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Sensitivity Analysis of Macroeconomic Forces and Sectoral Returns: Evidence from Energy and Textile Sectors of Pakistan

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Abstract

The basic purpose of this study is to empirically test the impact and sensitivity of macroeconomic factors on Energy and Textile sector of Pakistan. Secondary data is used for Macroeconomic variables, KSE-100, Textile and Energy Sector for the period 2008-2015. OLS, Unit Root Test, Granger-Causality and GARCH (1,1) tests have been used to analyze the senstivity behaviour. Resutls reveal that energy sector has most strong and positive relationship with market returns and this element is one of the major drivers of Pakistani equity market and the Textile sector has strong and negative relationship with change in crude oil price. Textile has also strong and positive relationship with change in exchange rate. Moreover, it is concluded that change in oil prices has negative and significant impact on energy sector. Further Exchange rate, inflation rate and market return have positive and significant impact on energy sector. There exists negative sensitivity and significant relationship between lagged textile return to present textile return. Further it is concluded that there exists negative sensitivity and significant relationship between lagged changes in crude oil price to present textile return. Moreover, there exists positive sensitivity and significant relationship between lagged changes in exchange rate to the current textile returns.

Keywords: Crude Oil Price, Interest Rate, Inflation, Exchange Rate, Sensitivity, GARCH

Introduction

Sensitivity in asset pricing focuses on the immediate effect of shocks on the movement of the stock returns for different sectors. Sensitivity in market returns of every sector is different from other sectors. Our study has taken energy and textile sectors because investment in energy sector is increasing and investment in textile sector is decreasing due to economical changes in Pakistan. It has been identified that energy sector has played a vital role in global economic growth. The continuous economic development of every country depends upon energy sector and all the developing countries know the core importance of energy sector for economic rapid growth. Pakistan being a developing country needs more energy for its economic uplift. This compact review with its historical perspective along with industrial revolution where it is acknowledged that assumed economic growth is only associated to energy field. This framework is a pre-requisite to identify the relationship between oil and energy sector. The energy sector has critical participation in the realm of economy, to embrace employment rate and GDP status. Bello (2013) examined the value of exchange rate which appreciated during evaluating period and further analyzed the energy sector volatility and identified the uprising trend of high returns.

The Textile industry of Pakistan is of sound value and rank throughout the whole world in recent past. However, Pakistan economy is still heavily dependent on textile and cotton sector.

Textile sector which is cotton based set nearly sixty percent to the whole export rate. Arshad and Bashir (2015) observed the negative effect of gas and oil prices on textile sector of Pakistan.

The volatile trends of the stock returns in an economy within shorter period are affected by the sensitivity of oil price, exchange rate, and inflation rate and market behavior. Therefore, Pakistan is no exception, so this study explores the assets pricing sensitivity based upon macroeconomic forces. The newness of this study will identify the real spirit of macro forces sensitivity and its effect on stock returns.

Literature Review

Kiani (2011) discussed that sharp increase in crude oil prices, leads to increase in inflation and result is GDP growth of Pakistan economy effects negatively which is not good for any developing country. Secondary data was taken for the period from 1990 to 2007, employing macrocosmic model.

Jawaid & Haq (2012) explained that this study observes some important independent macroeconomic factors effect on banking sector stock prices and volatility in Pakistan. The result of co-integration shows that a long run and significant negative relation happen between exchange rate volatility and inflation rate volatility with banking sector sock price. The result of co-integration also shows that a long run and significant positive relation happen between exchange rate volatility and interest rate volatility with banking sector sock price. Sensitivity exploration ratifies that the effects are strong. It is advised to investors to invest in banking sector only when volatility is observed in both interest rate and exchange rate. It is also advised to investors to use exchange rate and interest rate as an indicator for decision to invest in banking sector

Siong (2013) collected data on monthly basis from the beginning of 1980 to ending of 2013. At the first difference all variables are stationary as shown by unit root test. To see the different variables, effect different test like, Normality test, OLS regression Ganger Causality, have applied. The result shows that stock returns of Malaysia is positively affected by money supply, real exchange rates and inflation rates. The result shows that stock returns of Malaysia is negatively significant affected by financial variables. As a whole model is declared significantly fit as result shown by Jarque–Bera-Test.

Sarwar, Aftab, Khan and Qureshi (2014) examined and explained that in their research, different independent variables like, CPI, merchandize import, crude oil price, broad money level, Dollar price, merchandize export, exchange rate, trade balance and industry index are used and stock return as independent variable is taken and for this purpose data was collected from 1997 to 2013. In this research KSE-100 index is affected negatively by exchange rate and trade balance and KSE-100 index is affected positively by CPI, merchandize import, crude oil price, broad money level, Dollar price, merchandize export balance and industry index.

According to Ali and Ullah (2015) in Pakistan, the impact of inflation rate and interest rate with money supply is seen on exchange rates. Monthly data is collected from 2000 to 2009. Different tests like, co integration, vector error correction model and granger causality test is applied and it is seen that there exit the short run and long run relationship between inflation and exchange rate. The result also shows that sharp increase in money leads to inflation and as result increase in volatility of exchange rates also seen. In same direction, The result also show that sharp increase in interest rate also leads to inflation and results also show the increase in volatility of exchange rates.

Methodology

Secondary data is used for Macroeconomic variables, KSE-100, Textile and Energy Sector for the period 2008-2015 on monthly basis. E-Views 8 is used to analyze the data. Descriptive statistics is used to analyze the behavior of the data and the degree of relationship is measured through correlation. OLS model is used to visualize the impact of macroeconomic variables on sectoral returns. Whereas Unit Root Test, Granger Causality tests are used to identify the stationarity and lead lag relationship among the variables and GARCH models is applied to estimate volatility and sensitivity in financial markets. It provides a more real world context to predict the prices and rates of financial instrument.

Econometric Model

Models for computation of return and change

$$Energy\ Stock\ Return\ = \frac{Ep_{t-}Ep_{t-1}}{Ep_{t-1}} \quad (1)$$

Where as

$Ep_{t=}current\ value$

$Ep_{t-1=}lagged\ value$

$$Oil\ Prices\ Change = \Delta OP = \frac{Op_t - Op_{t-1}}{Op_{t-1}} \quad (2)$$

Where as

$Op_{t=}Oil\ price$

$Op_{t-1=}lagged\ oil\ price$

$$Change\ in\ Exchange = \Delta ER = \frac{ER_t - ER_{t-1}}{ER_{t-1}} \quad (3)$$

Where as

$ER_{t=}current\ exchange\ rate$

$ER_{t-1=}lagged\ exchange\ rate$

$$Inflation\ Rates = \Delta IR = \frac{IR_t - IR_{t-1}}{IR_{t-1}} \quad (4)$$

Where as

$IR_{t=}current\ inflation\ rate$

$IR_{t-1=}lagged\ inflation\ rate$

$$KSE\_R = \Delta I = \frac{IT_{t-}\ IT_{t-1}}{IT_{t-1}} \quad (5)$$

Where as

$IT_{t=}current\ stock\ prices$

$IT_{t-1=}lagged\ stock\ prices$

Model No 1. Impact of oil prices, exchange rates, inflation, KDE- returns on Energy stock returns.

$$Stock\ Retrns\ Engergy\ = f(\Delta Oil\ Prices, \Delta\ Exchange\ Rates, Inflation, KSE\ retuns)$$

$$\text{Stock Return Engergy}\ = \alpha + b_1(\Delta OP) + b_2(\Delta ER) + b_3(\Delta CPI) + b_4(\Delta I) + \varepsilon_t \quad (6)$$

ΔOP = Change in oil prices

ΔER = Change in Exchange Rate.

ΔCPI = Inflation Rate

ΔI = KSE_R -100 returns

Model No 2. Impact of oil prices, exchange rates, inflation, KDE- returns on Textile stock returns.

$$Textile\ Stock\ Return\ = \frac{Tp_{t-}Tp_{t-1}}{Tp_{t-1}} \quad (7)$$

$$Stock\ Retrns\ Textile\ = f(\Delta Oil\ Prices, \Delta\ Exchange\ Rates, Inflation, KSE\ retuns)$$

$$Stock\ Return\ Textile = \alpha + b_1(\Delta OP) + b_2(\Delta ER) + b_3(\Delta CPI) + b_4(\Delta I) + \varepsilon_t \quad (8)$$

ΔOP = Change in oil prices

ΔER = Change in Exchange Rate.

ΔCPI = Inflation Rate

ΔI = KSE -100 returns

Model No 3 . The GARCH (1, 1)Model

The ARCH model Engle (1982) has a drawback that it looks like showing moving average instead of auto regression. A new concept of lagged as conditional is introduced as auto regressive term in GARCH model. This idea was launched Bollerslev, (1986).

. $GARCH\ Model.$ $$y_{1=\alpha+\beta^1 x_t + \cup_t} \quad (9)$$

$$u_{t|\Omega_t} \sim_{iidN\ (o,h_t}$$

$$h_{t=}yo + \sum_{i=1}^{p} \delta_{ih_{t-i}} + \sum_{i=1}^{q} y_{iu^2{}_{t-i}} \quad (10)$$

According to Bollerselev in GARCH model, the value of h_t , depends not only, the past period that is (t-1), but it also depends upon, on past value of itself.

Results

Table 1 describes statistics analysis for four independent variables named crude oil prices exchange rates, inflation rates and KSE-100 with two dependent variables, are energy returns and textile returns. The table consists of mean, median, standard deviation kurtosis and skewness with minimum and maximum values. The mean value of independent variables is crude oil price is 0.000245, exchange rates 0.005567, inflation rates is - 0.00209, KSE-100 is 0.011774 and on the other hand dependent variables mean of energy return 0.012568 and textile return 0.092894.

The standard deviation of energy is 0.082724 and its return is 0.012568. Lower the risk is with energy sector, so it has lower return. The standard deviation of textile sector is 0.654721 and its return is 0.092894. Higher the risk is with textile sector, so it has higher return.

Standard deviation measures the variability of the data. Independent variables, standard deviation are, crude oil price is 0.089193, exchange Rates 0.014561, inflation rates is 0.158158 and KSE-100 is 0.072063 and on the other hand, standard deviation of first dependent variable that is energy return is 0.082724 and standard deviation of second dependent variable that is textile return 0.654721.

Skewness measures the range of asymmetry. If the data is positively skewed, then it will have a much longer right tail than the left tail. In this case, mean and median will be greater than mode. In most of the cases, mean will be greater than median. Skewness result of crude oil prices and KSE-100 is negative; it means the data is left side skewed. On the other hand, Skewness results of exchange rates, inflation rates, energy and textile sector is positive, which means data is right side skewed. The result of textile sector is highest positive skewed.

Fig. 1 shows the trend of CPI, Crude Oil Prices, Energy Prices, Exchange Rates, Textile and KSE-100 index for the period January 2008-2015. Energy and textile sector contributed to drive the KSE market in upward domain after the period 2012.

Table 1. Descriptive Statistics

	ΔCOP	ΔER(PK/us)	Infl	KSE_R	$ENERGY_R$	$TEXTILE_R$
Mean	0.000245	0.005567	-0.0020	0.0117	0.012568	0.092894
Standard Error	0.009151	0.001494	0.01622	0.0073	0.008487	0.067173
Median	0.013403	0.002792	-0.0291	0.021	0.000512	0.02835
Standard Deviation	0.089193	0.014561	0.15815	0.0720	0.082724	0.654721
Sample Variance	0.007955	0.000212	0.02501	0.0051	0.006843	0.42866
Kurtosis	1.156153	5.464548	4.43674	7.5139	6.170697	90.08961
Skewness	-0.70164	1.043677	1.24322	-1.731	1.527948	9.370911
Range	0.457352	0.11203	1.13315	0.5593	0.627621	6.690498
Minimum	-0.25968	-0.04838	-0.4375	-0.361	-0.22273	-0.364
Maximum	0.197668	0.063651	0.69565	0.1977	0.404891	6.3265
Sum	0.023322	0.528898	-0.1981	1.1185	1.193957	8.824926
Count	95	95	95	95	95	95

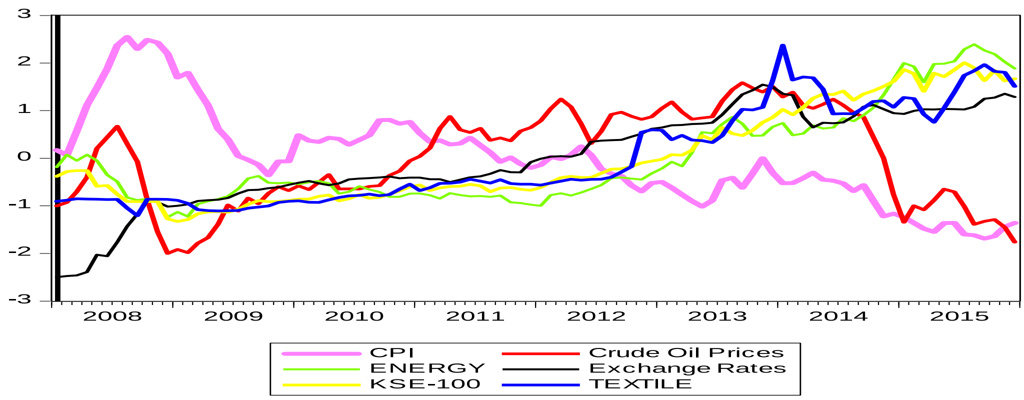

Figure 1: Trend of Price data in Logarithm Prices

Table 2 shows the correlation between variables. Correlation between exchange rates and crude oil prices is 0.097334 which shows poor and positive relation between them. Correlation between consumer price index and exchange rates is 0.097957 which also shows poor and positive relation between them. Correlation between KSE_100 and consumer price index is -0.0448 which shows poor and negative relation between them. Correlation between energy and crude oil price is 0.127157, which shows positive relation. Correlation between energy and exchange rate is -0.13047, which shows negative relationship, and not too poor one relationship. Correlation between energy and KSE-100 is 0.669109 which is positive and strong relationship which is strongest relationship in correlation matrix. Correlation between textile and crude oil price is -0.26509 which is negative and poor relationship.

The relationship of energy with independent variables, that are ΔCOP, *Δ ERPK/US*, *Inf*, KSE_R, shows that energy has most strong relationship with KSE_R that is 0.669109, while energy has most poor relationship with ΔCOP that is 0.127157. The relationship of textile with independent variables, that are ΔCOP, *Δ ERPK/US*, *Inf*, KSE_R, shows that textile has most strong relationship with *Δ ERPK/US* that is 0.221612, while textile has most poor relationship with *Inf* that is 0.029103.

Table 2. Correlation Matrix

	ΔCOP	ΔER (PK/US)	Inf	KSE_R	$ENERGY_R$	$TEXTILE_R$
ΔCOP	1					
Δ ERPK/US	0.09733	1				
Inf	0.07322	0.0979	1			
KSE_R	0.18305***	-0.278**	-0.0448	1		
$ENERGY_R$	0.12715***	-0.130***	-0.1723***	0.66*	1	
$TEXTILE_R$	-0.2650**	0.2216**	0.029103	0.03472	0.0478	1

*significant at p<0.01; **significant at p<0.05; ***significant at p<0.10

Table 3 indicates the coefficients of change in exchange rates is 2.637853, inflation rates is 0.172158 and KSE-100 is 0.694733 and all these independent variables are statistically significant at least at 1% level. The coefficient of change in COP is -0.28959 and is significant at least 5 % level. The result is indicating that one percent increase in crude oil prices contributes -0.28959 percent decrease in energy return. The result is showing that one percent increase in exchange rate (devaluation of local currency) contributes 2.637853 percent increase in energy return. One percent increase in inflation rate contributes 0.172158 percent increase in market return and one percent increase in change in exchange rates contributes 0.694733 percent increase in market return respectively.

Moreover, F= 7.77392 and P=1.99E-05, this shows that regression model of energy sector fits the data significantly. R^2 indicates that about 25 percent variation of energy return explained by total variations in independent variables, that are, *Δ* COP, *Δ ERPK/US*, *Inf* and KSE_R.

Table 3. Impact of Change in Oil Prices; Change in Exchange Rates, Inflation Rates and Market Returns on Energy Sector

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.000674	0.011965	0.056361	0.955179
Δ COP	-0.28959	0.125097	-2.31493	0.022891
Δ ERPK/US	2.637853	0.784832	3.361041	0.001141
Inf	0.172158	0.068837	2.500954	0.014195
KSE_R	0.694733	0.160157	4.33783	3.75E-05
Multiple R	0.506741	F test	7.773928	
R- Square	0.256786	F-significance	1.99E-05	
Adjusted R Square	0.223755			
S.E of Regression	0.104771			

The estimation of equation of energy return by regression is shown as follows:

$$Energy = 0.000674 - 0.28959\, \Delta\, COP + 2.637853\, \Delta\, ERPK/US + 00.172158\, Inf + 0.694733 KSE_R$$

Table 4 shows slope of change in crude oil prices is -2.42037 and change in exchange rates is 13.52846 and these coefficient variables are statistically significant at least at 1% level. The coefficient of KSE-100 is 1.638973 and this independent variable is significant at least 10% but coefficient of inflation is 0.13187 and this one has insignificant impact. It has found textile return, with change in crude oil prices is negatively and change in exchange rate, inflation rate and KSE-100 are positively linked. The result is showing that one percent increase in change in crude oil prices, contributes -2.42037 percent decrease in textile return. The result is explaining that one percent increase in exchange rate (devaluation of local currency) contributes 13.52846 percent increase in textile return. One percent increase in inflation rate contributes 0.13187 percent increase in market return and one percent increase in change in exchange rates contributes 1.638973 percent increase in market return respectively. Moreover, F= 4.326485 and P=0.003018, this shows that regression model of textile sector fits the data significantly. R^2 indicates that about sixteen percent variation of textile sector can be explained by total variations in independent variables, that are, *Δ* COP, *Δ RPK/US*, *Inf* and KSE_{R}.

Table 4. Impact of Change in Oil prices, Change in Exchange Rates, Inflation Rates and Market Return on Textile Sector

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.00085	0.069982	-0.01218	0.990312
Δ COP	-2.42037	0.731667	-3.30803	0.001352
Δ ER(PK/US)	13.52846	4.590325	2.947167	0.004084
Inf	0.13187	0.402614	0.327534	0.744025
KSE_R	1.638973	0.936725	1.749684	0.083581
Multiple R	0.401593	F – Test	4.326485	
R- Square	0.161277	F-Significance	0.003018	
Adjusted R Square	0.124			
S.E of Regression	0.612785			

The estimation of equation of textile regression is shown as follows:

Textile = - 0.00085 -2.42037 COP + 13.52846 *ERPK/US* + 0.13187 *Inf* + 1.638973KSE_R

Table 5 indicates the Unit root test indicates that the series of energy sector, textile sector, change in oil prices, inflation rates and market returns are stationary at first difference, Augmented dickey fuller test is used to see whether the data is stationary or not. The above data at first difference is stationary.

Table 5. Unit ROOT Test

	Unit Root Test		**Critical Values**		
Variables	Augmented Dickey-Fuller test statistics	Prob.*	1%	5%	10%
ENERGY	-8.49323	0	-3.50145	-2.89254	-2.58337
TEXTILE	-11.2051	0	-3.50145	-2.89254	-2.58337
COP	-5.67791	0	-3.50145	-2.89254	-2.58337
ER	-6.30506	0	-3.50145	-2.89254	-2.58337
CPI	-6.728292	0	-3.511262	-2.89678	-2.58563
KSE-100	-5.07472	0	-3.50305	-2.89323	-2.58374

Table 6 shows the Granger-causality results show that, exchange rate leads to change in crude oil price at 10% significant level that is P <0.010, energy return leads to change in crude oil price at 5% significant level that is P <0.05, textile $_R$ leads to change in crude oil price at 5% significant level that is p <0.o5, exchange rate leads to KSE_100 at 5% significant level that is p <0.05, energy return leads to exchange rate at 5% significant level that is p <0.05, exchange rate leads to energy return at 1% significant level that is p <0.01, textile return leads to exchange rate at 5% significant level that is p <0.05, exchange rate leads to textile return at 1% significant level that is p <0.01, energy return leads to KSE_100 at 1% significant level that is p <0.01, textile return leads to KSE_100 at 1% significant level that is p <0.01, textile return leads to energy return at 10% significant level that is p <0.010 and energy return leads to textile at 10% significant level that is p <0.01.

Table 6. Granger-causality among variables

Granger (1969) proposed granger causality test to identify the causal relationships between two variables. It comprised of VAR process. $\emptyset_t = \sum_{p=1}^{n} \alpha_p \psi_{t-p} - i + \sum_{q=1}^{n} \beta_q \emptyset_{t-q} + \mu_{1t}$ $\psi_t = \sum_{p=1}^{n} \lambda_p \emptyset_{t-p} + \sum_{q=1}^{n} \delta_q \psi_{t-q} + \mu_{2t}$

Null Hypothesis:	**Obs.**	**F-Statistic**	**Prob.**	**Granger Causality**
Inf does not Granger Cause *ΔCOP*	93	0.36014	0.6986	No Causality
ΔCOP does not Granger Cause *Inf*		1.48627	0.2318	No Causality
Δ ER PK/US does not Granger Cause *ΔCOP*	93	2.63510	0.0774***	Causality Exist
ΔCOP does not Granger Cause *Δ ER PK/US*		1.68655	0.1911	No Causality
KSE_R does not Granger Cause *ΔCOP*	93	0.33993	0.7127	No Causality
ΔCOP does not Granger Cause KSE_R		1.66613	0.1949	No Causality
$ENERGY_R$ does not Granger Cause *ΔCOP*	93	3.40179	0.0378**	Causality Exist
ΔCOP does not Granger Cause $ENERGY_R$		1.30350	0.2768	No Causality
$TEXTILE_R$ does not Granger Cause *ΔCOP*	93	3.33958	0.0400**	Causality Exist
ΔCOP does not Granger Cause $TEXTILE_R$		1.48089	0.233	No Causality
Δ ER Pk/US does not Granger Cause *Inf*	93	0.73209	0.4838	No Causality
Inf does not Granger Cause *Δ ER PK/US*		1.07093	0.3471	No Causality
KSE_R does not Granger Cause *Inf*	93	1.44047	0.2423	No Causality
Inf does not Granger Cause KSE_R		1.03517	0.3595	No Causality
$ENERGY_R$ does not Granger Cause KSE_R	93	0.06146	0.9404	No Causality
Inf does not Granger Cause $ENERGY_R$		0.16076	0.8515	No Causality
$TEXTILE_R$ does not Granger Cause *Inf*	93	0.07182	0.9307	No Causality
Inf does not Granger Cause $TEXTILE_R$		0.16183	0.8508	No Causality
KSE_R does not Granger Cause *Δ ER PK/US*	93	1.10563	0.3356	No Causality
Δ ER PK/US does not Granger Cause KSE_R		2.94740	0.0577**	Causality Exist

$ENERGY_R$ does not Granger Cause *Δ ER PK/US*	93	4.13472	0.0192**	Causality Exist
Δ ER PK/US does not Granger Cause $ENERGY_R$		7.21218	0.0013*	Causality Exist
$TEXTILE_R$ does not Granger Cause *ΔER PK/US*	93	3.94702	0.0228**	Causality Exist
Δ ER PK/US does not Granger Cause $TEXTILE_R$		7.55482	0.0009*	Causality Exist
$ENERGY_R$ does not Granger Cause KSE_R	93	17.7566	3.E-07*	Causality Exist
KSE_R does not Granger Cause $ENERGY_R$		1.18183	0.3115	No Causality
$TEXTILE_R$ does not Granger Cause KSE_R	93	17.9827	3.00E-07*	Causality Exist
KSE_R does not Granger Cause $TEXTILE_R$		1.37196	0.25	No Causality
$TEXTILE_R$ does not Granger Cause $ENERGY_R$	93	2.70272	0.0726***	Causality Exist
$ENERGY_R$ does not Granger Cause $TEXTILE_R$		2.81143	0.0655***	Causality Exist

*significant at p<0.01;**significant at p<0.05; ***significant at p<0.10

In table 7 the results indicate that there exist negative sensitivity and insignificant relationship between $ENERGY_R$ (-1) and energy return. The results show that there exist negative sensitivity and insignificant relationship between Δ*COP* (-1) and energy return. There exist positive sensitivity and insignificant relationship between independent variables that are *Inf* (-1) and KSE_R (-1) and dependent variable that is energy return. There also exists negative sensitivity and insignificant relationship between Δ *ER (PK/US*) (-1) and energy return. The above results indicate that probability of all independent variables is more than 10%. Therefore, there exits insignificant relationship between independent variables that are, $ENERGY_R$ (-1), Δ*COP* (-1), *Inf* (-1), *Δ ER PK/US* (-1), KSE_R (-1) and dependent variable that is energy return. The ARCH term is significant.

Table 7. Mean Equation of Energy

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
GARCH = C(7) + C(8)*RESID(-1)^2 + C(9)*GARCH(-1)				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
C	0.008858	0.013721	0.645542	0.5186
$ENERGY_R$ (-1)	-0.059038	0.175642	-0.336130	0.7368
ΔCOP(-1)	-0.028014	0.105798	-0.264785	0.7912
Inf (-1)	0.006869	0.070337	0.097659	0.9222
Δ ER (PK/US)(-1)	-0.442813	1.053349	-0.420385	0.6742
KSE_R (-1)	0.116505	0.230906	0.504556	0.6139
Variance Equation				
C	0.002823	0.003205	0.880822	0.3784
RESID(-1)^2	-0.044806	0.008325	-5.382274	0.0000
GARCH(-1)	0.613570	0.468643	1.309247	0.1905

R-squared	0.016917	Mean dependent var	0.011618
Adjusted R-squared	-0.038940	S.D. dependent var	0.082645
S.E. of regression	0.084238	Akaike info criterion	-2.101593
Sum squared resid	0.624459	Schwarz criterion	-1.858086
Log likelihood	107.7749	Hannan-Quinn criter.	-2.003234
Durbin-Watson stat	1.634117		

Table 8 indicates that, the probability of GARCH (-1) has 0.0221which is less than 5%, it means that there exit significant relationship between GARCH (-1) and energy return and alternative hypotheses will be accepted. It can be interpreting in this sense that one-unit increase in independent variable that is GARCH (-1), there is seen change 0.576869 in dependent variable that is energy return. The probability of *Δ ER (PK/US)* (-1) has is 0.0060 which is less than 5%, it means that there exits significant relationship between *ΔER (PK/US)* (-1) and energy return and alternative hypotheses will be accepted. It can be interpreting in this sense that one-unit increase in independent variable that is *Δ ER (PK/US)* (-1), there is seen change 0.0060 in dependent variable that is energy. The probability of all independent variables are more than 5%, it means that there exits no relationship between independent variables that are Δ*COP* (-1), *Inf* (-1), and KSE_R (-1) and dependent variable that is energy return.

Table 8. **Variance equation for Energy**

Dependent Variable: DENERGY				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1) + C(6)*ΔCOP(-1) +				
C(7)* *Inf* (-1) + C(8)*Δ ER (PK/US)(-1) + C(9)* KSE_R (-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.008347	0.011739	0.711051	0.4771
$ENERGY_R$ (-1)	0.148630	0.085385	1.740709	0.0817
Variance Equation				
C	0.003468	0.001847	1.877609	0.0604
RESID(-1)^2	-0.016529	0.063594	-0.259920	0.7949
GARCH(-1)	0.576869	0.252042	2.288785	0.0221
ΔCOP(-1)	-0.009922	0.010698	-0.927520	0.3537
Inf (-1)	-0.008053	0.005601	-1.437650	0.1505
Δ ER (PK/US)(-1)	-0.010118	0.003684	-2.746512	0.0060
KSE_R (-1)	-0.019409	0.017745	-1.093758	0.2741
R-squared	0.028712	Mean dependent var		0.011618
Adjusted R-squared	0.018154	S.D. dependent var		0.082645
S.E. of regression	0.081891	Akaike info criterion		-2.127581
Sum squared resid	0.616967	Schwarz criterion		-1.884074
Log likelihood	108.9963	Hannan-Quinn criter.		-2.029222
Durbin-Watson stat	1.917856			

In this table 9 the probability of textile returns (-1) has is 0.0000 which is less than 5%, it means that there exists negative sensitivity and significant relationship between textile return (-1) and textile return and alternative hypotheses will be accepted. It can be interpreting in this sense that one-unit increase in independent variable that is textile returns (-1), there is seen change - 0.6669335 in dependent variable that is textile return. In this table the probability of ΔCOP (-1) has is 0.0000 which is less than 5%, it means that there is negative sensitivity and significance relationship between ΔCOP (-1) and textile return and alternative hypotheses will be accepted. It can be interpreting in this sense that one-unit increase in independent variable that is ΔCOP (-1), there is seen change -0.193149 in dependent variable that is textile. The probability of *Inf* (-1) and KSE_R (-1) is more than 10%, it means that there exists positive sensitivity and insignificant relationships between independent variables that are *Inf* (-1) and KSE_R (-1) and dependent variable that is textile return. There also exists positive sensitivity and significant relationship between *Δ ER* (PK/US) (-1) and textile return. The ARCH term is also significant.

Table 9. Mean equation of Textile

Dependent Variable: $TEXTILE_R$				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
GARCH = C(7) + C(8)*RESID(-1)^2 + C(9)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.067219	0.010386	6.472007	0.0000
TEXTILE(-1)	-0.666935	0.143475	-4.648430	0.0000
ΔCOP(-1)	-0.193149	0.086869	-2.223442	0.0262
Inf (-1)	0.077292	0.050758	1.522769	0.1278
Δ ER (PK/US)(-1)	1.165383	0.654264	1.781211	0.0749
KSE_R (-1)	0.183617	0.155675	1.179483	0.2382
Variance Equation				
C	0.002461	0.001948	1.262957	0.2066
RESID(-1)^2	3.874987	0.842566	4.599033	0.0000
GARCH(-1)	-0.000227	0.003338	-0.068164	0.9457
R-squared	-0.375626	Mean dependent var		0.093387
Adjusted R-squared	-0.453786	S.D. dependent var		0.658214
S.E. of regression	0.793629	Akaike info criterion		-0.400608
Sum squared resid	55.42648	Schwarz criterion		-0.157101
Log likelihood	27.82858	Hannan-Quinn criter.		-0.302249
Durbin-Watson stat	1.216293			

In Table 10 the probability of GARCH (-1) is 0.0023 which is less than 5%, it means that there exists significance relationship between GARCH (-1) and textile return and alternative hypotheses will be accepted. It can be interpreting in this sense that one-unit increase in independent variable that is GARCH (-1), there is seen change 0.566816 in dependent variable that is textile return. In this table the probability of ΔCOP (-1), *Inf* (-1), Δ ER (PK/US) (-1) and KSE_R (-1) has greater than 5%, it indicates that no significance relationship is seen between ΔCOP (-1), *Inf* (-1), Δ ER (PK/US) (-1) and KSE_R (-1) and textile return.

Table 10. Variance Equation for Textile

Dependent Variable: $TEXTILE_R$				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1) + C(6)*ΔCOP(-1) + C(7)*DCPI(-1) + C(8)*Δ ER (PK/US)(-1) + C(9)* KSE_R (-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.076578	0.382300	0.200308	0.8412
$TEXTILE_R$ (-1)	-0.121252	1.568544	-0.077303	0.9384
	Variance Equation			
C	0.225096	0.090523	2.486626	0.0129
RESID(-1)^2	0.112823	0.230640	0.489172	0.6247
GARCH(-1)	0.566816	0.186309	3.042347	0.0023
ΔCOP(-1)	-1.068930	0.610154	-1.751900	0.0798
Inf (-1)	0.268633	0.456745	0.588145	0.5564
Δ ER (PK/US)(-1)	0.553253	3.668046	0.150830	0.8801
KSE_R (-1)	-1.651457	1.006456	-1.640863	0.1008
R-squared	-0.007146	Mean dependent var		0.093387
Adjusted R-squared	-0.018093	S.D. dependent var		0.658214
S.E. of regression	0.664142	Akaike info criterion		1.622712
Sum squared resid	40.57975	Schwarz criterion		1.866219
Log likelihood	-67.26748	Hannan-Quinn criter.		1.721071
Durbin-Watson stat	1.854159			

Conclusion

The results of descriptive statistics indicate that standard deviation of textile sector is highest one and the return from textile is also higher and on other hand, standard deviation of energy sector is lower than textile sector, therefore the return from energy sector is also lower. It shows that risk has association with return. It indicates that higher returns have linkage with high risk and low returns have connected with low risk.

Skewness result of change in crude oil price and market return is negative, it means that data is skewed in left side. On the other hand, skewness results of, change in exchange rates, inflation rates, energy and textile sector is positive, which means data is skewed as right side. The result of textile data is highest positively skewed.

The kurtosis value of textile return is highest one; it means that this distribution is problematic. The kurtosis value of exchange rate return exceeds the kurtosis value. The kurtosis value of crude oil return is less than normal value of kurtosis, so the value of kurtosis of crude oil return is platykurtic.

The relationship of energy is seen most strong and positive with KSE_R, while energy has most poor relationship with independent variables that is seen with ΔCOP. The relationship of textile with independent variables, that are ΔCOP, *Δ ERPK/US*, *Inf*, KSE_R, shows that textile has most strong relationship with *Δ ERPK/US*, while textile has most poor relationship with *Inf*.

It is concluded that change in oil prices has negative and significant impact on energy sector. Exchange rate has positive and significant impact on energy sector. Inflation rate has positive and significant impact on energy sector. Market return has positive and significant impact on energy sector. It is examined that twenty-five percent variation of energy return is explained by total variations in independent variables, *Δ* COP, *Δ ERPK/US, Inf* and $KSE_{R.}$

The results show that change in oil price has negative and significant impact on textile sector. Exchange rate has positive and significant impact on textile sector. Inflation rate has positive and insignificant impact on textile sector. Market return has positive and insignificant impact on textile sector. It is examined that sixteen percent variation of textile can be explained by total variations in independent variables that are, *Δ* COP, *Δ ER PK/US, Inf* and $KSE_{R.}$

The unit root test indicates that the series of energy sector, textile sector, oil prices, inflation rate and market returns are stationary at first difference.

Granger-causality results show that, change in exchange rate leads to change in crude oil price, energy returns leads to change in crude oil price, textile return leads to change in crude oil price, exchange rate leads to KSE-100, energy return leads to exchange rate, exchange rate leads to energy return, textile return leads to exchange rate, exchange rate leads to textile return, energy return leads to market return, textile return leads to market return, textile return leads to energy return and energy return leads to textile return.

It is added independent variables in mean equation for energy of GARCH (1, 1). The results indicate that there exist negative sensitivity and insignificant. There exits negative and significant relationship between lagged change in exchange rate to energy return.

It is added independent variables in mean equation for textile of GARCH (1,1). There exists negative sensitivity and significant relationship between lagged textile return to textile return. There is negative sensitivity and significance relationship between lagged change in crude oil price and textile return. It is added independent variables in variance equation for textile of GARCH (1, 1). There exists positive and significance relationship between GARCH (-1).

Variance equation GARCH (1, 1) indicates that the independent variable is added into the variance equation to have an idea about the extended variables in the mean equation. It is concluded that GARCH term is significant and change in oil price have negatively sensitivity**.**

This research study covers handsome amount of individual as well institutional deeper long run benefits nationally as well as internationally. Through this research put some practical aspects into solution yet some further aspects can be enhancing by using the policy tools. Some other unsuspected results can be found out to dig deeper into the matter. For further research some other variables like politics, terrorism, gold price and economic stability can be added to get more clear picture for the research. This research paradigm is of big value and foremost stability in the realm of the business markets. Then this paper may be more useful for investors for decision making and also for new researchers. This research work also makes pavement for further researchers and scholars.

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