** examined the difference between price movements in the spot and futures markets for commodities.Using the synchronous price action model, they found that, in the short run, there is a relationship between pricechanges and futures contracts as a function of the arbitrage elasticity of the physical product. Basically, these two values exhibit stochastic behavior when the price of the same asset changes and exhibit a certain relationship between them.
- **Bose (1988**) found that the Indian stock market is more volatile compared to the established market and Indian stock futureshave experienced many ups and downs due to speculation claims.The India study does not only examine the performance offutures products for the Indian economy. The results show that stock futures are not very profitable in the short run. Clear research in the context of emerging markets, particularly Indian stock futures, is rare.
- **Chakrabarty and Sarkar (2004)** examine the effectiveness of Indian commodity markets in determining the prices of agricultural commodities traded on commodity exchanges.Using common analysis and GARCH models for agricultural products, they clearly define the relationship between commodity futures and commodity stocks. They say you can protect other stock indices using data from one index. The new information is seen as an important factor in predicting future commodity price.
- **Faseli (20102019**explores the impact of 38 major macroeconomic news on the intraday volatility of crude oil from 2012 to 2018. The main purpose of this study is to expand the topic news rankings that show upcoming emergencies at a given time.Analysis using simple multivariate robust ordinary least squares (OLS) regression shows that macroeconomic news has a significant impac
- **Leuthold (2015**) evaluated cattle prices in futures and markets using the ARIMA model and general forecasting techniques,the mean square error sees the most appropriate and accurate forecast for market trading. The risk-reward ratio is huge. Therefore, these results show no strong evidence of inefficiency and call into question the use of mean squared error alone to analyze market prices.
- **Palaniappan Shanmugam and Raghu (2018**) examine the link between the position and futures prices of five agricultural commodities in India. The results show that there is a long-run relationship between futures prices and the prices of five agricultural products. In addition, there is a one-way relationship between the forward market price and the selling price, anda two-way relationship between agricultural products such as soybeans and shina. The study conducted by Arpana and Nandhini (2017) investigates the correlation between gold and oil prices specifically within the context of India.
- **Basab (2018**) describes the monopolistic competition of stock derivatives leading to stable stock market in India.The results show the integration of future costs, production decisions and inventory decisions.

3.Objectives

- To study the impact of future stock prices on inflation.
- To study the impact of volume of future agriculture commodity on agriculture GDP growth rate and inflation rate.
- To examine the price discovery and volatality in the commodity market.
- To analyze of performance in price movement of commodities.
- To analyze the impact of inflation on future commodity market.

4.Need of the Study

- The need for the present study the market practise for agro-commodity all together new to Indian market.
- To know the impact of other markets on commodity market, it became to understand the trading of commodity market.
- One of the single best things you can do to further your education in trading commodities is to keep thorough records ofyours trades.
- Indian is an agro based country, which holds the second position in the world in Agricultural product.
- Indian farmers face price risk due to volatality in the commodity market.
- So, the price, commodity future markets plays a very important role in price discovery.
- The needs of the study is market efficiency of the commodity market from the perspective of price discovery andvolatality.

5.Limitations of the Study

- The study covers commodities traded in Yahoo Finance only.
- Period of the study is confined that 10 years data from selected commodities, i.e., 2013 to 2023.
- The study has been confined to 4 commodities for testing the price discovery and volatality in the commodity market.

➢ This study is purly based on secondary data and therefore the quality of the study depends purely upon the accuracy,reliability and quality os secondary data provideed by exchange and grains markets of India.

6.Research Methodology

Source of Data
Secondary Data

This study mainly depend upon the secondary data, and used monthly future prices and Inflatioin rates. This Future prices collectedfrom the Yahoo finance and software used for this analysis and study is EVIEWS6.

Period of the Study

In the present study literature review has been considered for the past 10 years for the period of 2013 to 2023.

Data Analysis Tools:

Statistical Tools like Descriptive Statistics, Regression, Garch Model are used for the research.

7.Scope of the Study:

➢ The scope of the study is limited to Agricultural Commodities and Period of the study is confined that 10 years data fromselected commodities, i.e., 2013 to 2023
➢ The study mainly focuses on Indian commodity markest, its history and latest developments in the country in Agricultural commodities market.
➢ The study vastly covered the aspects of Agricultural commodity trading, clearing and settlement mechanisms in Indiancommodity exchanges..
➢ This study also helps to know about mechanism of commodity markets & the future market level.

8.Data Analysis

Table 1. Soybeans Descriptive Statistics

Mean	5.902153	1159.615
Median	5.520000	1032.250
Maximum	12.17400	1764.500
Minimum	1.540000	833.0000
Std. Dev.	2.473974	273.4041
Skewness	0.641391	0.457554
Kurtosis	2.683626	1.700463
Jarque-Bera	8.073495	11.68375
Probability	0.017655	0.002903
Sum	655.1390	128717.3
Sum Sq. Dev.	673.2600	8222481
Observations	111	111

Intrepretation:

The above table shows the descriptive statistics of the soybeans inflation rates and future for the period 2013 to 2023. The average soybeans future prices is greater than inflation rates. Themaximum price soyabeans inflation rate during the period wereRs.12.17 while minimum price of soybeans during was Rs. 1.54 with an average soybeans inflation rates of 5.902153. Future price of soybeans had a maximum price of Rs. 1764.500 and a minimum price of 833.0000 with an average price of Rs. 1159.615. Thehigh value of standard deviation also reveals the non-stability of price. The standard deviation inflation rates and future prices 2.473974 and 273.4041 it means future prices is higher than the inflation rates. The analysis of skewness valueof inflation and future prices is 0.641391 and 0.457554 which is equal to zero and they are negatively towards right.

Table 2. Regression Analysis

Dependent Variable: INFLATION
Method: Least Squares
Date: 07/07/23 Time: 9:39
Sample (adjusted): 2011M05 2020M04
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-0.762964	0.797355	-0.956868	0.3408
SOYABEANS_DATA	0.005748	0.000669	8.586182	0.0000

R-squared	0.403467	Mean dependent var	5.902153
Adjusted R-squared	0.397994	S.D. dependent var	2.473974
S.E. of regression	1.919532	Akaike info criterion	4.159894
Sum squared resid	401.6217	Schwarz criterion	4.208714
Log likelihood	-228.8741	Hannan-Quinn criter.	4.179699
F-statistic	73.72253	Durbin-Watson stat	0.281940
Prob(F-statistic)	0.000000		

Interpretation:

From the above table, the co-efficient value of soyabeans stock prices is -0.004571 which indicates for every 1 unit increase in soya beans price there will be an increase of -0.004571 units in inflation. The probability value of soyabeans prices is 0.0005. The R-Squard value is 0.120781 which indicates approximately 12% of dependent variable is explained using independent variable.
HO: There is no significance impact of Soyabeans on inflation.H1:
There is a significance impact of Soyabeans on inflation.

Table 3. Heteroskedasticity Test

Heteroskedasticity Test: ARCH

F-statistic	55.22633	Prob. F(1,85)	0.0000
Obs*R-squared	37.21763	Prob. Chi-Square(1)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/07/23 Time: 9:39
Sample (adjusted): 2011M06 2020M04
Included observations: 110 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.460551	0.447449	3.264173	0.0015
RESID^2(-1)	0.573418	0.077161	7.431442	0.0000

R-squared	0.338342	Mean dependent var	3.544462
Adjusted R-squared	0.332216	S.D. dependent var	4.475101
S.E. of regression	3.656967	Akaike info criterion	5.449160
Sum squared resid	1444.328	Schwarz criterion	5.498259
Log likelihood	-297.7038	Hannan-Quinn criter.	5.469075
F-statistic	55.22633	Durbin-Watson stat	1.878317
Prob(F-statistic)	0.000000		

Interpretation:

H0 : Residual test not having Heteroskedasticity.H1
: Residual test having Heteroskedasticity.
From the output it is clear that prob.chi-square value 0.9250 is greater than 0.05, That indicates the Null Hypothesis H0 is rejectedwhich means the residual having Heteroskedasicity.

Table 4. Garch Model

Dependent Variable: INFLATION
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 07/07/23 Time: 9:43
Sample (adjusted): 111
Included observations: 88 after adjustments

Convergence achieved after 20 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.764933	0.602934	1.268684	0.2046
SOYABEANS_DATA	0.003670	0.000543	6.761704	0.0000
Variance Equation				
C	0.551950	0.186307	2.962576	0.0031
RESID(-1)^2	0.827257	0.336088	2.461428	0.0138

R-squared	0.222648	Mean dependent var	5.902153
Adjusted R-squared	0.215516	S.D. dependent var	2.473974
S.E. of regression	2.191225	Akaike info criterion	3.712851
Sum squared resid	523.3599	Schwarz criterion	3.810492
Log likelihood	-202.0632	Hannan-Quinn criter.	3.752461
Durbin-Watson stat	0.186481		

Interpretation:

From the output of GARCH Heteroskedasticity the probability chi square(1) and the probability F are significant with less than 0.05 value. That indicates that these is a presence of GARCH in the model.Ho :
There is a significance impact of Soyabeans on inflation.

Table 1 : Cotton Descriptive Statistics

	INFLATION	COTTON
Mean	50.97766	77.99396
Median	5.540000	75.31000
Maximum	5009.000	152.3300
Minimum	1.540000	57.59000
Std. Dev.	474.8792	17.11634
Skewness	10.39231	1.730486
Kurtosis	109.0032	6.742002
Jarque-Bera	53967.60	120.1617
Probability	0.000000	0.000000
Sum	5658.520	8657.330
Sum Sq. Dev.	24806133	32226.60
Observations	111	111

Interpretation:

The above table shows the descriptive statistics of the cotton inflation rates and future for the period 2013 to 2023. The average cotton future prices is greater than inflation rates. Themaximum price cotton inflation rate during the period were Rs.5.0 while minimum price of cotton during was Rs. 1.54 with an average cotton inflation rates of 50.97766. Future price of cotton had a maximum price of Rs. 152.3300 and a minimum price of 57.59000 with an average price of Rs. 77.99396. The high value of standard deviation also reveals the non-stability of price. The standard deviation inflation rates and future prices Rs. 474.8792 andRs. 17.11634 it means future prices is higher than the inflation rates. The analysis of skewness valueof inflation and future pricesis Rs. 10.39231 and 1.730486 which is not equal to zero and they are negatively towards right.

Table-2-Regression

Dependent Variable: INFLATION
Method: Least Squares
Date: 07/07/23 Time: 12:19

Sample (adjusted): 1 111
Included observations: 111 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	214.4288	211.5445	1.013634	0.3130
COTTON	-2.095689	2.649821	-0.790880	0.4307

R-squared	0.005706	Mean dependent var	50.97766
Adjusted R-squared	-0.003416	S.D. dependent var	474.8792
S.E. of regression	475.6897	Akaike info criterion	15.18526
Sum squared resid	24664596	Schwarz criterion	15.23408
Log likelihood	-840.7821	Hannan-Quinn criter.	15.20507
F-statistic	0.6254490	Durbin-Watson stat	2.025785
Prob(F-statistic)	0.430732		

Interpretation:

From the above table, The co-efficient value of cotton prices is -2.095698 which indicates for every 1 unit increase in cottonprices there will be an increase of -2.095698 units in inflation.
H0 : There is no significance impact of cotton on inflation.H1
: There is significance impact of cotton on inflation.

Table 3. Heteroskedasticity Test

Heteroskedasticity Test: ARCH

F-statistic	0.008896	Prob. F(1,108)	0.9250
Obs*R-squared	0.009060	Prob. Chi-Square(1)	0.9242

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/07/23 Time: 12:21
Sample (adjusted): 2 111
Included observations: 110 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	226231.9	222929.8	1.014812	0.3125
RESID^2(-1)	-0.009076	0.096221	-0.094320	0.9250

R-squared	0.000082	Mean dependent var	224197.0
Adjusted R-squared	-0.009176	S.D. dependent var	2316529
S.E. of regression	2327133	Akaike info criterion	32.17619
Sum squared resid	5.85E+14	Schwarz criterion	32.22529
Log likelihood	-1767.690	Hannan-Quinn criter.	32.19610
F-statistic	0.008896	Durbin-Watson stat	2.000162
Prob(F-statistic)	0.925030		

Interpretation:

H0 : Residual test not having Heteroskedasticity.H1 :
Residual test having Heteroskedasticity.
From the output it is clear that prob.chi-square value 0.9250 is greater than 0.05. That indicates the Null Hypothesis H0 is rejectedwhich means the residual having Heteroskedasicity.

Table 4. Garch Model

Dependent Variable: INFLATION
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 07/07/23 Time: 12:25
Sample (adjusted): 1 111

Included observations: 111 after adjustments
Convergence achieved after 32 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	170.8040	985.7514	0.173273	0.8624
COTTON	-2.424445	10.31559	-0.235027	0.8142
Variance Equation				
C	190133.6	29131.96	6.526633	0.0000
RESID(-1)^2	-0.007623	0.140469	-0.054267	0.9567
R-squared	-0.015903	Mean dependent var		50.97766
Adjusted R-squared	-0.025223	S.D. dependent var		474.8792
S.E. of regression	480.8310	Akaike info criterion		15.16881
Sum squared resid	-837.8690	Schwarz criterion		15.26645
Log likelihood	1.982232	Hannan-Quinn criter.		15.20842
Durbin-Watson stat	1.982232			

Interpretation:

From the output of GARCH Heteroskedasicity the prob.chi square (1) and the prob F are significance with less than 0.05 value.That indicates that there is a presence of GARCH in the model.

Table : Regression Results

Commodities	R Value	R^2 Value	Adjusted R^2	F-Value	Significance Value
Soyabeans	0.403467	0.1627856201	0.397994	73.72253	0.0000
Wheat	0.030867	0.0009527717	0.021366	3.248700	0.4585
Coffee	0.040512	0.0016412221	0.031709	4.602224	0.0000
Cotton	0.005706	0.0000325584	-0.003416	0.625490	0.8142

Interpretation:

From the above table shows the result of Regression Analsis where the Dependent Variable is the future prices of the Soyabeans,Wheat, Coffee, Cotton respectively and future trading pricesof the same are the independent variables. R-square of theanalysis is coming out to be 0.1627856201 which shows that only 16% variation in the future prices of Wheat is being explainedby the future trading prices whereas in case of Wheat R-square of the analysis is coming out to be 0.0009527717 which shows thatonly 0% variation in the inflation rates arebeing explained by the future trading prices.
R-squard of the analysis is coming out to be 0.0016412221 which shows that only 0% variationin the futuer prices of Coffee is being explained by the future trading prices whereas in case ofCotton R-square of the analysis is coming out to be 0.0000325584 which shows that only 0% variation in the inflation rates are being by the future trading prices.
The Wheat significance value is coming out to be 0.4585 which is less than <0.05. we accept the Null Hypothesis.

9.Findings:

- The study analyzed the price discovery and volatality of selected are Soyabeans, Wheat, Coffee, Cotton.
- In the descriptive statistics, it was found that inflation and future values are soyabean Stock prices in the years 2013 to2015, there is high inflation more than soyabeans stock Prices it means high impact for the soyabeans stock prices.
- In the year 2016 to 2023, the inflation and soyabeans are equal it means there is no impact on soyabeans stock prices.
- From the Regression it was found that soyabeans prices and inflation are significance impact on 5.2% so that it can beconcluded there is less impact on soyabeans stock prices.
- The Garch model of the analysis shows that only 2.7% siginificance impact on soyabeans stock prices.
- In the descriptive statistics, it was found that inflation and future values are wheat stock prices in the year 2013 to 2016,there is low inflation compared to the wheat stock prices it means low impact for the wheat stock prices.

- In the year 2017 to 2023, the inflation and wheat prices are equal it means there is no impact on wheat stock prices.
- From the Regression it was found that wheat prices and inflation are significance impact on 5.4% so that it can beconcluded there is less impact on wheat stock prices.
- The Garch model of the analysis shows that only 0.6% significance impact on wheat stock prices.
- In the descriptive statistics, it was found that inflation and future values are cotton stock prices in the year 2013 to 2016and 2020, the inflation and cotton stock prices are same it means there is no impact on cotton stock prices.
- In the year 2021 to 2023, there is low inflation compared to the cotton stock prices it means low impact for the cottonstock prices.
- From the Regression it was found that cotton stock prices and inflation are significance impact on 5.8% so that it can beconcluded there is less inflation on wheat stock prices.
- The Garch model of the analysis shows that 0.14% significance impact on cotton stock prices .
- In the descriptive stastistics , it was found that inflation and future values are coffee stock prices in the year 2013 and2017 to 2020, there is low inflation compared to the coffee stock prices it means low inflation for the coffee stock prices.
- In the year 2018 to 2023 the inflation and coffee stock prices are same it means no significance impact on coffee stockprices.
- From the Regression it was found that coffee stock prices and inflation are significance on 5.4% so that it can be concludedthere is less impact on coffee stock prices.
- The Garch modelof the analysis shows that 0.14% significance impact on coffee stock prices.

10. Suggestions:

- The findings of the study provide evidence of Agricultural Market integration in India.
- Our findings suggest that the newly introduced Indian spot market, i.e., Aricultural Market promotes integrity in the agricultural commodity market by streamlining the procedures across the different integrated markets, removing information asymmetry between buyers and sellers, and promoting real-time price discovery based on actual demand andsupply.
- The current study has practical implications for various Agricultural commodities, including farmers, traders, and investors.
- In the long run, all four markets are co integrated.
- The Agricultural Market allows Indian farmers to learn about the prices of various commodities and thus take adavantageof price signals to adjust their prices.
- This combination of risk reduction and assumed profit will be enticing, potentially bringing the farming community andthe future market together on a sigle platform.
- There is need to create awareness about commodity Future Market. Awareness programs has to be conducted becausesince this was new to the markets. So it can be done through by giving advertisements in local channels, Newspaper, etc.,
- More agents and marketing executives should be appointed to educate the customers because the customers having manymyths in there mind.

11. Conclusion:

This study used the regression analyses to find out the impact of future prices on the inflation of the agricultural commodities and impact of future trading volume on GDP growth rate. The study finds significant relationship between inflation and future prices. The study also finds no significant impact of future trading volume on GDP growth rate.

REFERENCES:

1. Baharumshah, A. Z., and Habibullah, M. S. (1994). Price Efficiency in Papper Markets in Malasia: ACointegrationAnalysis. Indian Journal of Agricultural Economics, 49(2), 205- 216.

2. Basab, D. (2004). Role of Commodity Futures Market in Spot Price Stabilization, Production and InventoryDecisions with Reference to India. Indian EconomicReview, XXXIX No. 2,315-325.

3. Bessembinder, H., and Seguin, P. J. (1992). Futures-Trading Activity and Stock Price Volatility. Journal ofFinance, 47,2015-2034.

4. Bessler, D., and Covey, T. (1991). Cointegration: Some Results on US Cattle Prices. The Journal of FuturesMarket,11,461-474.

5. Bose, S. (2007). Understanding the Volatility Characteristics and Transmission Effects in the Indian StockIndex andIndex Futures Market. Money and Finance, ICRA Bulletin, 139- 162.

6. Brajesh, K. (2009). Effect of Futures Trading on Spot Market Volatility: Evidence from Indian CommodityDerivativesMarkets. Social Science Research Network, IIMAhmedabad, Working Paper Series1364231.

7. Brorsen, B. W., Ollerman, C. M., and Farris, P. L. (1989). The Live Cattle FuturesMarket and Daily CashPriceMovements. The Journal of Futures Market, 9,273-282.

8. Chakrabarty, R., and Sarkar, A. (2010). Efficiency of the Indian Stock Market with Focuson Some AgriculturalProduct.Paradigm, 14 No. 1,85-96.