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# Capital market shocks: responses to macroeconomic factors concerning price level (an empirical study on Karachi stock exchange)

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# ABSTRACT

Frequent and abrupt movements affect stock market movements adversely and results it in a highly volatile stock market. Hub of this study is to determine the relationship that exists between stock market volatility and macroeconomic variable concerning price level. Inflation rate, gold, oil and producer prices have been selected as macroeconomic variables concerning price level whereas volatility in KSE-100 Index served as dependent variable of the study. It is based on 144 monthly observations of the selected variables for a period of eleven years from 2002-2013. Multiple regression analysis is applied based on Ordinary Least Square. Findings revealed that statistically there exists a significant relationship between index volatility and selected macroeconomic variables. Movements in oil prices affect capital market movements positively whereas negative impact of inflation rate, gold and producer prices is revealed on index volatility. It is concluded that movements in these variables can help in predicting capital market volatility.

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## Introduction

Capital market is among one of the crucial pillars of a country. The role that capital markets play towards the development and prosperity of an economy cannot be denied (Schwert, 1989). It acts as a barometer of the economy. Upward movements in stock markets convey positive perception about the country's financial condition to the investors of both domestic as well as international markets (Filer, Hanousek, & Campos, 2000). On the other hand, downward stock market movements shatter investors' confidence about whether the country should be opted for investment or not (Luintel & Khan, 1999).

Stock markets bring the prospective buyer of securities/scripts closer to the prospective seller thus it acts as a mediator. Being as mediator it not only facilitates trades but also provide relevant and required information that would have difficult to obtain otherwise. Further retrieving this information would also cause heavy information costs for both the sellers and the buyers (Comincioli & Wesleyan, 1996). Thus, it expedites trading for the intended and potential investors.

The phenomenon that is attributed to the measurement of stock market performance is the volatility it possesses. Volatility is defined as the upward or downward movement in a security, asset or a stock. It has been defined as the relative rate at which the prices of a securities move in upward or downward direction for a short span of time((Hashemzadeh & Taylor, 1988). It refers to the risks inherited with investment in a tool (Farid, Ashraf, & Khan, 1995). Abnormal and frequent movements in stock prices are perceived as markets comprising high volatility.

A high volatile market gives negative signals to the investors about the financial state of a country (Malik, 2008). The fears of losing money due to abrupt swings in prices of securities urge the investors to invest their capital in markets that are either risk free or possess reasonable risk instead of investing it in stock market that is subject to high risk and volatility (Abugri, 2008) and . Consequently, it affects stock

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markets performance and so of the economy at large. Thus, it is imperative to investigate the factors that affect stock market volatility and this served as the rationale for this study.

Macroeconomic, fundamental and political instability related factors are the dominant factors that affect stock market movements of a country. This study is focused towards the investigation of relationship that exists between macroeconomic variables and stock markets. Although massive studies have been conducted to determine the impact that macroeconomic variables possess on stock markets (Gan, Lee, Yong, & Zhang, 2006; Hosseini, Ahmad, & Lai, 2011; Ibrahim & Aziz, 2003; Menike, 2006) however, this investigation is based on the empirical testing of conceptual framework revealed by Tangjitprom (2012) as a result of his meta-analysis regarding the relationship between macroeconomic variables and stock returns.

Tangjitprom (2012) has classified macroeconomic variables into four different categories. These are variables related to interest rate and monetary policy, variables concerning international activities, variables concerning price level and variables reflecting economic conditions. Present study is focused towards the excogitation of relationship that macroeconomic variables concerning price level possess with index volatility of Karachi Stock Exchange.

Macroeconomic variables concerning price level as the name suggest are those that depict pricing mechanism, strategies and changes in the prices of commodities of a country. Examples of macroeconomic variables concerning price level are gold prices, consumer price index, producer prices, oil prices, inflation rate, etc. (Tangjitprom, 2012). As per the past researches, these variables affect movements in stock market indices and return both directly as well as indirectly. This is because these affect the savings of the individuals that lead to changes in their preferences for investment in stock market and other alternative tools. So it is vital to explore the impact these variables possess (if any) on stock market of Pakistan.



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Presently, there are three bourses working in Pakistan. These are Karachi Stock Exchange, Islamabad Stock Exchange and Lahore Stock Exchange. Karachi Stock Exchange (KSE afterwards) is the oldest stock exchange of Pakistan. It was established on 18<sup>th</sup> September, 1947 however; it started its operation on 10<sup>th</sup> March, 1949 and shifted to electronic trading system in 1998. Four stock indices are working on Karachi Stock Exchange. These are KSE-30, KMI-30, KSE-All Share and KSE-100 index.

This study in focused on KSE-100 Index. One of the reasons behind the selection of KSE-100 index for the study is because it is used as a reference rate to compare prices. It comprised top 100 companies from all across the sectors to make full representation. Thus, it would be easy to make generalization of the study results. Along with this, KSE-100 Index data is available for a broader span of time enabling inclusion of maximum observations which is not possible for the rest of the indices available on KSE.

Aim of this study is to explore the relationship that exists (If any) between macroeconomic variables concerning price level and KSE-100 Index. Inflation rate, gold prices, oil prices and producer prices have been selected as explanatory macroeconomic variables of the study. Introduction of these variables is given in the methodology section of this paper.

#### **Theoretical Support**

The relationship between macroeconomic variables and securities return has been supported by Arbitrage Pricing Theory (APT hereafter). It was offered by Stephen Ross in 1976. According to APT, expected return on securities can be predicted with the help of macroeconomic factors and security's sensitivity to those macro factors (Chen, Roll, & Ross, 1986). Our study is based and supported by this theory.

#### **Objectives of the Study**

Abrupt and frequent movements in KSE during the last two decades have necessitated the need for a detail study that can determine motivators behind these movements (Abugri, 2008). It is not only important for the investors but also for the economists, analysts, policy makers and regulators (Farid et al., 1995).

Hub of this study is to:

✤ Explore the connection between macroeconomic factors concerning price level and KSE-100 index

✤ Investigate the direction of impact being positive or negative (if any) that selected explanatory variables possess on KSE-100 Index

✤ Trace the magnitude/strength of affect that selected explanatory variables possess on KSE-100 Index

## Literature Review

Determining the impact that macroeconomic variables possess on stock market volatility is divisive and so has been opted by many scholars, researchers and policymakers. There have been differences among the results of studies. These differences exist due to the differences among countries being developing/developed, stock markets and statistical artifacts used by the studies.

Singh (2010) conducted a study to explore the relationship that exists between macroeconomic variables and stock prices in India. Bombay stock exchange was selected for the study purpose. Explanatory variables of the study comprised Indian rupee per dollar, wholesale prices index and industrial production index. It was for a period from 1994-2009. It was aimed to test causality among variables and for this purpose Granger Causality Test was used. Bidirectional relationship exists between industrial production index and stock prices revealed as per the findings of the analysis. However, it was unidirectional for exchange rate and wholesale price index. Exchange rate and wholesale price index affect stock prices but these are not affected by movements in stock prices.

Sharma and Mahendru (2010) studied the relationship that macroeconomic variables possess on Bombay Stock Exchange (BSE). For this purpose, gold prices, inflation, exchange rate and foreign exchange reserves were taken as independent variables of this study. Focus of study was to check the impact of selected variables on stock prices of BSE. For testing the relationship between macroeconomic variables BSE, multiple regression analysis was used. Foreign exchange reserves and inflation were found to insignificant impact on stock prices whereas gold prices and exchange rates possess negative but significant relationship with stock prices. Meaning by an increase in these variables lead to decrease stock prices.

Bhunia and Mukhuti (2013)excogitated the impact of gold price on the stock returns. It was conducted on Indian stock Exchange.1991-2012 year data was considered for thestudy.To analyze the data gathered, multiple regression analysis was used.Findings indicated that around 86% of the deviation in stock price movements is explained by gold prices and the rest is not explained sure to the factors not considered for the study. Further, gold prices were found to affect stock prices positively i.e. increase in gold prices tend to increase stock prices.

The relationship between macroeconomic variables and stock prices was found to be significant in a study conducted by Fedorova and Pankratov (2010) on Russian stock market. EGARCH Model was used to analyze the data obtained. Explanatory variables of the study comprised Gross Domestic Product, net capital, exchange rate and oil prices were selected as explanatory variables indicators. Russian stock index was taken as dependent variable. Findings indicated that there exists significant relationship between selected macro factors and Russian stock market. Exchange rate and oil prices affect stock market movements to a greater extent as compared to the rest of the variables.

Joshi and Giri (2013) conducted a study on Indian stock market. It was aimed to determine the relationship that exist between explanatory variables which are 90 days Treasury bill yield, crude oil prices, , reserve money, exchange rate, money supply, industrial production and broad money. It was based on monthly observations of the selected variables for a period from 1994-2012. Granger Causality Test was used to excogitate the relationship that exists between selected macroeconomic variables and stock market. As per the findings, co-integration exists between stock market and macroeconomic variables. Exchange rate and Treasury bill yield were statistical significant relationship. However, rest of the variables were found to have no significant impact on Indian stock market suggesting that more macroeconomic variables should be included in the study.

Mukherjee and Naka (1995)studied the impact of seven macroeconomic variables on stock market of Ghana. These variables were consumer price index, interest rates, exchange rate, oil prices, gold prices, money supply and cocoa price. Monthly observations were taken for the study from 1991-2007. EGARCH model was used analyze the connection between dependent and explanatory variables of the study. As per the findings, interest rate and cocoa prices changes affect stock prices positively. On the other hand, negative impact of volatility in gold prices, oil prices and money supply was found on stock volatility. Consumer price index was found to have no significant impact on stock prices. Another study was conducted by Ibrahim and Aziz (2003) to determine the link between Malaysian's stock market and macroeconomic variables. Macroeconomic factors screened for the study were industrial production, money supply, price level, and exchange rate. Using Cointegration and Vector Auto Regression Model to process the data from 1977 to 1998, findings showed that exchange rate possess a negative impact on Malaysian stock market. This was for both short run as well as long run. Money supply affect stock prices movements positively in short run but negative in the long run. Industrial production affects stock market positively for both short and long run. It is concluded that an examination of the trend in selected macroeconomic variables can help predicting stock market movements in Malaysia.

Sahu, Bandopadhyay, and Mondal (2014)examined the impact of movements in oil priceson Indian stock market. Thirteen years daily observations were taken into consideration. These were from 2001 to 2013.Johansen's Cointegration and Granger Causality tests were used. Analysis revealed that stock market us affected by movements in oil prices.Upward movements in oil prices affect stock prices positively.

## Methodology

## **Data Analysis Tool**

Classical Linear Regression Model (CLRM hereafter) has been used. Ample studies have used it such as studies conducted by Bhunia and Mukhuti (2013), Saeed and Akhter (2012), etc. Firstly, the assumptions associated with CLRM have been tested (discussed in data analysis section of this paper) and then Ordinary Least Square techniques have been used to run Multiple Regression Analysis upon the fulfillment of the assumptions.

## Scope of Data

Monthly data for all selected variables have been considered for the study. It is for the period of eleven years from 2002 to 2013. Total observations for the study were 144. Although, the data of KSE-100 index from 1998 till to date is available. However, limitation was for the data of explanatory variables for the same period thus based on the availability of all selected variables data, study has used data for the period from 2002 to 2013.

## **Choice of Research Design**

It is based totally on secondary data. Primary data is not used for the study.

## Selection of Sample

KSE-100 index has been screened for the study out of the four indices available on KSE. This is primarily due to two reasons. Firstly, it is due to the availability of maximum observations for this index. Secondly, because KSE-100 Index represents top 100 companies listed on exchange from all the sectors. It enables us to generalize the results of the study across all sectors.

#### **Data Collection Sources**

Data has been collected from reliable website so as to assure that study is based on actual data instead of dummy figures. Data for KSE-100 Index has been collected from the website of KSE. For inflation rate, crude oil, gold and producer prices, published data available on the websites of World Bank and Trading Economics.

#### **Macroeconomic Variable Selection and Validation**

Inflation rate, oil prices, gold prices and producer prices have been selected as macroeconomic factors concerning price level. These depict pricing mechanisms in both domestic as well as international countries. This is because prices of these variables are influenced by international pricing mechanism and these further affect savings as well as preferences of the masses about investment in stock. Thus, it is imperative to study the behavior of these pricing swings on stock market swings i.e. volatility.

### **Crude Oil Prices**

Crude oil consists of all petroleum products which are refined to be used as gasoline, diesel, etc. Prices of crude oil are subject to abrupt changes from the last two decades (Fedorova & Pankratov, 2010). Not only domestic factors affect these movements but international factors do the same job. Thus, it is necessary to explore the connection between movements in crude oil prices and stock volatility.

The direction of impact that crude oil prices possess on stock movements is subject to controversies. Some studies have pointed out it to be positive(Saeed & Akhter, 2012) whereas some have explored this relationship as negative (Hosseini et al., 2011).

#### **Gold Prices**

Gold is a precious commodity used worldwide not only for investment purpose but also by the central banks and hoarders. Prices of gold are determined at London in a meeting conducted by the members of London Gold Pool. These prices when determined are then used as a reference/benchmark rate throughout the world.

Review of past researches indicate that an upward movement in gold prices affect stock market investment negatively (Shahzadi & Chohan, 2011). This is because investors consider investing their pool resources in this safe commodity subject to price appreciation instead of investing the resources in highly volatile risky stock market.

#### **Producer Prices**

Producer prices are the prices charged by the producer of goods from the wholesalers. These are ultimately shifted to the end users i.e. customers. Increase in producer prices affect savings of the masses and thus force them to reduce stock investment. Prior studies have explored the negative impact of producer prices on capital markets. These include studies conducted by Joshi and Giri (2013) and Singh (2010).

#### Inflation Rate

Inflation is an increase in the prices of goods and services leading to reduction in the purchasing power of the masses ("Inflation Rate .(n.d,"). An increase in this rate affects the savings of the individuals as well as it lead to reduce the corporate profits. This affects their ability to invest in stock markets due to which the stock market movements decline. Negative impact of inflation on stock prices is revealed as per the past researches done by Hosseini et al. (2011), Bilal, Noraini, Haq, Khan, and Islam (2012), Osamwonyi and Evbayiro-Osagie (2012), etc.

In Pakistan, this rate is reported by "Pakistan Bureau of Statistics". It reflected the actual change in consumer price index and so it is taken in its original form instead of in the form of rate of change.

#### Hypothesis of the Study

Study is grounded on testing the following hypothesis:

 $H_0$ : Oil prices, gold prices, producer prices and inflation rate have no impact on KSE-100 index volatility.

 $H_{\rm l}:$  Oil prices, gold prices, producer prices and inflation rate possess significant impact on KSE-100 index volatility.

## **Theoretical Framework**

Theoretical framework constructed for the study is as follows:



Where:

Oil prices, gold prices and producer prices are explanatory/ independent variables of the study and stock market volatility as dependent variable.

## **Model Specification**

Regression equation formulated for the study is:

**VOLI** =  $\alpha + \beta_1 \operatorname{OilC} + \beta_2 \operatorname{GoldC} + \beta_2 \operatorname{ProdC+Inf} + \varepsilon$ Where:

**VOLI** = Index Volatility

**OilC** = Rate of change in oil prices

**GoldC** = Rate of change in gold prices

**ProdC** = Rate of change in producer prices

Inf= Inflation rate

 $\epsilon = \text{Error/disturbance/residual}$ 

Rate of change in index points is calculated. It is referred to as volatility (Mandelbrot, 1997). Along with that, rate of change in explanatory variables is taken (except inflation rate). This is because if taken in original form these possess an upward trend and so were non stationary. To make them stationary which are a perquisite of the study, they are taken in the form of rate of change. Inflation rate is taken in its actual form because it itself depicts the change in the consumer price index.

#### **Data Processing Tool**

Statistical software of "Eviews" has been used to process the data of variables. It is used by many researchers and scholars (Hosseini et al., 2011; Mohammad, Hussain, Jalil, & Ali, 2009).

# Data Analysis

### Unit Root Test

As per Gujarati (2003), all the variables used for the study should be staionary. This is a prequisite for the application of CLRM. To test whether the variables used for the study are staionary or not, Aumented Dickey-Fuller Test has been used. Variable is unit root i.e. it is non-stationary is the null hypothesis of this test.

It is clear from the table of Augmented Unit Root test that P-values of index volatility, rate of change in oil, gold and producer prices are less thatn 0.05 i.e. level of significance thus we reject the null hypothesis and accept that variables are stationary. For inflation rate, results show that it is unit root however, when taken at first level difference, it proves to be stationary.

Analysis has been conducted into two stages. Firstly, the assumptions underlying CLRM have been tested. Upon fulfillment of these basic assumptions, Ordinary Least Square has been applied to run Multiple Regression Analysis.

## Testing the Assumptions of CLRM

The assumption of CLRM explained by Gujarati (2003) and their testing are as follows:

#### Linearity of Parameters

As per this assumption, model should be linear in parameters. Dependent and independent variables can be non-

linear. It is evident from the model equation that model is linear in parameters. Thus, this assumption is fulfilled.

## Homoscedasticity of Residuals

There should be equal variance among residuals. For this study, it has been tested through Breusch-Pagan-Godfrey Test. Null hypothesis of this test states that there is homoscedasticity/equal variances among residuals.

Result of this test clearly indicates that this assumption is fulfilled. The P-value (highlighted above) is greater than 0.05 i.e. level of significance so we accept the null hypothesis.

# Normality of Residuals

Normality of the test distribution has been checked through histogram.



It is evident from the values of skewness (-0.248) and Kurtosis (4.21) that test distribution is almost normal as it is not deviating majorly from normality. Also histogram is having bell shape.

#### Zero Mean value for Disturbance Term (Error)

The mean value for residuals should be zero. This assumption is also fulfilled as mean value is almost zero as shown in the right side of the histogram figure.

## No Auto Correlation Between Disturbances

Breusch-Godfrey Serial Correlation LM Test has been used to test autocorrelation among residuals. Presence of no autocorrelation is the null hypothesis of this test.

The p-value (highlighted above) is greater than the level of significance thus we accept null hypothesis which states that there is no autocorrelation among residuals.

#### Number of Observations

Total number of observations from all variables of the study (n) MUST be greater than the total number of parameters to be estimated. Independent variables used in this study are four whereas there are 144 observations of the variables. Thus, our study meets this assumption as well.

## No Perfect Multicolinearity between Explanatory Variables

In the presence of multicolinearity among explanatory variables of the study, results of the study show biased results. To test it, Variance Inflation Factor Test is used. Values near to 1 show the presence of no perfect multicolinearity however, as these goes beyond 10, perfect multicolinearity is an issue.

The highlighted figures show that there is no perfect multicolinearity among these variables.

#### **Empirical Results**

Multiple regression analysis based on Ordinary Least Square has been used in the study upon fulfillment of the basic assumptions of CLRM.

The estimated regression model as processed by Eviews is as follows:

VOLI = 0.0737 + 0.3466OilC - 0.4560 GoldC - 1.2859ProdC - 0.00379 Inf

As per the findings, the p-value of the model is **0.000001** which is less than  $\alpha$  i.e. 0.05 (level of significance) thus we reject the null hypothesis and accept H1 stating that there is significant relationship between stock volatility and explanatory macroeconomic variables of the study.

Further, the p-values of rate of change inoil, gold, producer prices and inflation rate are also less 0.05 i.e. level of significance with values of **0.0056**, **0.0070**, **0.0321** and **0.0025** respectively. Meaning by selected macroeconomic variables affect stock market movements significantly and lead to stock volatility.

Oil prices movements are found to affect stock market movements positively. This is evident from the value of regression co-efficient of oil prices. With one percent change in oil prices, stock volatility increases by **0.258%** when other variables are kept constant. This is consistent with the results of prior study conducted by Sahu et al. (2014),(Saeed & Akhter, 2012), etc. The relationship between oil prices movements and volatility varies from industry to industry. For example, the Dow Jones Transportation Index prices rise when oil prices increases and vice versa. On the loop, the Dow Jones Financial Index rise when oil prices drop and vice versa. KSE-100 Index lists top hundred companies together regardless of the sectors. Therefore, it is the communal effect that oil price movements possess on index volatility.

The direction of impact that gold price changes possess on stock volatility is negative. One percent change in gold prices, index volatility decreases by **0.404%** having the effect of other variables is kept constant. The study of Shahzadi and Chohan (2011) confirms this relationship. An increase in gold price attracts investors to invest their pool resources in this commodity rather than injecting these in to a high volatile market and consequently volatility decreases.

Movements in producer prices affect stock index volatility negatively. One percent change in producer prices leas to decrease stock volatility by **1.285%** provided rest of the variables remains constant. It is consistent with the findings of Joshi and Giri (2013). Producers' prices are shifted ultimately to the end consumers and thus it affects their savings deemed to be injected in capital market investments.

An upward increase in inflation rate affects stock index volatility negatively i.e. with one percent change in producer prices leas to decrease stock volatility by **0.003%** provided rest of the variables remains constant. Inflation affects the savings of the individuals that can be otherwise used to make investment in stock markets. This further reduces the stock market movements and affects the stock return and volatility adversely.

The explanatory power of the model is **20.8%**. It means 20.8% changes in index volatility are explained by the selected variables and the rest is unexplained because of the factors not considered for analysis. It is important to mention that this low variability is because this study is based on excogitating the impact of only one category of macroeconomic variables out of the four categories mentioned by Tangjitprom (2012). Inclusion of variables from those categories will certainly help increasing explanatory power of the model. Further, adding the fundamental as well as political instability related factors will help making predicting stock market movements more accurately. This is because stock market behavior is affected not only by movements in macroeconomic factors but also due to the fluctuations in fundamental (companies' specific) as well as political stability related factors.

CUSUM Test introduced by Brown, Durbin and Evans (1975) has been used to check the stability of the parameters of

the model. Cumulative sum is plotted along with 5% critical lines on both sides i.e. up as well as downward side. The graph shown above clearly depicts that parameters of the model are stable.



Autocorrelation among residuals has been checked through the value of Durbin Watson value. It is **1.76**. It falls between du to (4-du) suggesting that no evidence of positive or egative correlation is examined. It is in "no decision zone". Serial autocorrelation test presented above also confirms this.

CUSUM of Squares Test shows the linearity of the parameters used for the study. Movements outside the critical lines indicate that parameters are not linear.From the graph shown above, it is evident that parameters of the model are almost linear.



Capital market volatility is affected by movements in macroeconomic variables concerning price level. It is crystal clear from the results of the regression analysis that changes in gold prices, oil prices and producer prices play a significant role in affecting index volatility of KSE. Investors that are either domestic investors or are international investors gauge movements in these oscillators and the differences in their investment preferences indicate the strength of these variables in affecting capital market investments decisions.

To sum up, selected macroeconomic variables help in predicting stock market movements and should be pondered by the investors. Further, to increase variability about the factors responsible for stock market movements, more macroeconomic determinants should be included in the study.

#### **Recommendations**

Countries all across the globe are subject to fluctuations in their capital markets. Volatility in stock market is perceived as a good sign by the investors however, the point to worry is the frequency of these fluctuations. Frequent and abrupt movements in returns and indices hamper the economy progress by way of reduced investments by both domestic as well as international investors. Efforts are needed to keep the stock market at a reasonable volatile level.

Gold prices should be lowered or even kept at a stable level. It is not a tranquil task. Gold prices are determined by members of London Gold Pool at London.

		6			
		1% Test Critical	5% Test Critical	10% Test Critical	
Variables	T Statistics	Values	Values	Values	P-Value
VOLI	-10.454	-3.4808	-2.8836	-2.5786	0.0000
OilC	-9.079	-3.4808	-2.8836	-2.5786	0.0000
GolC	-11.332	-3.4808	-2.8836	-2.5786	0.0000
ProdC	-7.134	-3.4808	-2.8836	-2.5786	0.0000
Inf	-1.732	-3.4808	-2.8836	-2.5786	0.4124

# **Table I: Augmented Dickey-Fuller Test**

 Table II: Augmented Dickey-Fuller Test (First Difference)

		1% Test Critical	5% Test Critical	10% Test Critical	
Variables	T Statistics	Values	Values	Values	P-Value
Inf	-6.304911	-3.4808	-2.8836	-2.5786	0.0000

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.788305	Prob. F(4,139)	0.1346
Obs*R-squared	7.047836	Prob. Chi-Square(4)	0.1334
Scaled explained SS	10.56431	Prob. Chi-Square(4)	0.0319

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	1.068203	Prob. F(1,138)	0.3032	
Obs*R-squared	1.106085	Prob. Chi-Square(1)	0.2929	

Variance						
Date: 06	Date: 06/02/14 Time: 11:47					
Sample:	2002M01 2	2013M12				
Included	Included observations: 144					
	Coefficient	Uncentered	Centered			
Variable	Variance	VIF	VIF			
OILC	0.008415	1.579050	1.487598			
GOLC	0.021909	1.208792	1.060465			
PRODC	0.352759	2.391562	1.490128			
INF	1.52E-06	5.295273	1.161274			
С	0.000166	4.884133	NA			

Dependent Variable: VOLI				
Method: Least Sq				
Date: 06/02/14	Time: 11:53			
Sample: 2002M0				
Included observations: 144				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
OILC	0.258253	0.091731	2.815326	0.0056
GOLC	-0.404952	0.148018	-2.735823	0.0070
PRODC	-1.285961	0.593935	-2.165154	0.0321
INF	-0.003792	0.001233	-3.076370	0.0025
С	0.073732	0.012902	5.714853	0.0000
R-squared	0.208040	Mean dependent var		0.024035
S.E. of regression	0.070055	Akaike info criterion		-2.444962
F-statistic	9.128482	Durbin-Watson stat		1.765209
Prob(F-statistic)	0.000001			

So it is not possible to interrupt in their pricing mechanism. But the adverse effect of increase in gold price can be minimized. Limit should be imposed on future and forward derivative contracts on gold to assure that pricing on these contracts should not exceed a certain price. Similarly, Government should impose limits on producers to minimize raising prices on goods after a certain tolerable level.

With an increase in inflation, input costs for corporations increases and it leads to reduction in corporate profits. Consequently, the participation of these corporate institutions in capital markets is reduced which affect stock market movements adversely. Similarly, high prices of products and services reduce the savings of the individual investors making them difficult to approach capital markets. Government should control inflation by increasing the aggregate supply to compensate the aggregate demand. Increase in the production as well as infrastructural development will assist in doing so. Focus should be on keeping reasonable sustainable inflationary environment. It will boast the trust of both international as well as domestic investors to move towards stock markets in Pakistan.

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	Appendix						
Breusch-Godfrey Serial Correlation LM Test:							
F-statistic	1.068203	Prob. F(1	0.3032				
Obs*R-squared	1.106085	Prob. Chi	-Square(1)	0.2929			
Test Equation:							
Dependent Variable	: RESID						
Method: Least Squa	res						
Date: 06/02/14 Tin	ne: 13:23						
Sample: 2002M01 2	2013M12						
Included observation	ns: 144						
Presample missing v	alue lagged	l residuals s	et to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.			
OILC	-0.002903	0.091751	-0.031637	0.9748			
GOLC	-0.000950	0.147985	-0.006423	0.9949			
PRODC	-0.003223	0.593798	-0.005428	0.9957			
INF	-5.22E-07	0.001232	-0.000423	0.9997			
С	0.000101	0.012899	0.007848	0.9937			
RESID(-1)	0.087725	0.084878	1.033539	0.3032			
R-squared	0.007681	Mean dependent var		9.88E-18			
Adjusted R-squared	-0.028272	S.D. dependent var		0.069068			
S.E. of regression	0.070038	Akaike info criterion		-2.438784			
Sum squared resid	0.676934	Schwarz criterion		-2.315041			
Log likelihood	181.5924	Hannan-Quinn criter2		-2.388502			
F-statistic	0.213641	Durbin-Watson stat 1.905		1.905075			
Prob(F-statistic)	0.956241						

Heteroskedasticity T	est: Breusc	h-Pagan-Go	dfrey	
F-statistic	1.788305	Prob. F(4,139)		0.1346
Obs*R-squared	7.047836	Prob. Chi	-Square(4)	0.1334
Scaled explained SS	10.56431	Prob. Chi-Square(4)		0.0319
Test Equation:				
Dependent Variable:	RESID^2			
Method: Least Squar	es			
Date: 06/02/14 Tim	e: 13:23			
Sample: 2002M01 2	013M12			
Included observation	ns: 144			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
С	0.002705	0.001553	1.741621	0.0838
OILC	-0.014882	0.011044	-1.347492	0.1800
GOLC	0.029827	0.017821	1.673658	0.0964
PRODC	0.019866	0.071510	0.277813	0.7816
INF	0.000174	0.000148	1.175465	0.2418
R-squared	0.048943	Mean dep	oendent var	0.004737
Adjusted R-squared	0.021575	S.D. dependent var		0.008527
S.E. of regression	0.008435	Akaike info criterion -6.6		-6.678840
Sum squared resid	0.009889	Schwarz	-6.575722	
Log likelihood	485.8765	Hannan-(	-6.636939	
F-statistic	1.788305	Durbin-Watson stat 1.802		1.802693
Prob(F-statistic)	0.134571			

# Appendix

Graphs

