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Risk and Return Relationship in Stock Market and Commodity Prices: A Comprehensive Study of Pakistani Markets

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Abstract: The objective of this study is to determine the risk and return relationship on the basis of univariate modeling approach. This study is helpful to analyze the asymmetric nature of data including the seasonal affect and non linear properties in risk and return relationship scenario. In this study, monthly data was used regarding gold price, cotton prices and sugar price along with KSE 100 index. The data span of all variables cover the time period from July 1998 to July 2008. The overall results indicate that asymmetric and seasonal effect is present in commodities market and stock market. But the asymmetric properties and seasonal effect is most dominant in stock market prices comparative to other commodities.

Key words: Risk and return relationship • Commodities • Stock market prices • Univariate modeling approach

INTRODUCTION

Volatility is the ambiguity or risk about the value of security due to various market forces. Volatility can be higher or lower in terms of volume. Higher volatility means higher standard deviation of value of a particular security over a short period of time and lower volatility means lower standard deviation of values of a particular security over the time period. Volatility is believed to play a vital role in accelerate pricing and hedging, optimal portfolio selection and risk management predicting volatility is supposed to be testing and challenging area of research in the field of finance. This area of research highlights various dimensions of series of returns of investment securities on various points of time like long determination, volatility clustering etc [1]. It has been noticed that returns of stock market investment indicate various fluctuations along with clustering effect. The autocorrelation of volatility till long period of time is of great importance. Volatility clustering in return results shows that small or large price changes follow small or large price changes of either signs. There is negative correlation among conditional volatility and returns [1]. Commodity market returns and stock market returns show time varying volatility with clustering and asymmetric effect. Empirical substantiation of effectiveness of risk management and price behavior of the markets is depending upon the assumption of volatility of the returns [2].

The asymmetric volatility has been elaborated by the leverage effect, i.e. an increases financial leverage cause decline in the value of the stock, which results in making the stock riskier and increases its volatility [3, 4]. There has been a phenomenon of high level volatility in the past few years in established and rising financial markets across the world. Financial experts and investors consider the uncertainty, due to the volatility in market prices and the unsteadiness of business performance, of the returns on their investment assets, recent developments in financial econometrics urge the use of quantitative models that are capable to describe the inclination of investors towards risks, volatility and expected returns. This calls for models that are sufficient for dealing with the volatility of the market (series) [5].

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The Pakistan's economy is facing many challenges these days like continuously varying economic policies, deteriorating law and order situation, prevailing political uncertainty and instability, food and energy crisis causing increased production and operating cost of productions. A high rate of inflation and the terrorism activities in different part of country, these problems adversely affect the commodity markets and stock prices as well. Keeping in this view, it becomes an essential to study the dynamic nature of commodity prices and stock market prices.

In the present work, an effort has been made to understand the advancements of return and its volatility for stock prices along with the commodity market in Pakistan. The objective of this is to determine the risk and return relationship on the bases of univariate modeling approach and to analyze the asymmetric nature including the seasonal affect and non linear properties of risk and return relationship.

The rest of this paper is organized as follows: Section II discusses review of literature, hypotheses statements and conceptual model and III section is about the methodology. Empirical results and discussions of the study are explained in section IV. Finally, conclusions, limitations and future research are drawn in part V.

Literature Review: The connection between risk and return in the financial markets is widely studied in financial economics. The relationship between risk and returns of portfolio investment has been of great importance, but existing literature has not been able to bring an agreement on the existence of such relationship in stock market. Although various researchers have widely examined the relationship between return and risk in their research work. Human decision making process is also composed of relationship between risk and return. This has been known to every financial analyst that higher the risk, higher the return and lower the risk lower the return. It is generally believed that risk and return relationship is an important element for stock market predictability and volatility. There are also some state variables that predict both risk and return. A trader that normalizes the portfolio according to the state variables, to maximize the conditional Sharpe ratio, will generate a portfolio with time varying risk. It is indicated that the spread, interest rates and the default spread have predicting power for both moments of returns of bonds and stocks and the optimal asset allocation for a mean variance investor that realizes the forecasting power of these variables show considerable time variation in portfolio weights and conditional moments [6].

Financial time series such as stocks return or exchange rates exhibit so called volatility clustering. It means that large fluctuations in these series tend to be followed by large fluctuations and small fluctuations by small ones. Under this situation, the use of variance to capture fluctuations in stock returns is provided only gross volatility. However, investors and policy makers may be interested to see the value of their portfolio in some future point with respect to risk if such trend persistent in stocks prices. In modeling this market phenomenon, Autoregressive Conditional Heteroscedasticity (ARCH) approach is used. In anticipation that a high frequency data might result in improved accuracy of the volatility and use past daily returns to predict monthly return volatilities. First method propose a simpler rolling-window monthly estimator with equal weights on past squared returns on the daily basis, thus can be called 'intuitive' in nature so it finds a reasonably insignificant risk and return relation [7, 8]. According to the portfolio theory, investors demand a higher return from the market portfolio than expected from return on risk free investments. This market portfolio return is dependent on risk, thus establishing a positive relationship [9].

The ARCH model of [10] is the commonly used model in financial data to capture the time-varying volatility along its various extensions like the GARCH [2] and the EGARCH. The basic approach to all these models was to calculate conditional volatility without no stochastic function and no inclusion of excess lags in the equation. Volatility clustering approach normally captures the effects of sudden shocks or events in financial data [11]. The GARCH-M model is most useable model proposed to capture the effect of volatility in financial data [7, 12].

The relationship of risk and return for Pakistani market is the result of GARCH-M model showing the presence of strong volatility clusters establishing that a cyclical trend is followed by the time path of stock returns. [13] studied asymmetric asset pricing behavior and show that the positive shocks have a greater impact on the expected volatility than the negative shocks in Pakistani market [14]. The asymmetric behavior of stock market can also be elaborated through leverage effect and asset pricing model of portfolio theory [3, 4]. A negative relationship in stock market risk and return is also observed. Similarly risk and return relationship has widely been studied in commodity markets also [15]. The Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model is most preferred

Table 1: Augmented Dickey-Fuller Unit Root Tests

Commodities	Level	Tau	Pr<Tau
Gold	at level	-10.17	-3.45
Cotton	at level	-8.08	-2.89
Sugar	at level	-9.01	-2.89
Stock Index	at level	-7.91	-2.89

model because its auto regressive structure of conditional variance may better explain the serial correlation properties of financial data. [16] studied first the price volume in stock market returns through GARCH model approach and he incorporated traded volume in variance part of equation. O3n other hand, [17] proposed the GARCH, EGARCH and stochastic volatility models that based upon the parametric volatility model approaches. There is an extensive kind of literature on stock market volatility models in Pakistan [18-20]. Their empirical analysis was limited to stock market only and studies related to commodity markets are scared in Pakistan.

Data Description and Methodlogy

Data Description: In this study monthly data was used regarding gold price, cotton price, sugar price along with KSE 100 index. The data regarding monthly closing stock prices was collected from websites of Karachi Stock Exchange, Gold from Forex.com, Cotton from All Pakistan Textile Mills Association (APTMA) and Sugar was collected from Ministry of Production. The data span of all variables cover the time period from July 1998 to July 2008. We have used near month futures price of all commodities as proxy for monthly data. To capture the risk and return relationship, we have estimated percentage return of all commodities and stock price. There was wide variation of return in monthly data of all commodities and stock prices return. The price of all commodities shows an increasing trend while the return graph was highly volatile in nature.[1] The serial and auto correlation of different series have been checked to identify the stationary of series and randomness of series. The ADF test is applied to test the stationary of the return series of data. The ADF test confirms that all variables are stationary at level on the basis of critical and calculated value criteria. The results are given below in Table 1.

The effect of volatility in return series can be confirmed through Portmanteau Q-Test statistics. The effect of volatility can be captured through ARCH type's models. The Q-test is preformed up to 12 lags on all return series. The significance of Q-Test confirmed that all commodities and stock prices return series confirmed the presence of volatility clustering. The mean equation is based on intercept and residual term. Similarly the presence of ARCH effect can be tested on time series data by following Box Jenkins Methodlogy.[2] The results are given in table 2 (Insert in appendix).

Table 2: Portmanteau Q-Test on commodities market return and stock Market returns

	Gold		Cotton		Sugar		Stock Index	
Order	Q-Stat	Pro	Q-Stat	Pro	Q-Stat	Pro	Q-Stat	Pro
1	1.49	0.22	8.64	0.00	3.99	0.04	2.83	0.09
2	5.03	0.08	10.79	0.00	4.42	0.11	3.67	0.05
3	9.76	0.02	14.23	0.00	6.28	0.09	3.83	0.08
4	9.86	0.04	14.24	0.00	6.57	0.16	3.84	0.42
5	12.80	0.02	14.59	0.01	6.62	0.25	4.91	0.02
6	13.54	0.03	17.33	0.00	6.70	0.34	4.93	0.55
7	13.78	0.05	17.80	0.01	6.92	0.43	6.15	0.02
8	13.83	0.08	17.85	0.02	7.19	0.01	6.15	0.03
9	13.97	0.12	18.09	0.03	10.79	0.29	6.16	0.02
10	14.08	0.16	18.18	0.05	11.01	0.35	6.98	0.02
11	14.87	0.18	18.20	0.07	11.75	0.08	7.33	0.77
12	16.75	0.15	18.40	0.10	14.91	0.24	9.58	0.05

[1]Figures of commodities prices and stock return can be seen in appendix.

[2]In first step, the ARMA models are designed after this residual squared return series are regressed on their corresponding lags. The significance of F-Test as well as LM-Test confirmed the ARCH effect and Precondition towards GARCH family models.

Appendix

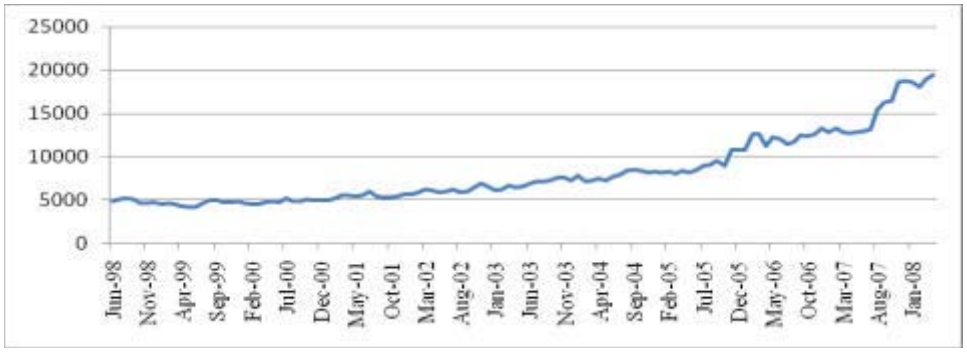

Fig.1: Monthly Gold Price (Rs per 10 g)

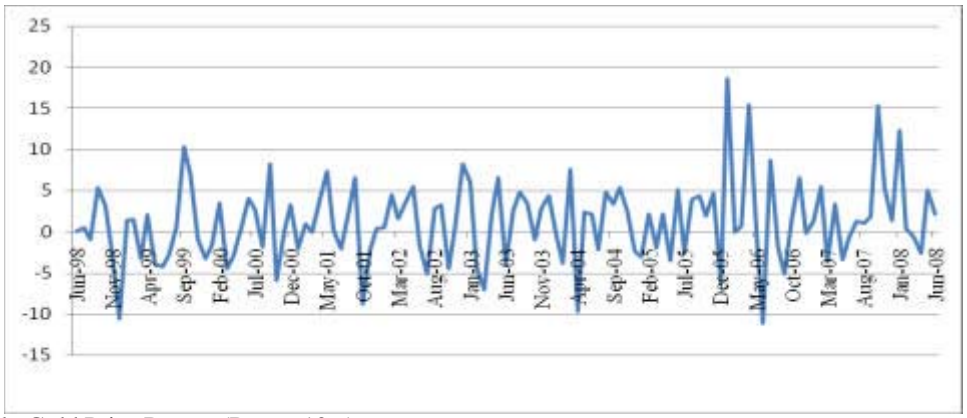

Fig. 2: Monthly Gold Price Return (Rs per 10 g)

Fig. 3: Monthly Cotton Price (Rs per 40 kg)

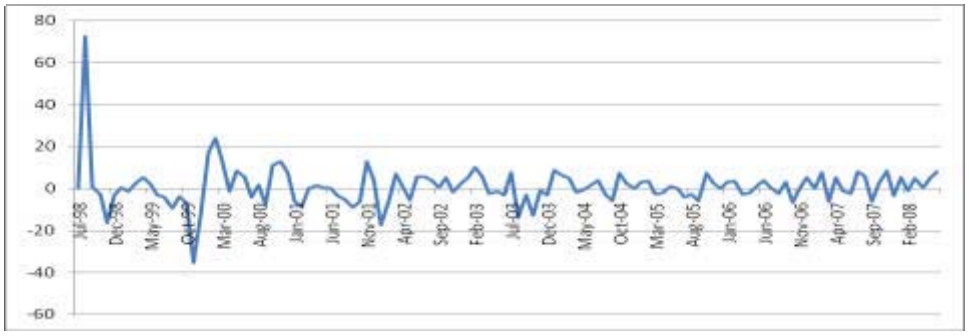

Fig. 4: Monthly Cotton Price Return (Rs per 40 kg)

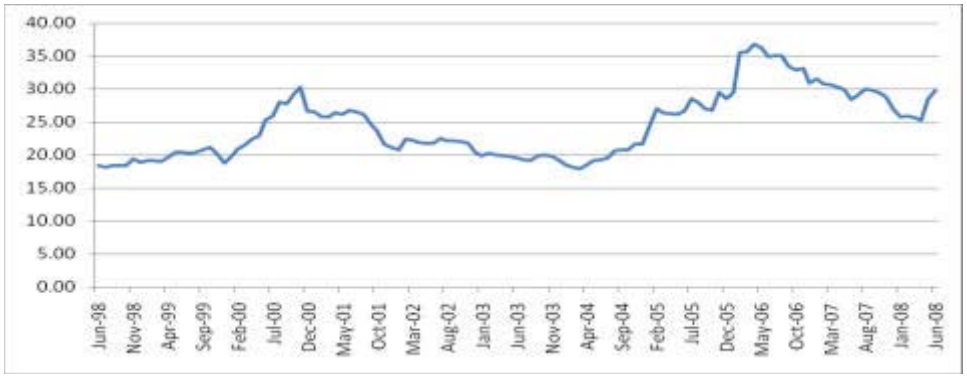

Fig. 5: Monthly Sugar Price (Rs per kg)

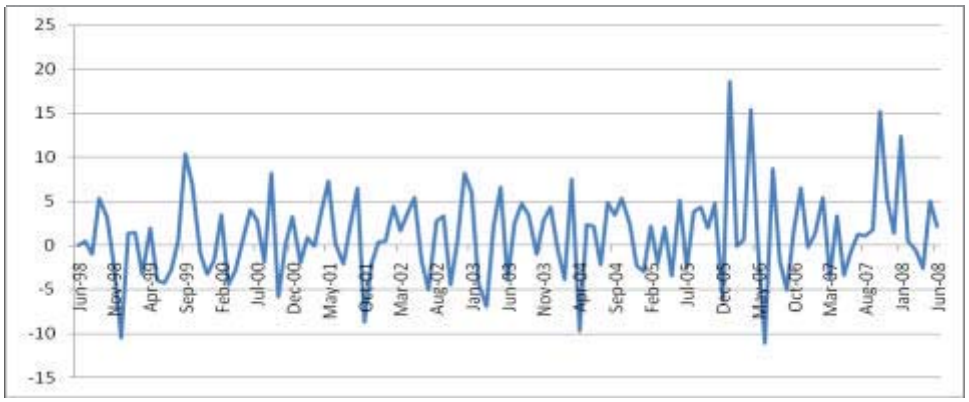

Fig. 6: Monthly Sugar Price Return (Rs per kg)

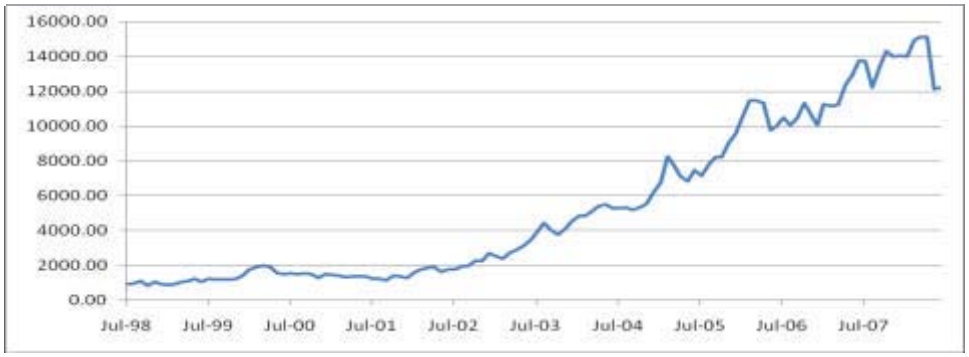

Fig. 7: Monthly KSE 100 Index Price

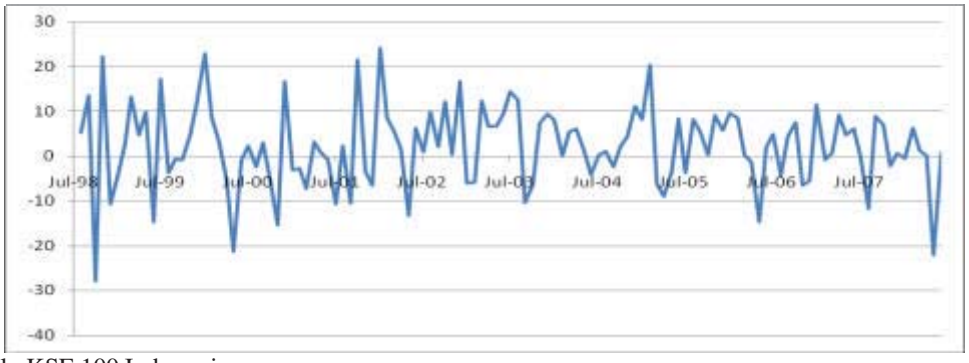

Fig. 8: Monthly KSE 100 Index price

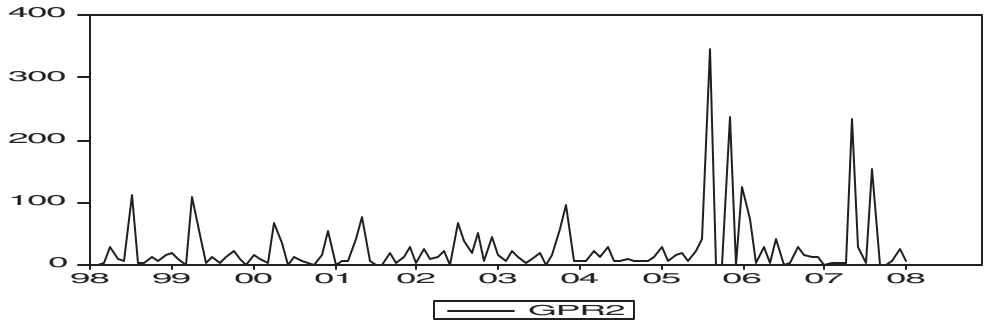

Fig. 9: Volatility of Gold price Squared Return

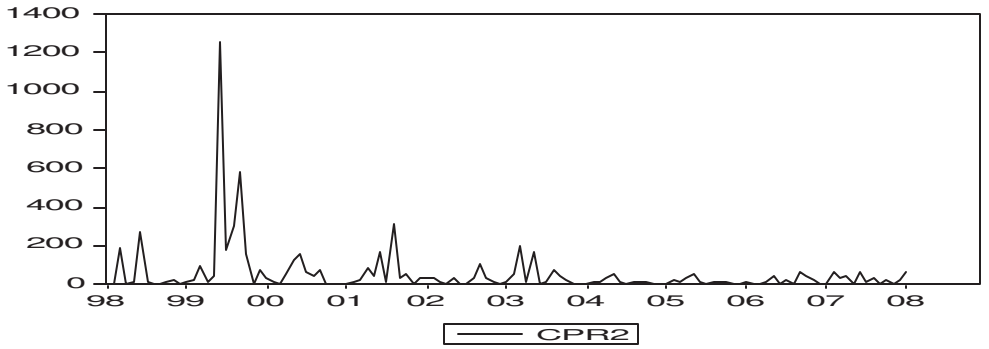

Fig. 10: Volatility of Cotton Price Squared Return

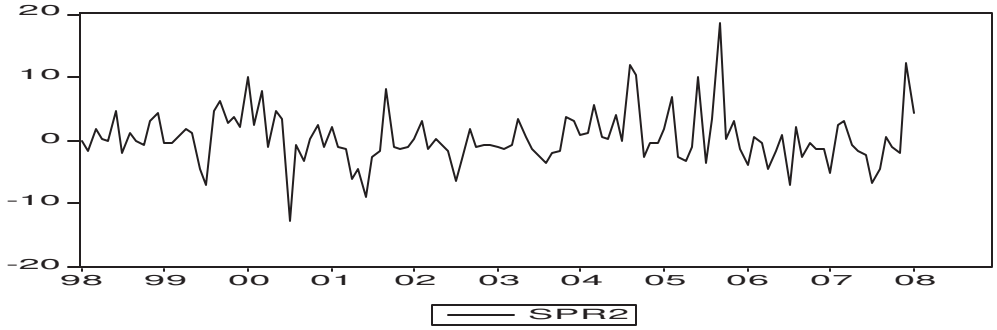

Fig. 11: Volatility of Sugar Price Squared Return

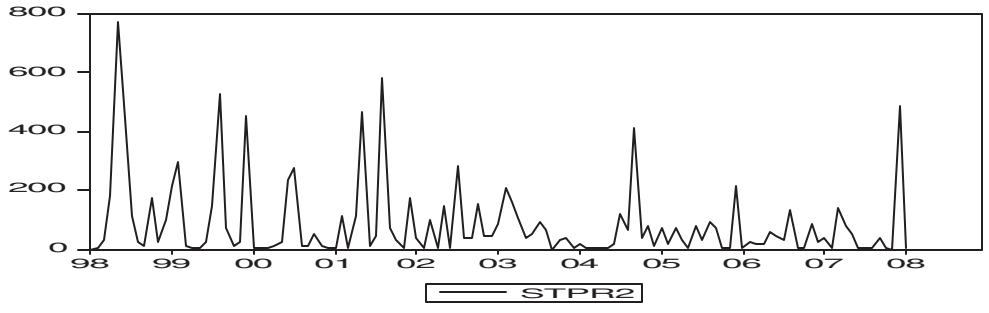

Fig. 12: Volatility of Stock Price Squared Return

Estimation Methodlogy: The conditional volatility models as well as ARCH and GARCH models are described in this section. ARCH type family models consider the lags in conditional variance and the volatility effect is captured through time varying models. These models include ARCH, GARCH and for further analysis EGARCH models have been used [1].Similarly the seasonal effect is also captured in Arch family models.

ARCH Model: The basic specification of ARCH model is given as From above equation; the stock market monthly prices, conditional mean and error term are represented. The final equation for measurement of conditional variance in return series can be written as:

$$Y_t = \varepsilon_{t-1} + \delta_t$$

$$\bullet_t = w_t \bullet_t$$

Where

$$\delta_t \Rightarrow N(0, \sigma^2{}_t)$$

$$\sigma^2{}_t = \beta_0 + \sum_{i=1}^{q} \beta_i \delta^2{}_{t-1}$$

In this conditional variance equation, the parameters must be $\beta_0 \succ 0 and \beta_i \geq 0.$

In the above mentioned ARCH model Yt represent the monthly return of series and ut is error term that is uncorrelated and process zero mean value. In this conditional variance equation, the parameters must be $\beta_0 \succ 0 and \beta_i \geq 0.$ the lags estimation is not well defined in ARCH models variance equation.

GARCH Model: [2] proposed GARCH (p,q) model that measure volatility which is effected by past prices and past lags denoted(Q,P) respectively.

GARCH (p,q) model is used to overcome the problem of past lags estimation as in ARCH model .The volatility in GARCH model is also the function of past return and past lags at same time (q,p) respectively. The GARCH model specification is given as:

$$y_t = \varepsilon_{t-1} + \delta_t$$
$$\delta_t = w_t \sigma_t$$

Where

$$\delta_t \Rightarrow N(0, \sigma^2{}_t)$$

The final equation of conditional variance can be written as: The conditional variance is linear function of q and p lags of past values or GARCH terms.

EGARCH Model: Exponential GARCH (EGARCH) model is preferred over GARCH model because it consider the asymmetric property as well as size, leverage effect and lags effect. The EGARCH model is extension of GRACH model because it incorporates positive and negative in model through logarithmic form. The specification of E GARCH models given as

$$y_t = \varepsilon_{t-1} + \delta_t$$
$$\delta_t = w_t \sigma_t$$

Where

$$\delta_t \Rightarrow N(0, \sigma^2{}_t)$$

$$\log \sigma^2{}_t = \beta_0 + \beta_1 \delta^2{}_{t-1} + \rho(\frac{\delta_{t-1}}{\sigma_{t-1}})\omega_{t-1} + \alpha[\frac{\delta_{t-1}}{\sigma_{t-1}}(\frac{2}{\pi})^{0.5}]$$

The restriction of non negativity is not required in E-GARCH model.

The parameter • captures the asymmetric effect. Negative value of rho capture the asymmetric effect that is used for indicating the higher volatility while is for size effect of risk and return series.

Empirical Results

GARCH _ Mean Results: The volatility of commodities markets and stock market return is analyzed by specification of ARCH models. After the specification of ARCH model for different series, the GACH -mean family models are used .In GARCH -mean frame work the upper part of equation specified the mean effect and lower part capture the variance effect of series. Different GARCH-Mean(p,q) have been estimated for different series .The best model is selected on the basis of Akaike Information Criterion (AIC).For Gold price return ,the GARCH-mean (1,2)is best fitted model. The standard coefficient of SQR (GARCH) is insignificant that can be explained if there is effect of risk on the mean return it is better captured by variance equation in Gold price return. The Results of Gold price return are given below in Table 3.

For cotton price return, the GARCH-mean (2, 1) is best fitted model on the basis of AIC criteria. The standard coefficient of SQR (GARCH) is also insignificant that can be explained if there is effect of risk on the mean return it is also better mentioned by variance equation in cotton price return. The Results of cotton price return are given below in Table 4.

For sugar price return, the GARCH-mean (2, 1) is best fitted model on the basis of Akaike criteria. The standard coefficient of SQR(GARCH) is significant that can be explained as if there is effect of risk on the mean return it is may be better mentioned by both the mean part of and variance part in case of sugar price return . The Results of sugar price return are given below in Table 5.

Table 3: Results from GARCH (p=1, 2 and q=1, 2) model on Gold returns

Variable	GARCH (1,1)	GARCH (2,1)	GARCH (1,2)	GARCH (2,2)
SQR(GARCH)	-0.39	0.01	4.12***	0.25
Intercept	7.77	286.91	-0.26	17.09
ARCH1	0.04	-0.02***	0.008	0.12
ARCH2			-0.01	-0.05
GARCH1	0.63	0.57	1.02*	-0.39
GARCH2		-0.04		0.55
AIC	6.07	9.03	6.04	6.12

*, **, *** significant at 1%, 5% and 10% respectively

Table 4: Results from GARCH (p=1, 2 and q=1, 2) model on Cotton returns

Variable	GARCH (1,1)	GARCH (2,1)	GARCH (1,2)	GARCH (2,2)
SQR(GARCH)	0.01	0.01***	0.01	0.009
Intercept	7.15	7.41	7.78	8.42
ARCH1	0.60*	0.40*	0.54*	0.32**
ARCH2	-		0.11	0.11
GARCH1	0.40*	0.89*	0.35	0.85*
GARCH2		-0.34**		-0.34**
AIC	6.66	6.65	6.683	6.66

*, **, *** significant at 1%, 5% and 10% respectively

Table 5: Results from GARCH (p=1, 2 and q=1, 2) model on Sugar returns

Variable	GARCH (1,1)	GARCH (2,1)	GARCH (1,2)	GARCH (2,2)
SQR(GARCH)	-5.82	-5.87	0.08	0.80***
Intercept	-0.24	-0.51*	-0.41	7.68*
ARCH1	0.01	0.01	-0.05	0.002*
ARCH2			-0.002	0.06**
GARCH1	1.003*	0.60	1.05	1.46*
GARCH2		0.41*		-0.96*
AIC	5.77	5.78	5.77	5.60

*, **, *** significant at 1%, 5% and 10% respectively

Table 6: Results from GARCH (p=1, 2 and q=1, 2) model on Stock Index returns

Variable	GARCH (1,1)	GARCH (2,1)	GARCH (1,2)	GARCH (2,2)
SQR(GARCH)	1.007*	26.89	1.40*	1.04*
Intercept	141.46*	96.78*	44.57	55.03
ARCH1	0.008	0.006	0.050	0.10
ARCH2			-0.12**	-0.13*
GARCH1	-0.93*	-0.63	0.51*	0.56
GARCH2		0.27		-0.24
AIC	7.20	7.21	7.24	7.26

*, **, *** significant at 1%, 5% and 10% respectively

Table 7: Results from EGARCH (2, 2) model on Gold returns

Variable	E-GARCH (2, 2)
C	5.96*
|RES|/SQR[GARCH](1)	-0.01
RES/SQR[GARCH](1)	-0.10*
EGARCH(1)	0.01
EGARCH(2)	-0.98*
AIC	5.95

*, **, *** significant at 1%, 5% and 10% respectively

For stock price return, the GARCH-mean (1, 1) is best fitted model on the basis of AIC criteria. The standard coefficient of SQR (GARCH) is significant that can be explained as if there is effect of risk on the mean return it is may be better mentioned by both the mean part of and variance part in case of stock price return. The GARCH value coefficient represent that stock market return series is long mammary data .The Results of stock price return are given below in Table 6.

E-GARCH Model Specification Results: The asymmetric effect volatility of different series is captured through the estimation of E-GARCH model .The asymmetric and hetrocedasticity effect of all series is tested. The most appropriate E-GARCH model of each commodity price return and stock price return are reported below. The significant terms indicate that |RES|/SQR[GARCH] indicate that bad news has large effect on the volatility of the series than any good news.

The results of the E-GARCH model indicate that RES|/SQR [GARCH] represent the asymmetric market pattern or variance. The negative sign and significant sign in E-GARCH model represent that any bad news has large effect on volatility of return series comparative to good market news. The most appropriate E-GARCH models confirm the asymmetric volatility effect for different series.

Results of Seasonal Effect Models: The seasonality in risk and return series is captured by introducing the time dummies in men and variance part of univariate modeling series .The dummies represent the seasonal effect in most appropriate GARCH-Mean framework in different series. The value of mean coefficient is positive for all series indicating the positive relationship between risk and return of each series. The stock models also represent a positive relationship between market volatility and its return [15, 1]. The significance of different seasons indicates that the seasonal effect is present in series. The results of seasonal effect of different series are given below

The above mentioned results of Gold price return indicating that seasonal dummies have asymmetric effect on Gold Market. The seasonal dummies in risk and return part of gold price are combination of positive and negative sign .The return part of Gold indicating no seasonal effect while the negative seasonal effect is observed in volatility part is observed in month of June. Similarly, the nature of seasonal effect can be observed in cotton price, gold price return. The asymmetric nature in stock price return is also observed .The seasonal effect in return part is positive and significant for Seasonal dummies and negative effect is also observed to their corresponding months in volatility part of stock price return series.

Table 8: Results from EGARCH (3, 3) model on Cotton returns

Variable	E-GARCH (3, 3)
C	1.29*
|RES|/SQR[GARCH](1)	0.52**
RES/SQR[GARCH](1)	-0.14
EGARCH(1)	0.60*
EGARCH(2)	0.74**
EGARCH(3)	-0.83
AIC	6.52

*, **, *** significant at 1%, 5% and 10% respectively

Table 9: Results from EGARCH (2, 2) model on Sugar returns

Variable	EGARCH (2, 2)
C	1.41**
|RES|/SQR[GARCH](1)	0.07
RES/SQR[GARCH](1)	0.47*
|RES|/SQR[GARCH](2)	0.01
RES/SQR[GARCH](2)	-0.69*
EGARCH(1)	-0.19
EGARCH(2)	0.63*
AIC	5.59

*, **, *** significant at 1%, 5% and 10% respectively

Table 10: Results from EGARCH (5, 5) model on Stock Price returns

Variable	EGARCH (5, 5)
C	5.01**
|RES|/SQR[GARCH](1)	0.65*
RES/SQR[GARCH](1)	0.07
|RES|/SQR[GARCH](2)	-0.33
RES/SQR[GARCH](2)	0.05
|RES|/SQR[GARCH](3)	-0.24
RES/SQR[GARCH](3)	0.07
|RES|/SQR[GARCH](4)	0.16
RES/SQR[GARCH](4)	0.16
|RES|/SQR[GARCH](5)	0.64**
RES/SQR[GARCH](5)	-0.18
EGARCH(1)	0.24
EGARCH(2)	-0.10
EGARCH(3)	0.41**
EGARCH(4)	-0.80*
EGARCH(5)	-0.17
AIC	7.18

*, **, *** significant at 1%, 5% and 10% respectively

Table 11: Risk-return relationship and seasonality in return and risk

	Gold		Cotton		Sugar		Stock Index	
Variable	Estimate	Pr>[t]	Estimate	Pr>[t]	Estimate	Pr>[t]	Estimate	Pr>[t]
SQR								
(GARCH)	1.70	0.17	0.584	0.17	-2.196	0.17	0.029	0.92
C	-7.59	0.30	-1.67	0.41	10.26	0.06	-9.06	0.01
D1	0.22	0.94	0.75	0.74	-0.69	0.70	10.62	0.00
D2	2.46	0.58	-0.76	0.84	-2.38	0.31	10.23	0.00
D3	6.03	0.23	-4.11	0.26	-1.16	0.68	10.03	0.00
D4	5.53	0.11	-4.16	0.12	-5.67	0.04	10.75	0.00
D5	-1.17	0.77	-0.54	0.85	-5.62	0.02	11.19	0.02
D6	4.05	0.40	-4.04	0.29	0.23	0.94	9.80	0.02
D7	-2.28	0.56	1.20	0.57	-6.98	0.06	14.11	0.00
D8	-0.41	0.96	-1.36	0.71	2.00	0.54	17.21	0.00
D9	3.02	0.47	1.36	0.64	5.162	0.15	14.27	0.00
D10	-0.19	0.96	0.79	0.68	-7.22	0.04	10.32	0.00
D11	0.46	0.89	0.20	0.93	-2.49	0.51	10.22	0.00
C	11.13	0.54	2.55	0.63	5.09	0.70	67.43	0.11
ARCH(1)	0.04	0.40	0.14	0.06	0.04	0.45	0.16	0.20
ARCH(2)	-	-	-	-	0.01	0.89	-	-
GARCH(1)	0.71	0.00	0.60	0.00	0.61	0.73	0.64	0.00
GARCH(2)	-	-	-	-	0.21	0.88	-	-
D1	-15.96	0.48	3.87	0.74	-0.08	0.99	-123.50	0.05
D2	-15.00	0.34	16.36	0.63	-8.18	0.47	-56.74	0.15
D3	-14.28	0.42	26.11	0.42	-4.11	0.84	-41.54	0.43
D4	2.26	0.91	-19.14	0.27	-9.11	0.43	-56.26	0.24
D5	11.28	0.58	35.93	0.38	-6.49	0.75	21.60	0.75
D6	-29.70	0.05	87.99	0.03	11.54	0.48	-88.93	0.21
D7	10.74	0.63	-75.88	0.00	-7.20	0.75	-59.73	0.39
D8	11.77	0.73	31.59	0.24	3.56	0.88	-35.87	0.62
D9	-32.20	0.21	-1.75	0.94	3.04	0.84	-54.67	0.44
D10	-4.72	0.81	-10.76	0.43	-24.20	0.01	-105.66	0.02
D11	3.41	0.87	-7.31	0.43	-4.09	0.93	-53.48	0.32

CONCLUSION

The basic purpose of this study is to observe risk and return relationship in commodity markets as well as stock market on the basis of univariate modeling approach. The asymmetric and nonlinear relationship between risk and return is observed on the basis of GARCH-MEAN and E -GARCH modeling approach. The most appropriate models for commodities and stock markets are reported. The overall results indicate that Asymmetric and seasonal effect is present in commodities market and stock markets. But the asymmetric properties and seasonal effect is most dominant in stock price risk and return relationship.

The GARCH-M model is selected on the bases of Akakia criteria. The most appropriate model for gold price return is GARCH (1,2); cotton price return is GARCH (2,1), while sugar price return is GARCH (2,2) and stock market price return is GARCH (1,1) which is consistent regarding studies, [21, 1]. The most appropriate E-GARCH specification for gold price return, cotton price return, sugar price return and stock price return EGARCH (2, 2), EGARCH (3, 3), EGARCH (2, 2) and EGARCH (5, 5) are respectively. Seasonality affect is absorbed in risk and return relationship of each commodity and stock price returns. The asymmetric properties of seasonal affect is most dominant in stock price risk and return relationship, that implies, that bad or good news highly affect stock market return positive or negative.

Future Research: This work has got norms attention in financial economic literature. A dynamic way of analysis can be adopted for the in-depth exploration the topic. The futures studies on this topic can be carried out inform of bidirectional causality and multivariate relationship among risk and return model. The impact of different shocks in economy on stock market price can be analyzed.

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