

## **Investigating the Impact of Macro Economic Factors on Pakistan Stock Market: An analysis of Pre, Between and Post Financial Crisis**

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### **Abstract**

*This study investigates the association between macroeconomic variables for pre, between and post financial crisis for the period from 1999 to 2018. This study is on time series analysis. By unit root test, we evidence to run Johnson co-integration test. The co-integration test reveals that the significant result with stock prices in Pakistan. However, Granger causality test shows indication of bi-direction relation between exchange rate and stock prices in Pakistan and money supply and stock prices in Pakistan and Uni-directional causality between gold prices and stock prices and inflation rate and stock prices in Pakistan for pre-financial crisis 2007-8. The results of between financial crises 2007-8 show Causality between gold prices with stock prices and inflation rate with stock prices in Pakistan. However, we found no causality between variables for post-financial crisis 2007-8 during present study.*

**Keywords** Financial Crisis, Gold Prices, Inflation Rate, Money Supply, Pakistan Stock Market, Real Effective Exchange Rate, Pakistan Stock Prices.

### **Introduction**

In the last few decades, many researchers discussed the macroeconomic and financial factors in the capital market of a country,

(Michara, 2010). Oil price from which is considered as the main factor which affects countries which import but also impact such countries which produce it, (Kose & Unal, 2020). In united states, the financial crisis 2007 starts have a global impact within a short era of time which effect on the economic system and economic and financial activities of the world, (Arif et al, 2017). While this may be true, there is a market called stock market (SM), where buyer and seller meet to exchange securities with each other. Similarly, the stock exchange is represented as an efficient market or organized platform where buyer and seller exchange equity securities or publicly held corporation are transacted (Srinivasan & Prakasam, 2014).

A Stock market (SM) acting the key part in the economic advancement, growth and development of any country. On contrary, the general performance of the SM is reflecting by the performance of the Stock prices (SP), Nordin, (2020). Stock exchange performance could detect the economic health of the country because the index value of the stock market represents how well most successful companies of the country are performing. As the stock prices fall than the prices of gold increase, uncertainty in the economic environment attract investment in gold as a haven, (Graham Smith, 2016). The fluctuation in the index return indicates a risk to investor of the SM as well as to a country as a whole. Accurate understanding related to the stock market with macro-economic variables that are important and very beneficial and play a vital role for policymakers, regulators and businesses to great thought about current stock market policies. There is a more significant impact of a macroeconomic variable when there has an increase in oil prices, (Harrera , et al 2011) Obviously, investors have knowledge about such relationship in the stock market then such information and knowledge assists investor to do better decision and remove risk exposure of their investment (Hara shah& Abu 2011; Dwumfour & Addy (2019).

There are variations found in the stock market every day because there are so many market forces, which affect stock prices. Rising commodity prices will affect the buying power of the country as well

as individuals, in this situation investor withdraw funds to meet their expenses, similarly, stock prices will decline in the capital market, (Saqib, 2017). Variability of one market on the other is not a new thing. By an example, we say that if the prices of interest-rate increase it harms for companies and individuals to invest in stocks rather than to deposit because it is a safe decision for the investor, which has a low level of risk for any lose, (Mulyani, 2014; Shuangqun, 2017). Likewise, an increase in the gold price also affects the investor risk because investor takes many positions to hedge its risk. It is important to detect those factors which affect the stock market prices and then to see its degree of long- and short-term impact and co-movement among these factors and stock exchange. The basic parameter in an economy is money supply (MS), as the rise in money supply leading to the moved up in stock prices, circulation of money increase investment in the stock market, (Hussam et al, 2017).

In a context of Pakistan, many factors has still not studied yet to see the impacts on Pakistan stock market prices. Such as, Inflation rate which has discussed by few researchers and on the other hand money supply which is also a valuable factor regarding the impact on stock prices have not discussed in detail so there has still gap in the scenario of Pakistan. Second according to our best knowledge, there have no any pre, between and post-study conducted based on the financial crisis. Therefore, this study used this factor in different economic conditions. Therefore, the present study analyzing that what is the relation between oil prices, gold prices, real effective exchange rate, money supply and interest rate with Pakistan stock market (PSX)? The current study purpose is examine the relation of long term and short-term connection between the Stock prices and gold prices, Inflation Rate, Oil price, real effective exchange rate and money supply, to observe the effect in stock prices by gold prices, Inflation rate, money supply, exchange rate and oil prices on Pakistan stock prices PSP. These stock market drivers have a key significance for policymakers to formulate effective financial market policies. This could also help predict the behavior of the SM upon the movement in this determinant.

## **Literature Review**

The stock exchange is a market that is considered and including an important aspect for economic progress to any Country because the economic condition of the country has based on its companies operated in the country. If its performance is well, it has considered that the health of the country is good. Similarly, the stock market is place where equity securities trade have operated between buyer and seller. There are many changes have seen in SM because these factor vary in market. As changes Gold Price, oil prices, inflation and exchange rate, money supply (MS), are important Macro-Economic elements affect the prices of the stocks in market. Therefore, we give below the work on research prior and review it for our study.

Lim, Brooks, & Kim, (2008) Established that the impact of prior financial crisis damage the prices of stock. Their study is based on financial crises held in 1997 by taking 8 Asian stock markets and found 1997 crisis has badly influence and occur crisis on stock market. (Mishra, Das, & Mishra, 2010) depicted the volatility in stock prices by seeing the effect of prices of gold and return of stocks exchange for India taken as DSE 100 index. Their findings show that the prices of gold and the prices of stock market has strongly caused each other.

Goudarzi & Ramanarayanan, (2011) studied done on Indian stock with the foreign institution by using monthly data.. They found co- integration & bilateral causality b/w Indian stock and foreign institution investment. (A. I. I. Hunjra, M. Azam, G. S. K. Niazi, B. Z. Butt, & R. I. Azam, 2011) analyzed the relation of risk & return with stock prices and commodity prices for Pakistan over the period from 1998 to 2008 and show that commodity market seasonally affects stock prices.

Bekhet & Mugableh, (2012) conducted the research on Malaysia from 1977 to 2011 by taking Malaysian stock index of market variable as dependent and PPI (producer prices index), GDP, CPI (consumer prices index), exchange rate and Money supply as an independent variable. They concluded that GDP has a positive and significant effect on stock prices index whereas PPI, CPI, MS and

effective exchange rate has negative but significant effect on the stock index in Malaysian market.

Baig, Shahbaz, Imran, Jabbar, & Ain, (2013) explored a relation to depict the effect of oil prices and gold price with (KSE 100-index) of Pakistan. They found no significant connection present for the long term between stock prices and oil and gold prices. (Naik, 2013) Conducted a study in India from 1994 to 2011 by taking dependent variable Bombay stock index and index of industrial production, money supply, Inflation rate, Short run interest rate and effective exchange rate as an independent variable. He concluded that money supply have positive effect on IPI (industrial production index) inflation have significant and negative moreover insignificant results are found among interest rate & exchange rate.(Bilal, Talib, Haq, Khan, & Naveed, 2013) used the co-integration test to describe that there is no long-term relationship of gold prices in KSE index. Their results show that there have significant relationship between gold price and stock price in Pakistan and India from 2005 to 2011.(Basit, 2013a) showed the effect of KSE 100 with oil & gold prices for Pakistan by taking oil prices and gold price and run on KSE 100. They used 2005 to 2011 6-year data. They applied simple regression models and present no any association b/w oil and gold price with KSE 100-index.

Srinivasan & Prakasam, (2014) Studied the exchange rate & gold prices for the sample of India taken duration from 1990 to 1914. Their finding concluded no any relation b/w gold with stock prices. (Kurihara, 2016) Studied done on stock price, foreign reserve, interest & exchange for developed & advanced Economies in Asia. They used annual data from 1980 to 2015. Results show no any co integration b/w these variables except foreign exchange reserve which has positive & significant effect on stock.

Arfaoui & Ben Rejeb, (2017) Conducted a study on the global context where they presented that oil prices, prices of gold, US dollar and SP stock price have a direct and indirect link. They use data for 1995-2015. Results found that there have the negative affect b/w price of gold and oil price whereas oil has significantly affected by gold prices & USD dollar.

Rahman & Mustafa, (2018) analyzed the changes due to gold & crude oil prices for a duration 1986 to 2016. They found long run relation of price of gold & crude oil with stock price in the USA. (Al-Ameer, Hammad, Ismail, & Hamdan, 2018) studied to find the long-term relationship between two main variables HDAX index and gold prices. He found a long-run relationship between variables for all four-time periods. ((Tursoy & Faisal, 2018) explored the changes and effect of prices of gold & oil prices on the stock market for the case of turkey. There finding depicts the short- and long-term association b/w crude oil prices and stocks & negative relationship of gold and stocks.

Dwumfour & Addy (2019) Described the effect of Interest rate and effective exchange rate disclosure with portfolio stock return for Ghana stock exchange (GSE). Results showed a direct effect of the financial crisis on return (Singhal, Choudhary, & Biswal, 2019) Explored the linkages of Return and Volatility in Mexico by taking dependent variables as Stock Prices and Exchange Rate and independent variables as Gold price and Oil prices for the period of 2006 up to 2018. They found a significant association between gold & stocks & insignificant association with oil& stock prices.

Fig. 1 shows the conceptual framework of this study. The dependent variable in current research is Pakistan stock prices in market that is link with oil price, Inflation rate, gold prices, money supply (MS) and real effective exchange rate.

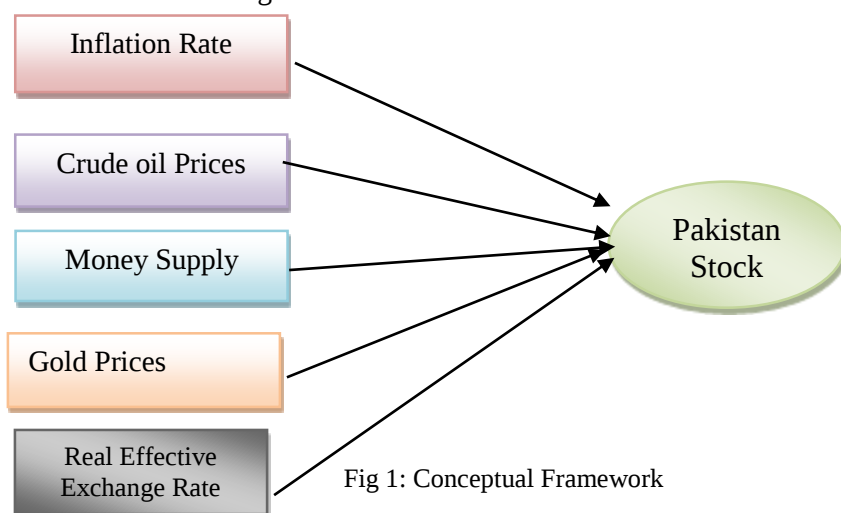


Fig 1: Conceptual Framework

Based on the considered from the literature review above, we construct the subsequent hypothesis for the current study.

**H1:** There is significant relation exist between crude oil price and Pakistan stock prices.

**H2:** There is significant relation exist between gold price and Pakistan stock prices.

**H3:** There is significant relation exist between Inflation rate and Pakistan stock prices

**H4:** There is significant relation exist between money supply and Pakistan stock prices.

**H5:** There is significant relation exist between REER and Pakistan stock prices.

## **Research Methodology**

This study analyzed the key factor and determinants of the Pakistan SM. The researcher used Secondary data and data is taking from the website of investing index.com, mundi.com and yahoo finance. Money supply data take from state bank in Pakistan website. In this research, we used 19-year monthly data from 1999 to 2018. The duration of this study is dividing into three-segment pre-financial crisis that has taken from 1999 to 2006 respectively, between financial crises has taken from 2007 to 2010 and post financial crisis has taken from 2011 to 2018. Sample for the study is Pakistan stock exchange (PSX). The data had run separately by every three segments. By taking stock prices of Pakistan to identify the investment to the safe investor all around Pakistan and provide protection for their investment because investors in Pakistan are usually taking different position while doing an investment.

This study based on quantitative method, specifically the type of the study is co-relational by correlation it means that the researcher has to test the cause independent variable in Pakistan stock prices due to independent variables gold prices, oil prices, real effective exchange

rate, Inflation rate, and MS money supply. Following table below represents the variables, their construction, and data source. The variables of the study are below.

Table 1: Variables Description

| <b>Variables -Their Representation and Construction</b> |                        |                                 |
|---------------------------------------------------------|------------------------|---------------------------------|
| <b>Variables Name</b>                                   | <b>Variables Proxy</b> | <b>Variables Measurement</b>    |
| KSE 100 Index                                           | PSP                    | Monthly Stock Price of PSX      |
| Inflation Rate                                          | IR                     | Monthly Inflation Rate          |
| Oil prices                                              | OILP                   | Barrels of oil spot prices      |
| Gold Prices                                             | GLDP                   | Per Troy Ounce                  |
| Real Effective Exchange Rate                            | REER                   | Monthly Exchange Rate           |
| Money Supply                                            | MS                     | M1 = Currency + Demand Deposits |

For estimation of the model, the basic logarithmic model has specified as:

$$LPSP = \alpha_1 + \beta_1 LGLDP + \beta_2 LOILP + \beta_3 LIFR + \beta_4 LREER + \beta_5 LMS + e_t$$

Where, LPSP = (log) KSE 100 index, LGLDP = (log) gold price, LOILP = (log) oil price, LIFR = log of inflation rate, LREER = (log) of real effective exchange rate, LMS log of money supply,  $e_t$  = random term for error, last  $t$  = times subscript.

There the statistical method used in this study is the unit root test. The test of unit root has taken into consideration to check the stationary and non-stationary of each variable separately. Based on the real results there has further test will be applying on given data. The study used the

ADF augmented dickey fuller and Phillip Peron test. Where following hypothesis has developed which are describe as

(H0) the null hypothesis of the time series data are usually have a unit root which also means that the data is non stationary.

If the probability or p-value  $> 5\%$  we usually accept the (H0) null hypothesis and reject the (H1) alternate hypothesis.

(H1) the alternate hypothesis of the time series data usually have unit root that has also called stationary data.

Similarly, If the probability or p-value  $< 5\%$  reject the null hypothesis in favor of (H1) alternate hypothesis.

Johnson co-integration test tells the long period and short period relationship of variables. Accordingly, the test has classified as two types that are trace test and the eigenvalue test both of them have same hypothesis. Following equation has created from where the null and alternate hypothesis has generated to test the results of Johnson co-integration

For the null hypothesis (H0): There have no co-integration b/w variables

Therefore, when the probability or p value  $> 5\%$ , similarly then null hypothesis (H0) for co-integration is accepted and the alternate hypothesis (H1) has rejected.

For alternate hypothesis (H1): usually there has co-integration b/w variables.

Therefore, when the probability or p value  $< 5\%$ , similarly then reject the null hypothesis (H0) and alternate hypothesis (H1) has accepted.

After it, the researcher put the granger causality test that provides the base regarding the cause and effect between variables. The statistical software used in this study is E-views and micro fit.

(H0): The null hypothesis described that there has no cause and effect or granger causality between two variable. Whereas accept and rejection of the hypothesis has based on the p value.

Therefore, when the probability or p value  $> 5\%$ , then null hypothesis (H0) is accepted and reject (H1) alternate hypothesis for two variable in granger causality test.

(H1): As compared to the null hypothesis, the alternate hypothesis (H1) explained that there have cause and effect between two variable in granger causality test.

Therefore, when the probability are p value  $< 5\%$ , the null hypothesis (H0) in a given study is rejected in favor of alternate hypothesis (H1).

## Results and Discussion

Table 2 (a) below contains empirical results about the descriptive statistics for all variables for pre-financial crisis 2007-8 in which it generally shows the normality of variables data. When we see the table the p-value of PSP, GLDP, INFR, REER, OILP and MS are is insignificant and normal because there has no evidence that support to reject the null hypothesis from the given study.

**Table 2 (a): Descriptive statistics**

|              | <b>PSP</b>   | <b>GLDP</b>  | <b>OILP</b>  | <b>INFR</b>  | <b>REER</b>  | <b>MS</b>    |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Mean         | 9.017        | 9.923        | 4.397        | -3.053       | 4.066        | 13.077       |
| Median       | 7.812        | 9.872        | 4.490        | -3.132       | 4.085        | 12.980       |
| Max          | 9.348        | 10.610       | 5.239        | -2.198       | 4.161        | 13.681       |
| Min          | 6.803        | 9.453        | 2.917        | -4.262       | 3.939        | 12.569       |
| Std. D       | 0.803        | 0.309        | 0.582        | 0.496        | 1.054        | 0.322        |
| Skeweness    | 0.267        | 0.477        | -0.394       | -0.183       | -1.160       | 0.077        |
| Kurtosis     | 1.577        | 2.345        | 2.196        | 2.201        | 3.706        | 1.809        |
| Jarque B     | 9.238        | 5.349        | 5.069        | 3.086        | 3.532        | 5.761        |
| Pro          | <b>0.109</b> | <b>0.168</b> | <b>0.179</b> | <b>0.213</b> | <b>0.108</b> | <b>0.156</b> |
| Observations | 96           | 96           | 96           | 96           | 96           | 96           |

Table 2 (b) below describes the empirical results of descriptive statistics of variable data for between financial crises 2007-8. In which the P values of PSP, GLDP, INFR and MS are insignificant therefore, we concluded that data is normal and OILP and REER are significant.

**Table 2 (b):** Descriptive statistics (Between Financial Crisis)

|              | <b>PSP</b>   | <b>GLDP</b>  | <b>OILP</b>  | <b>INFR</b>  | <b>REER</b>  | <b>MS</b>    |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Mean         | 9.235        | 11.12        | 4.884        | -2.055       | 4.343        | 13.910       |
| Median       | 9.240        | 11.11        | 4.877        | -2.036       | 4.400        | 13.931       |
| Max          | 9.624        | 11.68        | 5.454        | -1.373       | 4.453        | 14.242       |
| Min          | 8.589        | 10.55        | 3.974        | -2.753       | 4.100        | 13.634       |
| Std. D       | 0.259        | 0.346        | 0.314        | 0.408        | 0.128        | 0.176        |
| Skeweness    | -0.566       | -0.136       | -0.763       | 0.010        | -0.974       | -0.079       |
| Kurtosiss    | 2.893        | 1.864        | 3.864        | 2.027        | 2.262        | 1.946        |
| Jarque B     | 2.586        | 2.728        | 6.152        | 1.893        | 8.678        | 2.269        |
| Pro          | <b>0.274</b> | <b>0.255</b> | <b>0.046</b> | <b>0.387</b> | <b>0.013</b> | <b>0.321</b> |
| Observations | 48           | 48           | 48           | 48           | 48           | 48           |

Table 2 (c) below contains the empirical results of descriptive statistics of variable data for post-financial crises, where the P values of PSP, GLDP, INFR, OILP, REER, MS are insignificant so the data are normality distributed.

**Table 2 (c):** Descriptive statistics (Post Financial Crisis)

|              | <b>PSP</b>    | <b>GLDP</b>  | <b>OILP</b>  | <b>INFR</b>  | <b>REER</b>  | <b>MS</b>    |
|--------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Mean         | 10.189        | 11.825       | 5.303        | -2.868       | 4.631        | 14.73        |
| Median       | 10.349        | 11.807       | 5.495        | -2.843       | 4.638        | 14.67        |
| Max          | 10.831        | 12.068       | 5.778        | -1.972       | 4.940        | 15.34        |
| Min          | 9.312         | 11.632       | 4.598        | -4.327       | 4.454        | 14.21        |
| Std. D       | 0.477         | 0.104        | 0.383        | 0.544        | 0.090        | 0.349        |
| Skeweness    | -0.550        | 0.223        | -0.679       | 0.312        | 0.922        | 0.168        |
| Kurtosiss    | 1.895         | 2.197        | 1.791        | 2.444        | 5.231        | 1.705        |
| Jerque B     | 9.739         | 3.368        | 13.23        | 2.791        | 33.524       | 7.164        |
| Pro          | <b>0.1007</b> | <b>0.185</b> | <b>0.101</b> | <b>0.247</b> | <b>0.101</b> | <b>0.127</b> |
| Observations | 96            | 96           | 96           | 96           | 96           | 96           |

Table 3 (a) result shown that the (H0) null hypothesis where  $R=0$  show Zero co-integration and (H1) alternate hypothesis  $R=1$  show One co-integration at least at 5 % and 1 % significance level and which is only acceptable when both the trace test & max Eigen test value is greater from both 5 % and 1 % value of critical bound. As when we see the 1 % significance only trace test, we accept our alternate hypothesis in favor of null because the trace test value  $136.53 > 103.18$  and two co-integration the Eigenvalue is significant. Afterwards, both 5 % and 1 % significance level as trace test value  $94.96 > 68.52$  &  $76.07$  accept the second alternative hypothesis of two integration. therefore, we concluded that both test show three co-integration at 5 % significance level and Eigen test value three co-integration at 1 % significance level and by Eigenvalue it can be concluded that no co-integration at zero and one. Therefore, we have a reason to tell that the prices of gold and the prices of oil have an influence on SMP. To seeing, the effect of an independent variable on the dependent variable we see table of the normalized coefficient for the long run and short.

**Table 3 (a): Multivariate Co-Integration**

| <b>Pre financial crisis</b> |       |            |       |        |
|-----------------------------|-------|------------|-------|--------|
| <b>Trace tests</b>          |       |            |       |        |
| H0                          | H1    | Trace Test | 95%   | 99%    |
| $r=0^{**}$                  | $r=1$ | 136.53     | 94.15 | 103.18 |
| $r \leq 1^{**}$             | $r=2$ | 94.96      | 68.52 | 76.07  |
| $r \leq 2^{**}$             | $r=3$ | 59.82      | 47.21 | 54.46  |
| $r \leq 3$                  | $r=4$ | 26.935     | 29.68 | 35.65  |
| <b>Trace tests</b>          |       |            |       |        |
| H0                          | H1    | Trace Test | 95%   | 99%    |
| $r=0^*$                     | $r=1$ | 41.57      | 39.37 | 45.10  |
| $r \leq 1^*$                | $r=2$ | 35.14      | 33.46 | 38.77  |
| $r \leq 2^{**}$             | $r=3$ | 32.88      | 27.07 | 32.24  |
| $r \leq 3$                  | $r=4$ | 15.60      | 20.97 | 25.52  |

In Table 3 (b) below, we analyzed our result for a data variable to see the co-integration in between financial crises where our data show one co-integration when we seeing both trace test and test of Eigen value. Because, value of both tests are greater to its value of critical bound 5% and 1 % significance level. Therefore, we concluded that our model has an impact on stock prices in between financial crisis.

**Table 3 (b):** Multivariate Co-Integration (Between financial Crisis)

| Pre-Financial Crisis |       |            |       |        |
|----------------------|-------|------------|-------|--------|
| Trace Tests          |       |            |       |        |
| H0                   | H1    | Trace Test | 95%   | 99%    |
| $r=0^{**}$           | $r=1$ | 160.35     | 94.15 | 103.18 |
| $r\leq 1^{**}$       | $r=2$ | 99.782     | 68.52 | 76.07  |
| $r\leq 2^{**}$       | $r=3$ | 6.3010     | 47.21 | 54.46  |
| $r\leq 3$            | $r=4$ | 26.074     | 29.68 | 35.65  |
| Trace Tests          |       |            |       |        |
| H1                   | H1    | Trace Test | 95%   | 99%    |
| $r=0^*$              | $r=1$ | 39.37      | 39.37 | 45.10  |
| $r\leq 1^*$          | $r=2$ | 33.46      | 33.46 | 38.77  |
| $r\leq 2^{**}$       | $r=3$ | 27.07      | 27.07 | 32.24  |
| $r\leq 3$            | $r=4$ | 20.97      | 20.97 | 25.52  |

The table 3 (c) contains the co-integration results for post-financial crisis 2007-8 in which both Eigenvalue and Trace test confirm one co-integration and 5 % and 1 % significance level and two co-integration at 5 % significance level. Therefore, our model has an impact on stock prices for post-financial crisis.

**Table 3 (c):** Multivariate Co-Integration (Post- Financial Crisis)

| Post- Financial Crisis |       |            |       |        |
|------------------------|-------|------------|-------|--------|
| Trace Tests            |       |            |       |        |
| H0                     | H1    | Trace Test | 95%   | 99%    |
| $r=0^{**}$             | $r=1$ | 128.75     | 94.15 | 103.18 |
| $r\leq 1^{**}$         | $r=2$ | 72.767     | 68.52 | 76.07  |
| $r\leq 2^{**}$         | $r=3$ | 38.871     | 47.21 | 54.46  |
| $r\leq 3$              | $r=4$ | 17.362     | 29.68 | 35.65  |

| Trace Tests    |       |            |       |       |
|----------------|-------|------------|-------|-------|
| H0             | H1    | Trace Test | 95%   | 99%   |
| $r=0^*$        | $r=1$ | 55.98      | 39.37 | 45.10 |
| $r\leq 1^*$    | $r=2$ | 33.78      | 33.46 | 38.77 |
| $r\leq 2^{**}$ | $r=3$ | 21.51      | 27.07 | 32.24 |
| $r\leq 3$      | $r=4$ | 11.92      | 20.97 | 25.52 |

Table 4 (a) below shown that the results of pre-financial crisis 2007-8 for long run and short when we see the long run Johnson normalized coefficient approve Gold, Oil price, effective exchange rate and MS has reported as insignificant that shows the variable cannot affect SP for the long period. When we see that IR that significantly impact prices of stocks for example inflation rate has increased by 1 % stock prices is also increase by 0.25 %. When we see the short-run price of oil and IR are insignificant and price of gold, exchange rate & money supply are significant for short term and positive relationship.

**Table 4 (a):** Normalized Short Run Co-Integration (Pre-Financial Crisis)

| Normalized Long Run Adjusted Short Run Co-efficient based on Johansson Approach (Pre Financial Crisis) |                       |             |          |                     |               |
|--------------------------------------------------------------------------------------------------------|-----------------------|-------------|----------|---------------------|---------------|
| Dependent Variable PSP                                                                                 |                       |             |          |                     |               |
| Variable                                                                                               | Coefficient           | Decision    | Variable | Coefficient         | Decision      |
| GLDP                                                                                                   | $(-0.0789)$<br>0.3107 | Significant | GLDP     | $(0.132)$<br>0.0423 | Insignificant |
| OILP                                                                                                   | $(-0.0677)$<br>0.1158 | Significant | OILP     | $(0.022)$<br>0.042  | Significant   |
| REER                                                                                                   | $(4.6207)$<br>0.1158  | Significant | REER     | $(0.005)$<br>0.009  | Significant   |
| INFR                                                                                                   | $(0.2507)$<br>0.0823  | Significant | INFR     | $(-0.227)$<br>0.168 | Significant   |
| MS                                                                                                     | $(-3.211)$<br>0.5479  | Significant | MS       | $(0.036)$<br>0.052  | Significant   |

Table 4 (b) below show the results for between financial crises in which we found that gold, REER and MS don't report a long period relation with SM in Pakistan. When we see price of oil and IR the p value are signs that show that when oil prices increase by 1 % than SP decrease by -0.67 % and when the inflation rate has increased by 1 %

stock prices is decrease by -0.097 in Pakistan. When we see short-run coefficient exchange rate is significant and positive and the money supply is significantly negatively affect stock prices for the short run.

**Table 4 (b):** Normalized Short Run Co-Integration (Between Financial Crisis)

| <b>Normalized Long Run adjusted Short Run Co-efficient based on Johansson Approach (Between Financial Crisis)</b> |                       |                 |                 |                       |                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|-----------------|-----------------------|-----------------|
| <b>Dependent Variable PSP</b>                                                                                     |                       |                 |                 |                       |                 |
| <b>Variable</b>                                                                                                   | <b>Coefficient</b>    | <b>Decision</b> | <b>Variable</b> | <b>Coefficient</b>    | <b>Decision</b> |
| GLDP                                                                                                              | $(-1.2451)$<br>0.1559 | Significant     | GLDP            | $(0.1478)$<br>0.1115  | Insignificant   |
| OILP                                                                                                              | $(-0.6759)$<br>0.0402 | Significant     | OILP            | $(0.7313)$<br>0.3570  | Significant     |
| REER                                                                                                              | $(3.0724)$<br>0.2489  | Significant     | REER            | $(0.0107)$<br>0.0429  | Significant     |
| INFR                                                                                                              | $(-0.0972)$<br>0.0352 | Significant     | INFR            | $(-0.1474)$<br>0.2894 | Significant     |
| MS                                                                                                                | $(0.5170)$<br>0.2946  | Significant     | MS              | $(-0.0354)$<br>0.0804 | Significant     |

Table 4 (c) results show the results for post-financial crisis 2007-8 where no variable is significant with the SP in Pakistan. The results show that all the variables are significant in short period and only MS is positively affected stock prices other negatively affect stock prices.

**Table 4 (c):** Normalized Short Run Co-Integration (Post Financial Crisis)

| <b>Normalized Long Run adjusted Short Run Co-efficient based on Johansson Approach (Post Financial Crisis)</b> |                       |                 |                 |                        |                 |
|----------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|-----------------|------------------------|-----------------|
| <b>Dependent Variable PSP</b>                                                                                  |                       |                 |                 |                        |                 |
| <b>Variable</b>                                                                                                | <b>Coefficient</b>    | <b>Decision</b> | <b>Variable</b> | <b>Coefficient</b>     | <b>Decision</b> |
| GLDP                                                                                                           | $(44.373)$<br>5.5991  | Significant     | GLDP            | $(-0.01082)$<br>0.0018 | Insignificant   |
| OILP                                                                                                           | $(15.654)$<br>2.4136  | Significant     | OILP            | $(-0.0002)$<br>0.0054  | Significant     |
| REER                                                                                                           | $(-15.596)$<br>8.5146 | Significant     | REER            | $(-0.0010)$<br>0.0009  | Significant     |
| INFR                                                                                                           | $(-6.2872)$<br>1.1214 | Significant     | INFR            | $(-0.01679)$<br>0.0009 | Significant     |
| MS                                                                                                             | $(-19.375)$<br>2.8674 | Significant     | MS              | $(0.0042)$<br>0.0016   | Significant     |

After discussing the normalized results for long period and short period coefficient, there we analyzed the causality test of granger that necessary to check cause and effect and direction between variable dependent and independent.

## **Conclusion and policy implication**

In this study, we analyzed long period and short period coefficient based on Johnson multivariate co-integration for pre-financial crisis 2007-8. In this study Inflation rate has, significant and positive related with Pakistan SP for the short period and gold price, effective exchange rate and money supply MS is significant for short-run, and it shows a positive relationship with stock prices in Pakistan. We found significant and positive relation of oil price and inflation rate for between financial crisis and long run, for short-run coefficient exchange rate is significant and positive, and money supply is significantly negatively affected Pakistan stock prices for short-run for the pre-financial crisis. Our results for post-financial crisis 2007-8, where no variable are significant with the stock price in Pakistan and all the variables are significant only for short period but the money supply is positively affected stock prices other are negatively affect stock prices. Our results are match with, (Liaquat et al., 2017; Kose & Unal, 2020; Rasheed et al, 2020; Parab & Reddy, 2020).

This study has many policy implications as; first, the attention should devoted toward the money supply in case of Pakistan, because money supply has significantly and positively affecting the Pakistan stock prices PSP. One of increase in the money supply could be the Pakistan continuous Fiscal deficit due to which Government Issue T-bills that increase the money supply in the market so Pakistan could control the money supply by collecting more tax revenue or through any other debt apart from issuing T-bills to cover the fiscal deficit.

Second, the attention should be giving to IR because IR is affecting the stock market prices. Pakistan country should maintain the inflation rate, to reduce the volatility in the stock market prices.

Third, Gold prices found to be negatively affecting stock market prices, so currently in Pakistan gold prices are decreasing so policy should pay attention to this fact to reduce the stock market prices.

Fourth, the real effective exchange rate had found to be negatively affecting Pakistan. Pakistan policymakers should pay attention to it, to manage the stock market prices.

Fifth, the study delivers some signals about fiscal & monetary policies allowing for pressure creation by prices of oil on SMP. The study clears that the influence of OP fluctuation in Pakistan stock prices. Therefore, it should control and maintain as the most volatile and important factor that shows significant role in creating fluctuation in stock prices.

Sixth, the research finding implicated that the study aid some constructing regarding portfolio strategies to investor & for other people who active in the financial & commodity market because the cause and effect regarding all macroeconomic variable are established for Pakistan stock prices.

Seventh, the study provides some expertise about the macroeconomic variable now the investor keep in mind while investing on these variables and would considered although the stock market is best for investment or gold price, oil price, etc. are safe.

Finally, the study is beneficial for the risk-averse investor if they want to mark portfolios that reduce the systematic risk that they can diversify by making portfolios, investing all these are some of the concern variables that be the best portfolio to mitigate risk for the investor.

The present study sees the relationship of Macro-economic variable with Pakistan stock prices (PSP), where some variables has shown to be affecting stock prices in Pakistan and some are not employed any effect. Future research can done by adding more variables like country risk, gas prices etc. Hereinafter except the macro-economic variable, some socio and political factor has also taken into consideration that

includes government stability, internal and external conflict, Democracy, and political instability etc.

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