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# Interdependencies of Stock Index, Oil Price, Gold Price and Exchange Rate: A Case Study From Pakistan

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**Abstract**

*The core objective of the research conducted is to explore the interactions of the stock index, gold price, crude oil price and exchange rate in Pakistan from September 1997 to April 2018. The interaction is examined by concurrent equations. For analyzing the trend of Pakistan economy, unit root test, correlation test, co-integration technique, vector autoregressive model, granger test is done. The result indicates the absence of a long-run relationship among all of the variables. However, results demonstrate the significant effect of crude oil price & Gold price on the exchange rate. Whereas, Pakistan stock market is affected by the exchange rate. Recommendations for the government are given to give more focus on economic policies for the crude oil price, stock index, gold price and exchange rate to make them stable in the country. The study is tremendously beneficial for high authorities in the business, policy and decision-maker in the country and as well as investors because they can predicate and able to understand the fluctuation of these variables in the economy. Statistical software used for this study is EVIEWS 9th edition.*

**Keywords:** *Stock Index, Gold Price, Crude Oil Price, Exchange Rate, Vector Autoregressive Model*

**JEL Classification***: D51, C43*

## INTRODUCTION

An international financial system (IFS) comprises of globally accepted rules and regulations agreements, principles and financial institution that help in the imports and exports of any country, different investment operation and arrangement of financial capital flow in multiple countries. Before the invention of currency, silver and gold were used as a form of intermediary for the purpose of goods and services exchanged. From the beginning, money was less important for economic activities until the 19th century when world economies collaborate for trade purpose. Different countries were following their own way of exchanging goods and services like in India, China, Europe, America (Abbas, 2010). There are number of countries (Turkey in 2001, Argentina in 1994, East Asian in 1997, Latin America in 1994 and Global financial crisis

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from 2000 to 2011, another global financial crisis in 2007) that were affected by major financial crises due to which their economy crashed, more specifically stock price of those countries were affected badly (Abbas, 2010).

### *Exchange Rate in Economy*

Foreign exchange market plays a vital role to enhance the country's economy. Exchanging one country's currency to another according to current market price is named as an exchange rate. Globally, the exchange rate is one of the important indicators of macroeconomic variables which are mostly used for analyzing financial events at the overall country's economic level. The exchange rate of the International financial currency market is examined with the demand and supply of currency. Some other factors also have a deep influence on exchange rate including remittance, inflation rate, and interest rate and it is quite challenging to estimate the actual rates of foreign exchange market due to the size of the market. All of the studies which have been done on the exchange rate in past indicated that oil price, gold price, inflation rate, gross domestic product is linked with exchange rate, while in this situation investors have to make right decision to invest in any economy where they would be getting higher return with lower risk (Ahmed, Kashif & Feroz, 2017).

### *Crude Oil price in Economy*

Globally, the oil price in the energy sector is a key factor for the growth of any country. As the demand for oil increases in the developed and developing economies both, the price of oil also increases rapidly in the world. The rapidly growing demand for oil by the consumer is creating a problem for oil-producing countries to manage the actual consumer demand. An economy of the country can directly or indirectly both be influenced by the fluctuations of oil price. Oil prices are directly linked with the manufacturing sector and services sector of the economy. A rise in oil price will directly affect the cost of goods and services in the economy which ultimately bring a boom in the price level in the country. Various researches were done in past on oil price importance (Kumar, 2019; Narayan & Sharma, 2011; Narayan & Sharma, 2014; P. Narayan, S. Narayan & Sharma, 2013) and identified it as a dominant factor in the economy. Macroeconomic indicators like stock price, exchange rate, money supplies, and GDP and gold price of an economy are direcs--tly affected by the oil price.

### *Gold Price in Economy*

Across the world, gold is considered the most important and valuable element exists among other commodities in the world and it is measured by the icon of power, wealth, and prosperity. In the past decade, if any nations have the gold they were considered as the richest nations at that time. In Eastern countries, gold is used for the trade purpose into the business. In global financial market investors always consider gold as a safe haven for their investment portfolio to get a safe and secure return for their investment. In the entire world, the importance of gold is the same, no matter which country you live and which country you go but the importance of gold is the same in all over the world. It has been accepted by an international survey that gold reduce the financial risk, particularly in the time of financial crisis (Ahmed, Kashif & Feroz, 2017). According to Baur and McDermortt (2010); Baur and Lucey (2010) gold is a shelter for the investors because of its unassociated nature with financial market assets at the financial crisis times.

### *Stock Market in Economy*

The stock market is a platform, in which buyers and seller trade securities and shares from listed companies. For the purpose of economic development, the stock market is considered as one of the major instrument. Apart from the country's industrial sector, the stock market performs a vital role to enhance the development in the country. It is critical for every country to highlight those causing elements which create disturbance in the stock market overall performance. In the stock market, the listed company's prices are set or determine on the basis of investors demand and supply mechanism. Different variables (exchange rate, gold price, interest rate) influenced the Stock market. The stock market of Pakistan in past decades worked separately, now all 3 stock markets of Pakistan (i.e., Karachi, Lahore and Islamabad) gets merged and form single Pakistan Stock Market. In a recent study, Pakistan stock market is marked as the best stock exchange market. Among the top 100 companies which are listed into Karachi 100 index is expected to provide or give maximum return to the investor.

A report published by Express Tribune newspaper in 2014 that Karachi stock exchange considered in to list of top 10 ten best exhibitions throughout the world in 2013 and which made a benchmark of yearly return of 49.4% as compared to US dollars which are 37 %. Moreover, in 2015 a report published by daily time newspaper that Karachi stock market was labelled on 3rd position in world and 1st position in the Asia region among all other stock exchange market. Since their peak, the KSE-100 index then faced very tough time by a drop of 100 points, due to such worst performance investor lose their confidence and try to find the new way of investments, such as gold because it is considered as a safe haven. Ultimately the gold price goes upward trend at the time. These overall circumstances of investment behaviours affect both developing countries stock market like India, Pakistan, and Srilanka as well as developed countries stock market (Ahmed, Kashif & Feroz, 2017).

### *Problem Statement*

From the independence way back in 1947, Pakistan economy has been fighting with numerous economic problems and challenges and foreign debt is one of them (Bal & Rath, 2015). Pakistani currency has been depreciated heavily from the last few years due to the externalities and forces that brought the attention of many external investors towards the economy. The exchange rate of Pakistani economy decreased heavily due to the external pressure of Debt (Ahmed, Kashif & Feroz, 2017). Moreover, Pakistan is obliged to pay to IMF of the debt that put direct pressure on the exchange rate of the country contrary to strong currencies of the world like the United States (US) Dollar, Great Britain Pound (GBP) and others. On the other hand, Pakistan has to work extremely hard to combat with the aforementioned challenges along with countering other strategic problems as well such as the War on Terror (WOT) (Khan, 2011). Pakistan economy and the daily lifestyle of a society deeply affected by stocks market instabilities. A drop in the price of a share has the extensive potential to cause the prevailing collapse of the economy (Al-Majali & Al-Assaf, 2014; Adjasi, Harvey & Agyapong, 2008).

This particular study is prone to conduct in the region of Pakistan considering the strategic and foreign challenges the country has and the association between Oil and Gold prices there. The research will examine the instability in the Gold and Oil prices in the selective region and analyze the same with their respective exchange rate. This research also emphases on the instability on the stock index in case of Pakistan Stock Exchange (PSX). Nevertheless, several

studies conducted in past on this subject matter in developed economies of the world, however, have to dig out little evidence as far as developing nations are related. Consequently, there is a need to fill this gap by reviewing this impact. Based on the same analysis, the researcher will study the economy of the country in order to recommend the head headers accordingly to retaliate from the same problem which may change into a disaster, if not managed properly now. Following are the objectives of this study:

1. To discover the impact of the exchange rate, gold price & stock index on a crude oil price of Pakistan.
2. To discover the impact of crude oil price, gold price & stock index on the exchange rate of Pakistan.
3. To discover the impact of crude oil price, exchange rate & stock index on a gold price of Pakistan.
4. To discover the impact of crude oil price, exchange rate & gold price on stock index of Pakistan.

*Research Question*

Is there any relationship exists among the variables i.e., gold price, crude oil price, exchange rate and stock index?

## EMPIRICAL STUDY

*Oil Price and Exchange Rate*

In past researches of financial sectors, oil price and exchange rate have been one of the top questions for the researchers. After a high recession in the economy of European countries and the US (i.e. in 2008), the major elements like oil price and exchange rate forecast the economy at the macro level. There are many types of research done to explore the linkages between oil price and exchange. The finding of Narayan, Narayan, and Sharma (2013) discovered the cointegration of oil price and exchange rate in US market. In point of view of Tang and Xiong (2012) linkages between commodities and exchange rate of the United States can help investors and traders for the purpose of understanding the market scenario. Furthermore, it is added by Zhang, Fan, Tsai, and Wei (2008) that in United States (US) exchange rate can positively be affected in long run but the effect of oil reduces in the short run on the minimum level. According to Tiwari, Dar, and Bhanja (2013) find that no relationship exists among exchange rate and oil price with a higher scale in India economy. Wen et al., (2018) recommend that crude oil price Granger cause the exchange rate in a non-linear way but not vice versa.

Jain and Ghosh (2013) carried out the study in the Indian economy and showed the relation of the Indian exchange rate and dollar rate with the global oil price. The duration of data is from 2009 to 2011 on a monthly basis. The core target of the conducted research was to check the association of variables. The main results of the study represent commodities such as gold price, crude oil price, the metal price an essential factor in the changing behaviour of the exchange rate in India. Furthermore, results predict a strong relation between commodities price & exchange rate if the price of commodities increases than it affects the exchange rate. It is suggested that this study is beneficial for the policymaker of the exchange rate that they would be able to explain the nature of the exchange rate and their impacting factors.

### *Gold Price and Exchange Rate*

Foreign exchange market and the gold market is always being important indicators for the investors to minimize the risk of the investments and avail the investment opportunities from where they get maximum profit. There is a close association between the forex market and gold markets. However, both markets risks and benefits are unpredictable due to the price fluctuations. The price of both markets gets provoked by different reasons such as war, political instability, the country's economic condition, geographical region, and recession.

Sari, Hammoudeh, and Soytas (2010) research found that gold is used as a shelter to protect the volatile situation in the economy. Apergis (2014) reviewed that impact of gold price on Australian dollar/United State dollar exchange rate. The data set of this paper was from the year 2000 to 2012 daily and monthly data. The statistical test revealed that the AUD / USD exchange rate is linked to the gold price if the gold price increased it would direct effect to the US and Australian dollar. The author recommended that this research is beneficial for the key official's, portfolio managers and fund manager. According to Sjaastad (2008) that major sources of the instability of the gold market are floating exchange rate due to this gold price depreciates and appreciates with the enormous figure. The gold market is always considered as protecting instrument for any hazard situation in G7 countries (Joy, 2011).

### *Stock Price and Exchange Rate*

In macroeconomic indicators, the stock market is one of the major element for analyzing the country economy and as well as for the development of the industry. Jayashankar and Rath (2017) examined the exchange rate and stock price relationship. Findings revealed that there is a direct relationship among these variables in the long run but in the short run, the association between the variables is not significant. With the help of a statistical test of Granger causality, the relationship between exchange rate and stock price is a direct relationship with each other in the long run.

Raji, Ibrahims and Ahmad (2017) examined between the exchange rate and stock price. The results of the statistical test revealed that both variables are the more important element to analyze events in the African financial market, moreover findings of the researcher are that, there is a negative relationship between foreign exchange market and the stock market and a negative association between portfolio balance and exchange rate, stock price. Abbas (2010) study on the five major Asian countries currencies with stock market that are Srilanka, Pakistan, Indonesia and India, his findings of study concluded that, no long-run association exists among the stock market and exchange rate but short-run relationship of exchange rate and stock market exists in two countries that is Pakistan and Srilanka.

### *Crude Oil Price and Gold Price*

Bildirici and Turmen (2015) conducted a study on linkages among gold price and crude oil price. Result of the study showed that the oil market and the gold market is not only valuable elements for economists but it is also of greater importance instrument for the policymakers to predict the future risk of the country. The movements of gold price showed significant relationship towards on oil price in the short run and as well as in the long run. Jan, Wali and Asif (2014) study on commodity prices and exchange rate their study findings

revealed that gold price and exchange rate relation is negative in the economy but linkages among the oil price and exchange rate is positive that is increasing one unit in oil price will lead to increase in the same unit of exchange rate. Furthermore, it has been described by Reboredo (2013) gold market plays hedging role at the time of oil price fluctuation. Ups and down of oil price can be considered as a critical tool to know the nature of gold price in the market. Zhang and Wei (2010) investigated from the period of 2000 to 2008 and the findings indicated that gold and oil price have a significant correlation in the market.

***Gold Price and Stock Price***

Akbar, Iqbals and Noor (2019) proved gold prices and stock prices have a negative relationship. Research accompanied by Baur and Lucey (2010) based on the United State (US) and United Kingdom(UK) stock market and the gold market showed that gold does not act as a protector in the United State and United Kingdom bonds market. In short-run gold is used as a protector or hedge only in the stock market. Linkage among gold price and stock price (Sharma & Mahendru, 2010). As per Shahzadi and Chohan (2012), an inverse relationship was observed by gold price and stock price in Pakistan economy context. Furthermore, it has also been studied by Ahmed, Kashif, and Feroz (2017) about the stock and gold market and discovered gold as a shelter at the time of prices appreciates in the stock market. Additionally, Akgul, Bildirici and Ozemir (2015) have done research on the behaviour of the stock market on the gold price and explore negative relation between them, which mean if gold price increase it does not affect on the stock market indexes.

Moreover, Choudhry, Shabi, and Hassan (2015) examined the association among the gold market and the stock market period of recession time in the country. Findings of the study showed that gold is not considered as efficient elements of hedge in the time of financial crisis. The reasons are that gold and stock market relation are independent to each other's but as a general fact, gold is used as a shelter at the time of crisis and the stock market is a platform where the country can stabilize their financial condition.

***Crude Oil Price and Stock Price***

A number of researches conducted in past based on the behaviour of the oil market and stock market relationship. Sahu, Bandopadhyay, and Mondal (2015) conducted research on the behaviour of stock price and oil price on the Indian economy and results explored the long-run relationship of oil price and the stock market, due to oil price ups and down stock market indexing has a negative outcome in the country. Turhan, Hacihasanoglu, and Soytas (2013) investigated the oil price and stock market relationship from the year 2002 to 2010, in order to find out their relationship. The empirical result indicated a positive linkage between the oil price and stock market after the great recession in the world economy in 2008. Past research by Basher, Haug, and Sadorsky (2012) explored the association of the stock market and oil price. Its results proved that a change in one per cent of oil price brings a change of one per cent in stock price. The study concluded that the linkage is positive between the stock index and oil price. Additionally, Gomes and Chaibi (2014) explored research on, between the oil market and the stock market. Findings of researches discovered that both have a significant correlation among stock market indexes and oil market. Research conducted by Malik and Hammoudeh (2007) explored the association among the stock market of the Gulf country and oil market using data from 1994 to 2001. The research determined that the oil market of Saudi Arabia is

considered one of the most influencing markets to rapidly changing in commodities prices in the world.

***Stock Index, Oil Price, Gold Price and Exchange Rate***

Research of Roubaud and Arouri (2018) examine the linkages among oil prices, stock markets and exchange rates through the reactions of the uncertainty of economic policy and highlighted significant relationship among them. Delgado et al. (2018) studied the Mexican economy through the relationship between COP, ER and the SI. The study identified that the stock market index increases by a rise of the Mexican peso. Furthermore, an appreciation of Mexican peso can also be caused by higher oil prices. A study conducted by Bai and Koong (2018) about the relationships of China and the U.S through oil price, stock market and exchange rate from the period of 1991 to 2015. Sari et al. (2010) highlighted that gold price, exchange rate and oil price have a short-run relationship only. Ismail (2009) discovered that stock market index and exchange rate have a major influence on the gold price.

## METHODOLOGY

This research is conducted for the purpose to inspect the interaction between variables by utilizing time-series data from 1997M09 to 2018M04 with 248 observations. Secondary data is used in this statistical study; data collection is done by extracting data through different websites, Data of exchange rate from IMF; gold price and crude oil price from Pakistan Bureau of Statistics and Stock Index are from Yahoo Finance. This research is being done on comparing variables in the context of Pakistan. The statistical test used in this research is descriptive statistics, correlation test, unit root test, JJ co-integration, vector autoregressions (VARs), and Granger causality.

***Research Model***

$$ER_t = \alpha + \beta * SI + \beta * COP + \beta * GP + \varepsilon$$

$$GP_t = \alpha + \beta * SI + \beta * COP + \beta * ER + \varepsilon$$

$$OP_t = \alpha + \beta * SI + \beta * GP + \beta * ER + \varepsilon$$

$$SI_t = \alpha + \beta * GP + \beta * COP + \beta * ER + \varepsilon$$

Where, ER is Exchange Rate, SI is Stock Index, COP is Crude Oil Price, GP is Gold Price, Ɛ is Error Term

## FINDING AND ANALYSIS

*Table 1: Descriptive Statistics*

| | Mean | Maximum | Minimum | Std. Dev. | Obs. |
|---|---|---|---|---|---|
| *LER* | *4.280054* | *4.750222* | *3.701796* | *0.284704* | *248* |
| *LCOP* | *3.868110* | *4.877942* | *2.347558* | *0.634879* | *248* |
| *LGP* | *6.518679* | *7.480152* | *5.491249* | *0.662064* | *248* |
| *LSI* | *8.966789* | *10.83154* | *6.735424* | *1.194655* | *248* |

Table 1 gives the detailed statistics of all variables i.e., LER, LCOP, LGP & LSI of Pakistan. Mean of LSI shows that its central tendency is high as compared to other variables. Among all variables, the maximum & minimum values have less difference, which shows stability during the sample period. Standard Deviation of LSI has the highest volatility.

### *Correlation Test*

Correlations test show, the existing relationship between variables.

*Table 2: Correlation Table*

| Correlation Probability | LER | LCOP | LGP | LSI |
|---|---|---|---|---|
| *LER* | *1.000* | | | |
| *LCOP* | *0.689250* | *1.000000* | | |
| *LGP* | *0.899474* | *0.840103* | *1.000000* | |
| *LSI* | *0.868456* | *0.764515* | *0.888586* | *1.000000* |

*Note: Significant at the 10% level*

Analyzing the above correlation result in Table 2, all variables have a correlation with each other. LGP and LSI are strongly correlated with an LER, which lies under "high" correlation, and LGP and LSI with LCOP are considered in the range of "high" parameter. The association between LER and LCOP lies under "moderate" correlation. Whereas, LSI & LGP are strongly correlated with each other. Therefore, the sign of multicollinearity is observed among LGP, LSI and LER, LGP and LCOP & LSI and LGP.

### *Unit Root Test*

Table 3 represents the unit root test, which is applied in the study to explore either stationarity of data exists or not. Stationarity of variables was identified through intercept and trend of ADF test. The hypothesis of the technique is;

$H_o$ = There is a unit root.

*Table 3: Unit Root Test*

| | ADF | | | |
|---|---|---|---|---|
| | I(o) | | I(I) | |
| | Intercept (P. Value) | Trend & Intercept (P. Value) | Intercept (P. Value) | Trend & Intercept (P. Value) |
| *LER* | *0.662* | *0.576* | *0.000* | *0.000* |
| *LCOP* | *0.446* | *0.650* | *0.000* | *0.000* |
| *LGP* | *0.871* | *0.917* | *0.000* | *0.000* |
| *LSI* | *0.919* | *0.449* | *0.000* | *0.000* |

It has been verified through the unit root test that all of the variables i.e., ER, GP, COP & SI are non-stationary at levels. Thus, Ho is accepted and H1 is rejected. It indicates that trend exists in variables. However, all of them become stationary at first difference. Here, H1 is accepted and Ho is rejected.

### *Lag Order Selection*

*Table 4: Lag Order Selection*

| Lag Length | AIC | SC | HQ |
|---|---|---|---|
| *0* | *2.639340* | *2.697350* | *2.662714* |
| *1* | *-13.34131* | *-13.05126** | *-13.22444** |
| *2* | *-13.39960** | *-12.87751* | *-13.18924* |
| *3* | *-13.34450* | *-12.59036* | *-13.04064* |
| *4* | *-13.34936* | *-12.36318* | *-12.95200* |
| *5* | *-13.32126* | *-12.10304* | *-12.83041* |

** indicates lag order selected by the criterion*
*AIC: Akaike information criterion*
*SC: Schwarz information criterion*
*HQ: Hannan-Quinn information criterion*

*Table 5: Lag Exclusion Wald Test*

| | | LCOP | LER | LSI | Joint |
|---|---|---|---|---|---|
| **Lag 1** | *246.8577* | *266.3175* | *216.9325* | *228.4352* | *944.6801* |
| | *[ 0.000000]* | *[ 0.000000]* | *[ 0.000000]* | *[ 0.000000]* | *[ 0.000000]* |
| **Lag 2** | *4.840275* | *4.805107* | *1.496706* | *2.079065* | *13.02602* |
| | *[ 0.304082]* | *[ 0.307885]* | *[ 0.827225]* | *[ 0.721219]* | *[ 0.670854]* |
| **Lag 3** | *5.327081* | *5.969646* | *2.822081* | *1.612286* | *15.65337* |
| | *[ 0.255352]* | *[ 0.201427]* | *[ 0.588027]* | *[ 0.806582]* | *[ 0.477403]* |
| **Lag 4** | *11.94306* | *3.472869* | *5.068279* | *3.336581* | *26.65988* |
| | *[ 0.017780]* | *[ 0.482016]* | *[ 0.280363]* | *[ 0.503157]* | *[ 0.045422]* |
| **Lag 5** | *4.578737* | *4.171080* | *6.953890* | *1.768327* | *18.54696* |
| | *[ 0.333313]* | *[ 0.383348]* | *[ 0.138345]* | *[ 0.778272]* | *[ 0.292854]* |

As the autoregressive model is sensitive to the selection of appropriate lag length, the study is to ascertain the appropriate lag length before conducting the cointegration analysis in line with Johansen. As the autoregressive model is sensitive to the selection of appropriate lag length, the study is to ascertain the appropriate lag length before conducting the cointegration analysis in line with Johansen. Due to the complexity of the right selection of lag length in the autoregressive model, the study has to discover the suitable lag length before Johansen co-integration analysis. Three criterions are usually used for discovering optimal lag length, i.e. AIC, SIC and HQ mentioned in Table IV. "2" lag length is proposed by AIC criteria. However, "1" lag length is proposed optimal by remaining SC and HQ criteria. As a result, the study selected SC and HQ criteria as optimal lag length. The optimal lag length for this study is "1". Table V represents the Lag exclusion Wald Test. For ensuring the lag order which provides significant information content are not omitted from the Vector Autoregression (VAR), wald test is performed. The result shows that one lag is jointly significant for all the equations in the VAR System. Then VAR was estimated with 1 lag.

### *Johansen Co-integration*

Unit root test in Table 3 validate all variables that are stationarity at 1st difference, therefore we conducted JJ Cointegration technique to explore a relationship of variables if they have the long-run relationship or short-run. This test is built on the hypothesis mentioned below;

$H_o$ = No Co-integration exist.

$H_1$ = Co-integration exist.

*Table 6:s J. Co-Integration.*

| Hypothesized No. of CE(s) | Trace Statistic | 5% Critical Value | Max. Eigen statistics | 5% Critical Value |
|---|---|---|---|---|
| *None* | *25.24180* | *47.85613* | *0.053191* | *13.44584* |
| *At most 1* | *11.79595* | *29.79707* | *0.029825* | *7.448654* |
| *At most 2* | *4.347298* | *15.49471* | *0.016628* | *4.124944* |
| *At most 3* | *0.222354* | *3.841466* | *0.000903* | *0.222354* |

*Note: Significant at 5% level*

Table VI confirms that Trace & Max. The eigenvalue is less than 0.05 critical values and is not significant at 5% level, which concludes that co-integration does not exist in all variables. Thus, an alternative hypothesis is not accepted relatively null hypothesis is not rejected.

### *Vector Autoregressive Model Estimates*

Vector Autoregression model is an addition to uni-variate auto regression model to multi-variate time series data. Every factor in VAR model is considered as endogenous. VAR is a multi-equation system. VAR(p) model:

$$Yt = a + A1Y_{t-1} + A2Y_{t-2} + \ldots + ApY_{t-p} + \varepsilon$$

*Table 7: Vector Autoregressive Model*

| | D(LGP) | D(LCOP) | D(LER) | D(LSI) |
|---|---|---|---|---|
| **D(LGP(-1))** | *0.074885*<br>*(0.2792)* | *0.218294*<br>*(0.1292)* | *-0.025514*<br>*(0.3386)* | *0.198603*<br>*(0.1697)* |
| **D(LCOP (-1))** | *-0.011786*<br>*(0.6992)* | *0.214344*<br>*(0.0008)** | *0.032391*<br>*(0.0060)** | *0.106214*<br>*(0.0959)** |
| **D(LER (-1))** | *0.045544*<br>*(0.7834)* | *0.524600*<br>*(0.1279)* | *0.041261*<br>*(0.5182)* | *-0.385019*<br>*(0.2663)* |
| **D(LSI (-1))** | *-0.027838*<br>*(0.3621)* | *0.116764*<br>*(0.0661)** | *-0.025014*<br>*(0.0337)** | *0.004401*<br>*(0.9450)* |
| **C** | *0.005682*<br>*(0.0414)** | *-0.000886*<br>*(0.8783)* | *0.004056*<br>*(0.0002)** | *0.012847*<br>*(0.0274)** |

*Note: Prob. value in ().*
*Significant at the 10% level*

The obtained results of VAR model technique mentioned in the above table indicates that for D(LGP), each variable coefficient i.e. D(LCOP) & D(LSI) has negative & statistically insignificant relation, whereas D(LER) has positive and insignificant relation at 10% level.

For D(LCOP), the coefficient value of D(LGP) & D(LER) has positive and statistically insignificant relation, however, D(LSI) has statistically significant and positive relation at 10% level respectively. In D(LER), the coefficient of D(LGP) has negative and statistically insignificant relation, D(LCOP) has positive and statistically significant relation, conversely, D(LSI) has negative but is significant statistically relation at 0.10 level. Moreover, for D(LSI), the coefficient of D(LCOP) has positive and statistically significant relation, D(LGP) has positive but statistically insignificant relation & D(LER) has negative and significant relation at 10% level. In general, the above estimates specify that (D(LGP)) is the most dependent and weakest variable. However, (D(LER)), (D(LCOP)) & (D(LSI)) are the most independent variables among all.

### *Granger Causality Test*

*Table 8: Granger Causality Test*

| Null Hypothesis | P. value |
|---|---|
| *LER → LCOP* | *0.8456* |
| *LCOP → LER* | *0.0278** |
| *LCOP → LGP* | *0.2811* |
| *LGP → LCOP* | *0.3221* |
| *LSI → LCOP* | *0.3132* |
| *LCOP → LSI* | *0.8045* |
| *LER → LGP* | *0.6611* |
| *LGP → LER* | *0.0085** |
| *LSI → LER* | *0.4769* |
| *LER → LSI* | *0.0874** |
| *LSI → LGP* | *0.2761* |
| *LGP → LSI* | *0.4689* |

*Note: Significant at the 10% level*

The above table clearly showed that LER & LCOP has a uni-directional relationship. It implied that LCOP leads to affect the LER. LER & LGP has uni-directional relationship. It implied that change occurs in the LER due to LGP. Moreover, LSI and LER also have a uni-directional relationship which implied that LER can cause a change in the LSI. However, the relationship does not exist between LCOP & LGP and, LSI and LCOP and LSI and LGP, vice versa

### *Discussion*

The findings of the present study reveal that more focus on economic policy will stabilize the rapid price fluctuation in the economy. However, the result of the study agrees with the research conducted by Jain and Ghosh (2013) concluding that commodities price is an essential factor in the changing nature of the ER. It shows that the association is present among commodities price (i.e. COP) with ER. If the price of commodities increases than it influences the ER as shown in granger causality results i.e. GP and OP influences ER. Similarly, Apergis (2014) conducted a study that there is an influence of GP on AUD/USD ER. The statistical test discovered that Australia to US dollar-ER is linked to the GP if the GP increased it would

direct effect to the US/Australian dollar. This result agreed with the result of the present study that due to variation in GP influences ER. Furthermore, the outcomes are also similar to that of Raji, Ibrahim and Ahmad (2017) study in which relationship was examined between the ER & stock price. The results of the study reflected that both variables are important elements and concluded that, the negative association presents between the ER and SI. Findings of Bildirici and Turmen (2015) proposed that oil market, as well as the gold market, is not only valuable elements for economists but it is also of greater importance instrument for the policymakers to forecast the future risk of the country. The influence of ER in this study on SP is followed by the results of Wong (2017) representing the strength of ER that effects SI.

## CONCLUSION

All of the results will be analyzed in this section to give a brief overview of the research. Linkages among the factors such as ER, GP, COP, and SI are enormously essential for international trade and investment. Furthermore, the relationship between variables fluctuates in different time period due to the dependency of the global economy. The Unit Root Test outcomes represent that selected variables movement at first difference is stationary. Correlation test shows that SI & GP is strongly correlated with an ER, and SI & GP also highly correlated with COP. COP relationship with ER possesses "moderate" correlation. Whereas, SI & GP are highly correlated with each other. Absence of long-run relationship among all variables is confirmed through cointegration test. VAR indicates GP as the most dependable and weakest variable. However, COP, ER & SI are the most independent variables among all.

Conclusion of the study is that when GP or COP changes it will affect ER and when ER decline it will be considered as a favourable situation for Pakistan because export becomes cheaper, import prices will increase which leads to cost-push inflation (in which supply cost increases that will ultimately decline the living standards). By depreciation in ER increase in sales could be observed that increases jobs in the country due to which unemployment ratio decreases. Domestic demand also increases that cause demand-pull inflation (in which inflation rises and gross domestic product also rises). In such condition, investors become reluctant in investing due to a rapid increase in the devaluation of currency (Bergvall, 2004). An approach for good market described that stock price encourages due to fluctuations in the ER. Devaluation of ER will surge the export effectiveness of the businesses concerning lower the prices, higher will be their sells to other countries. Due to the expansion in exports, more profits for the businesses will be observed. This will give hype to the company's' value and to its stock prices. Therefore, the decline of ER results in escalating stock price whereas the decline in stock price occurs due to an increase in ER. (Ülkü and Demirci, 2012). The government can consider the ER in order to influence the stock market.

## RECOMMENDATIONS

Regardless of a few limitations, this study positively adds some understanding of the Pakistan economic situation.

1 The government should promote the small industries enterprises that are export-oriented industries. These small enterprises will generate employment and help to increase export, which ultimately reduces the trade deficit, and strengthen

the currency.

2 Levied heavy taxes and customs duty on import of goods, this will also discourage the import and help to curtail demand for foreign currency and improve the exchange rate and stable the demand for a currency.

3 The government should also mobilize capital from saving to investment this will reduce the demand for factors of production and increase GDP and growth rate of the economy and this will bring stability in the exchange rate.

4 For a country like Pakistan, that totally depends on the oil importers at a huge level, where the government of Pakistan cannot eliminate adverse fluctuation of the oil shock, but appropriate policy response can minimize it (Asian Development Bank, 2005)

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