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PRICE VOLATILITY ON SELECTED COMMODITIES

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***Abstract*--- Price volatility plays an important role in the commodity market. The major reason for the price change is weather pattern, natural disaster and demographic changes. This study analyzes the price volatility for the specified agricultural commodities with reference with NCDEX market are Turmeric, Castor Seed, Cotton Seed, Chana and Mustard Seed. In the future trading., this can be predicted with the help of E-Garch tool. To check the stationarity level in the specified commodities, Augmented Dickey Fuller Test and Phillips Perroson test has been used.**

***Keywords*--- Commodity, Volatility, NCDEX**

1. INTRODUCTION

Commodity futures are contracts where traders can buy required quantity of a particular commodity at a future date.. Nowadays the commodities are also considered to be real assets which was opposed to financial assets like Bonds and stocks. They have established by real goods rather than an estimated worth. Commodity futures which are sold on the forward basis, which means that the investors will purchase the asset at a fixed price before the asset is been produced (willer - 2019). This can benefit the producers by giving it currency upfront, and it helps the investor, if the price of the asset remains high.

In early days most of the Commodities are commonly bought by the large sectors and institutions those who have the ability to handle and capability to resell them in a smarter way.(bjorne bars - 2014). But nowadays even small investors have started to purchase commodity like equities, which are like shares of stock but they are backed by the real asset of the commodity.

Agricultural products like tea, coffee also comes under commodities. Agricultural commodities are the crops and livestock used in the food industry. Grains, such as corn, rice and soybeans are included in the agricultural segment. Grains are abundantly produced and can be stored for long period of time, making trading more flexible to meet market demand. The agricultural sector also includes "soft" commodities, which are commodities that cannot be stored long. These include cotton, sugar and coffee.

This study analyze the price volatility of the commodity trading for the selected agricultural commodities such as Turmeric,castor seed, cotton seed, chana, mustard seed. The relationship among each day future price will indicate the price co-movement of each commodity. This study helps the traders and investors to know more about the market trend and efficiency and to identify the particular commodity stock.

2. LITERATURE REVIEW

Poon and Granger, measured that volatility plays a vital role in making financial decisions like asset allocation, derivative pricing and risk management. However, there is no particular sector where, a particular model should be used to calculate volatility. Different volatility models which are being used by analyst and practitioners lead to different volatility estimates. In past 20 years, this acts as a major area for the research in financial economics for both practitioners as well as academicians. Unfortunately, most of the work was

done in developed markets in the context of stock markets.

Mandelbrot (1963) and **Fama** (1965) were the first to examine the statistical properties of stock returns using EMA (exponential moving average method). Dimson and Marsh (1990) suggest that simple models perform better than the exponential smoothing. Kaur (2004) examined the nature and characteristics of stock market volatility in India. The overall findings of the following experts were,

- Still now there is no any concluded evidence as to the supremacy of any price changes fore-casting model in the history of literature on developed markets.
- According to the Indian context, research on this type of important topic is defined a sthat there is no work which compares the performance and ability of all the important and specified competing models.

Franses and Nan Dijk (1996) examined on five europen stock markets based on forecasting ability of random walk. And identified that the random walk model works better then anyother approach. **Bittlingmayer** (1998) analysed with the German expertized during the interwar period and concluded that political factors plays a trageric role in defining both economic condition and movements in the stock price volatility.**Jorion and Goetzmann** (1999) identifies the main factors which causes major stock market declines on wars and adverse political development,which also tends to rise the volatility in sharp at 39 countries between 1920s and 1990s. . **Voth** (2002) studied the equity price volatility almost in 10 countries between the year 1919–39 and argued that political factors, in particular commodities fear the revolution and also explains a substantial part of stock market volatility during the represented period.

Amita Batra (2004) analysed the time variation in volatility in the Indian stock market between the period of 1979-2003. Using monthly outcome data and asymmetric GARCH methodology have augmented by structural change analysis and also identifies the sudden shifts in the stock price volatility and the nature of events which cause these type of shifts in volatility. **Johan Knif and Seppo Pynnönen** (2007) explored relationship between stock return correlation and volatility. They analyzed the incremental effect of volatility on the level of correlation. Their focus is set on the impact of the volatilities involved in the definition and calculation of the correlation as well as on the effects of external volatilities from other markets. They have constructed an explicit model to investigate the contribution of the level of volatility on mutual correlations of the markets. Their results strongly supported the findings that high volatility tends to increase correlations between the markets. Their results can be directly utilized by portfolio managers in planning portfolio diversification strategies in accordance with the expected future volatility.

Suliman Zakaria and Suliman Abdalla (2012) examined the model stock return volatility in the Saudi stock market by using daily closing prices on the general market index. They employed different univariate specifications of the generalized autoregressive conditional heteroscedastic (GARCH) model, including both asymmetric and symmetric models. An application of the GARCH (1,1) model provides a strong evidence on the persistence of time changing volatility. By allowing the returns series mean equation to depend on a function of the conditional variance, his results provides the evidence of the existence of a positive risk premium, which also supports the positive correlation hypothesis between the expected stock returns and volatility.

Snehal Bandivadekar and Saurabh Ghosh (2017) studies the impact of introduction of index futures on spot market volatility on both S&P CNX Nifty and BSE Sensex using ARCH/GARCH technique. The empirical analysis value based on decline in the spot market volatility describes the introduction of index futures due to the increased impact of the recent news and also the reduced effect of uncertainty evolved from the old news.

3. METHODOLOGY

Data used in this study was collected only from NCDEX. Other commodity exchanges data are not used .Top 7 commodities at NCDEX market during my study period was been considered i.e., turmeric, castor seed, chana, cotton seed, mustard seed, jeera & barley were considered in this study Period of 5 years which ranges from 2015 to 2019. To understand the depth knowledge of price volatility more past data has to be considered Some of the commodity (i.e, jeera & barley)were not satisfied the condition for egarch model. That commodity was eliminated from the analysis.

4. RESULT AND DISCUSSION

Table 4.1

E- GARCH Model for Turmeric

LOG(GARCH)=C(1)+C(2)*ABS(RESID(-1)/@SQRT(GARCH(-1)))+C(3)*RESID(-1)/@SQRT(GARCH(-1))+C(4)*LOG(GARCH(-1))				
Variable	Coefficient	Std Error	Z-Statistics	Probability
Variance Equation				
C(1)	-1.106355	0.353888	-3.128055	0.0018
C(2)	0.141175	0.029434	4.796378	0.0000
C(3)	0.051201	0.017881	2.863420	0.0042
C(4)	0.876486	0.041345	21.19955	0.0000

Source: Secondary data

C (1): constant in the model represents a long-run average;

C (2): The ARCH term which is the lag of the squared residuals from the mean equation represents news about volatility from the previous period;

C (3): The GARCH term is the last period's forecast variance:

C (4): Correlation between the realized volatility and the historical return. (Leverage effect).

The above table indicates the EGARCH result of castor seed.The EGARCH (-1.106355) coefficients are less than one for Castor Seed. It proves that the new result of volatility will not affect the prices for a longer duration. The average value of ARCH and GARCH effect of castor seed (0.192376) is found to be less than one.This clearly indicates that greater persistence of external shocks towards return.the leverage effect (0.876486) for Castor Seed. This commodity has insignificant impact. It proves that a positive result has high volatility on conditional variance when compared to the negative shock.

Table 4.2

E-GARCH Model for Castor Seed

LOG(GARCH)=C(1)+C(2)*ABS(RESID(-1)/@SQRT(GARCH(-1)))+C(3)*RESID(-1)/@SQRT(GARCH(-1))+C(4)*LOG(GARCH(-1))				
Variable	Coefficient	Std Error	Z-Statistics	Probability
Variance Equation				
C(1)	-1.327696	0.230544	-5.758978	0.0000
C(2)	0.310563	0.033824	9.175800	0.0000
C(3)	-0.118375	0.018375	-6.110310	0.0000
C(4)	0.870429	0.024886	34.97648	0.0000

Source: Secondary data

C (1): constant in the model represents a long-run average;

C (2): The ARCH term which is the lag of the squared residuals from the mean equation represents news about volatility from the previous period;

C (3): The GARCH term is the last period's forecast variance:

C (4) :Correlation between the realized volatility and the historical return. (Leverage effect).

The above table indicates the EGARCH result of castor seed.The EGARCH (-1.327696) coefficients are less than one for Castor Seed. It proves that the new result of volatility will not affect the prices for a longer duration. The average value of ARCH and GARCH effect of castor seed (0.19199) is found to be less than one.This clearly indicates that greater persistence of external shocks towards return.the leverage effect (0.870429) for Castor Seed. This commodity has insignificant impact. It proves that a positive result has high volatility on conditional variance when compared to the negative shock.

Table 4.3

E-GARCH Model for Chana

LOG(GARCH)=C(1)+C(2)*ABS(RESID(-1)/@SQRT(GARCH(-1)))+C(3)*RESID(-1)/@SQRT(GARCH(-1))+C(4)*LOG(GARCH(-1))				
Variable	Coefficient	Std Error	Z-Statistics	Probability
Variance Equation				
C(1)	-3.873967	0.220458	-17.57234	0.0000
C(2)	-0.588888	0.013953	-42.20512	0.0000
C(3)	-0.330643	0.013901	-23.78586	0.0000
C(4)	0.426449	0.030805	13.84350	0.0000

Source: Secondary data

C (1): constant in the model represents a long-run average;

C (2): The ARCH term which is the lag of the squared residuals from the mean equation represents news about volatility from the previous period;

C (3): The GARCH term is the last period's forecast variance:

C (4) :Correlation between the realized volatility and the historical return. (Leverage effect).

The above table indicates the EGARCH result of castor seed.The EGARCH (-6.335794) coefficients are less than one for Castor Seed. It proves that the new result of volatility will not affect the prices for a longer duration. The average value of ARCH and GARCH effect of castor seed (0.450273) is found to

be less than one.This clearly indicates that greater persistence of external shocks towards return.the leverage effect (0.882771) for Castor Seed. This commodity has insignificant impact. It proves that a positive result has high volatility on conditional variance when compared to the negative shock.

Table 4.4

E-GARCH Model for Cotton Seed

LOG(GARCH)=C(1)+C(2)*ABS(RESID(-1)/@SQRT(GARCH(-1)))+C(3)*RESID(-1)/@SQRT(GARCH(-1))+C(4)*LOG(GARCH(-1))				
Variable	Coefficient	Std Error	Z-Statistics	Probability
Variance Equation				
C(1)	-6.335784	0.552673	-11.46190	0.0000
C(2)	0.882771	0.060044	14.70208	0.0000
C(3)	-0.432488	0.048291	-8.956048	0.0000
C(4)	0.288525	0.066680	4.027078	0.0001

Source: Secondary data

C (1): constant in the model represents a long-run average;

C (2): The ARCH term which is the lag of the squared residuals from the mean equation represents news about volatility from the previous period;

C (3): The GARCH term is the last period's forecast variance:

C (4): Correlation between the realized volatility and the historical return. (Leverage effect).

The above table indicates the EGARCH result of cotton seed.The EGARCH(-3.873967) coefficients are less than one for Castor Seed. It proves that the new result of volatility will not affect the prices for a longer duration. The average value of ARCH and GARCH effect of castor seed (-0.919531)is found to be less than one.This clearly indicates that greater persistence of external shocks towards return.the leverage effect (0.426449) for Castor Seed. This commodity has insignificant impact. It proves that a negative result has very less volatility on conditional variance when compared to other commodities. The investors can trade .in such commodities which results in positive return.

Table 4.5

E-GARCH model for Mustard Seed

LOG(GARCH)=C(1)+C(2)*ABS(RESID(-1)/@SQRT(GARCH(-1)))+C(3)*RESID(-1)/@SQRT(GARCH(-1))+C(4)*LOG(GARCH(-1))				
Variable	Coefficient	Std Error	Z-Statistics	Probability
Variance Equation				
C(1)	-0.166561	0.027957	-5.957677	0.0000
C(2)	0.120870	0.015988	7.560866	0.0000
C(3)	0.013474	0.007732	1.742714	0.0814
C(4)	0.991297	0.002236	443.2844	0.0000

Source: Secondary data

C (1): constant in the model represents a long-run average;

C (2): The ARCH term which is the lag of the squared residuals from the mean equation represents news about volatility from the previous period;

C (3): The GARCH term is the last period's forecast variance:

C (4): Correlation between the realized volatility and the historical return. (Leverage effect).

The above table indicates the EGARCH result of mustard seed.The EGARCH (-0.166561) coefficients are less than one for Castor Seed. It proves that the new result of volatility will not affect the prices for a longer duration. The average value of ARCH and GARCH effect of castor seed (0.134344)is found to be less than one.This clearly indicates that greater persistence of external shocks towards return.the leverage effect (0.991297) for Castor Seed. This commodity has insignificant impact. It proves that a positive result has high volatility on conditional variance when compared to the negative shock.

5.CONCLUSION

Considering the above results, it is visible that the efficiency of the commodity market has significantly improved with the increase in traders, investors, producers, suppliers and all stakeholders since 2015 to 2019, meaning that the Indian commodities market performs the functions of both price risk management and price discovery. Both these functions can be well performed by the future price of the commodities . Market efficiency of future price is good in the sequence , cotton seed, mustard seed.,castor seed, chana and turmeric.This study made some observation which may help the investors to understand better about the particular stock commodities.For better result investors can

also predict with EGARCH(1,1) tool which can be done as a future work.

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