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DYNAMIC NEXUS AMONG GOLD PRICE, EXCHANGE RATES, AND EQUITY RETURN OF PAKISTAN

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ABSTRACT

This paper investigated the relationship between the gold price and the exchange rate on the equity return of Pakistan. The equity market provides an opportunity for investors to capitalize on diverse markets and expand their investment portfolio. This paper consisted of monthly Gold prices in the US dollar; monthly exchange rates of US dollar in terms of Pakistani Rupee and stock market index were taken for the period of January 2010 to December 2019. The unit root is used for the stationary test, Cointegration, Granger Causality test for a lead-lag relationship. The empirical result shows that exchange rates and stock prices data series are non-stationery and integrated of order one. The result showed that there is a long-run relationship between stock price and exchange rate and gold price. Finally, we applied a Granger causality test to find out and the casual relationship among gold price, exchange rate, and stock prices. Outcomes show that there is no causal relationship between stock price and exchange rate. However, there is a causal relationship between stock price and gold price.

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1. INTRODUCTION

Equity market plays a very imperative position in a country's economic and financial system due to the fact that it collects, assembles and allocates local wherewithal and directs them towards the dynamic investments. Hence, due to this resource allocation function, it shares a significant association with the overall economy. Besides the allocation of resources at the right places to ensure optimum use, equity markets in any economic system act as an effective and interactive medium through which local and foreign investors can interact with each other. Mobilization of the equity in the form of financial resources is made from lenders to borrowers on such platforms. As per Pervaiz et al. (2018), the investigation of previously mentioned factors is significant enough to dissect the presentation of the stocks. While, on the opposite side, expanding the development and

significance of financial exchange has likewise opened another skyline for the analysts. In such a manner, the causal connection between macroeconomic variables and instability in financial exchange returns is the piece of numerous looks into. As a result of it, the markets have made momentous development and enhancement of strength and volume. Investors, economists, policymakers and financial analysts have done extensive research and made substantial efforts to comprehend the dynamic and multidirectional interaction between equity prices and major economic indicators. Still, there is a strong need to further explore those dynamic relationships among macroeconomic variables of Asian states and their equity prices.

Equity markets are considered as the prime drivers that play an active part in moving the funds from lenders to borrowers for the development of the economy. In general, the exchange of equity is likely to accelerate economic development by facilitating the liquidation process of financial assets. Furthermore, it also assists in the diversification of the risk at the global platform as it provides the opportunity to international investors to invest in different markets and diversify their investment portfolio. Nonetheless, due to the prevailing uncertainty in the microenvironment of these developing countries, international investors feel hindered while entering in these stock markets.

The underlying Paper would examine whether a statistically momentous relationship prevails amid the exchange rate, gold price and Pakistani equity market or not. The study would also consider the impact of uncertain and unpredictable circumstances on that relationship. In addition, the research seeks to explore whether the recent variations in the equity stock market from the past few years are the result of fluctuations in the macroeconomic environment of the country or there are some other factors responsible for volatility. The shock of the financial crisis on the returns from the Pakistani equity market would also be analyzed to underline the major factors that have the strongest influence. In order to execute the research, the research has selected prime economic indicators that play a very vital role in shaping the economy of Pakistan.

Zamir *et al.* (2017), the exchange rate means the rate at which ones' money is exchanged for a substitute. As it were the expense of a country's money in wording to a substitute country is the exchange rate. It is also seen as the valuation of one country's money as far as to substitute cash and the proportion of units of money that can purchase a proportion of units of money. The Nominal exchange rate is a rate at which the overall costs of the two amounts of money or monetary standards are estimated, for example, Rupee in connection to the US Dollar. Subsequently, the ostensible exchange rate is a money related idea, while the real exchange rate is without a doubt seen as a genuine idea.

Equity markets provide the opportunity for investors to capitalize on diverse markets and expand their investment portfolios at the international stage. Moreover, the exchange of equity accelerates economic development by facilitating the liquidation process of financial assets. It is a place that enables parties to trade or market the shares either over the counter or through an exchange phenomenon. The future cash flows' net present value of any enterprise based on market price. In general, it is a place that presents the future of major and minor companies in the form of cash flows discounted to the present date. It is considered as the vital component of a market economy as it enables the local individuals and foreign investors to get a small percentage of ownership in an organization. Afterward, they would be entitled to profits of that company provided

the performance of that organization remains satisfactory in the future. We can split the whole equity market into two subclasses, the primary market as one class and the secondary market as other class. The primary market contracts with the trading of shares that are being sold and purchased for the first time. After the first purchase, if someone wants to sell or exchange it, then the shares would be traded on the secondary market.

1.1 PAKISTAN STOCK EXCHANGE

Pakistan Stock Exchange, established in 1947, was formally incorporated in 1949 under the name of Karachi Stock Exchange. The second stock exchange was established in 1970 in Lahore to full fill the needs of stock trading. To cater to the investors of the northern parts of the country Islamabad Stock Exchange was established. These three stock exchanges had separate indices, management, and trading interfaces and had no mutual structure so these exchanges are integrated their operation in January 2016 under the new name Pakistan Stock Exchange (PSX).

PSX has made gigantic strolls in its history, having a small presence of five listed companies from the outset with a total paid-up capital of Rs 37 Mn. In 1960 there were 81 companies with a market capitalization of Rs 1.8 Bn whereas now there are 546 companies listed with a market capitalization of Rs 7.692 Tn. The listed companies consist of 35 sectors.

1.2 GOLD PRICES AND EQUITY RETURN

If an investor chooses to capitalize on the stock, then the investor would get a return on invested. Whereas, if an investor decides to invest in gold, s/he would be storing the return on invested value. Bonds and stocks function efficiently when there is stability in the economic and political environment of that region. In instability prevails, then it would be better to store the value instead of getting a lower return due to bad economic conditions.

1.3 EXCHANGE RATE AND EQUITY RETURN

If the currency of a local market appreciates its value, then the market would gain the attraction of various investors. It would increase the overall demand for equity in the stock exchange market, consequently increasing the equity prices.

The underlying study has been executed with the following research objectives:

To examine if any long-run nexus prevails among Pakistan Stock Exchange, Exchange Rate and Gold Price.

2. LITURATURE REVIEW

Franck and Young (1972) confirmed that there is evidence of an insignificant relationship among macroeconomic variables and the equity market. However, Agarwal (1981) evidenced that an association prevails between the exchange rate of the US dollar and US equity price indices. A positive causal association was confirmed. Giovannini and Jorion (1987) showed agreement with the Franck & Young (1972) by proposing that the rate of exchange and USA equity price indices shared a positive correlation with each other. An interesting insight emerged during the review of literature when Smith (2001) explored the same relationships among the same variables in the same market and proposed clearly opposite results to the previously conducted studies by certifying a negative association between understudy variables. However, the difference prevailed because the researcher chose a different time frame than previously conducted studies.

Solnik (1987) reported no significant impact of the exchange rate prevails on the stock prices. The research has been done in a quite unique manner where the researcher has attempted to explore the influence of various major economic indicators including the rate of exchange on equity prices. The conclusion negated the probable existence of any association between two variables. Similarly, Jorion (1990) proved the association among the returns of the US stock market entailing huge multinationals and US dollar effective exchange rates, suggested a moderate association among both research variables.

A negative nexus between the equity market and the exchange rates Pakistan also maintained by Raza and Afshan (2017). Liang et al. (2013) utilized the board data approach to study the association between swapping scale and stock expense in ASEAN-5 countries and found that there exists a contrary association between the cheapening of the change scale and stock expenses.

In Asian countries, Zeng and Yang (2014) looked into the association between transformation scale and stock expenses by using the quantile backslide approach. Results revealed that the change standard and stock expenses are antagonistically compared in nine Asian countries anyway quantile results showed that relationship is heterogeneous.

Muhammad et al. (2002) examined the relationship among some major money related markers and worth returns of huge South Asian countries including Pakistan, India, Sri-Lanka, and Bangladesh. Major financial markers consolidated the pace of exchange of all of these states. The assessment attested that no causal alliance wins among the pace of exchange and worth returns neither right now short-run in India and Pakistan. In any case, a bidirectional connection won among the Sri-Lanka and Bangladesh.

Bhattacharya and Mukherjee (2005) found no huge alliance wins among the transformation scale and stock expenses. The assessment was driven in the Indian setting, and experts examined the relationship by removing the data on macroeconomic components including the pace of exchange and worth expenses of the Indian market.

Nishat (2004) examined the short-run equilibrium relation among a different set of major economic indicators and the Karachi stock exchange index. Moreover, the contemporary era has witnessed a clear upsurge in the importance of the stock market that has consequently led the researchers worldwide to assess the association between economic growth and the development of the stock market. Right from the creation of this state, the nation has faced serious challenges in terms of resource allocation and economy. The socio-political instability has also caused major national troubles. These issues have prevented the country from understanding its true potential in the world economy. However, the country has consistently fought against all these problems. The government has formulated various economic reforms on liberal grounds as a solution. It comprises giving permission to foreign investors to invest in the local market.

The major fiscal variables that were not picked by the past researchers were studied at the present time. The assessment viewed the causal relationship among protections trade expenses and major money related markers from the timespan 1990 beyond what many would consider possible of 2008. The adjustment of trade, growing, pace of exchange and present-day creation record were assessed as standard examination factors, on the other hand, the general worth rundown was the specialist of stock exchange costs. In order to overview the Karachi Stock Exchange 100 rundown, the investigators used the Granger causality test. Results of the test uncovered in the correlational

relationship among the Pakistani stock exchange market and major budgetary pointers. Despite the Granger causality test, inspectors used the co-integrational model of Johansen close by unit root Augmented Dickey-Fuller test. Revelations of the assessment required consistency with the investigation coordinated by Nishat and Shaheen (2004).

Various sources have witnessed the association among major economic indicators and share prices in the US and other developed economies of the world (Gay, 2016). With regard to the developing economies, researchers and analysts are still confused, and the association between both variables lacks a piece of clear evidence due to the presence of other factors. Due to this fact, researchers advised conducting future research so to understand the reason behind this.

Maysami et al. (2004) investigated the Singapore equity market by assessing the short-run equilibrium association among the equity stock market index of Singapore and the prevailing major economic indicators. The equity market index consisted of the hotel index, the finance index as well as the property index. As defined earlier, one thing that defines the efficiency of the stock market is its power to deter the investor from making abnormal profits and allowing investors to earn profit through the use of instantly available stock market information. In such a market, the forecasts related to the movement in stock prices are made only on the basis of open information.

Khan (2018) analyzed the Turkish stock exchange to confirm the shock of a major economic factor on the equity returns of the Turkish exchange market. The study used a macroeconomic model and the economic indicators selected for the research were IPI, growth rate, variation in the consumer price index, variation in the rate of exchange, money supply, MSCI world equity index return, the rate of interest and international crude oil growth rate.

On the other hand, Hong Kong, Australia, and Thailand exhibited a causal unidirectional flow, which ran only from M1. Li (2003) attempted to explore the causal association between bond and stock returns. During the last four decades, the major trends have been documented for the first time in the bond-stock causal association for the G7 states. A similar pattern has been followed. Moreover, steady development has been witnessed, starting from scratch in the decade of 1960 to around 0.5 by the mid of 1990 decade.

Mishra (2004) analyzed the Indian Stock Exchange market by assessing the causal short term association among the major economic indicators and equity market. The variables included the rate of interest, foreign exchange rate, and money supply for 1992-2002. By using vector autoregression technique together with the Granger causality test on a monthly basis to explore the trend of the relation and figure out any proof for the uni-direction causality directing from the exchange rate to the demand for money and rate of interest, the result found absolutely no evidence for the granger causality among return on the foreign exchange rate and return on equity.

Hamidi et al. (2018) found that economic development mainly relies on the rate of interest and stock exchange market functionality. The influence of the rate of interest upon stock exchange offers satisfactory implications for practices related to risk management, valuation of financial securities, federal strategy towards the stock and bond market and overall state monetary policy. The research offers a significant empirical association among the rate of interest and stock index of 15 states comprising Venezuela, Chile, Spain, South Africa, Philippines, Mexico, Australia, Italy, Japan, Jamaica, Germany, Colombia, Canada, and Bangladesh. Moreover, the study extracted the data for 1988-2003 to seek the certification of the prevalence of efficiency in the share market.

Sohail and Hussain (2009) explored the short and since quite a while prior run relationship among the five noteworthy money related markers and Lahore stock exchange. Data were extracted for 2002-2008 on a month-to-month premise. The eventual outcomes of the examination recommended that from the beginning differentiation, the time game plan was stationary, and at the level, the time course of action was not stationary. The assessment prescribed that the customer esteem record and extension passed on a turnaround association with the stock return. On the other hand, the money supply and mechanical age had a positive effect in the short run. At any rate, the treasury charge rate (latest three months) had a positive yet immaterial effect in the short abrupt spike sought after for stock return. It was foreseen by the investigation that in order to control growth, account administrators are urged to get adequate money related exercises to lessen the assortment in the monetary trade. Pakistani capital markets are truly affected by the positive employment of mechanical age. Therefore, the game plan of the systems that help the stock expenses through mechanical age progression is proposed to the policymakers.

3. METHOD

This paper explores the dynamic interaction between economic variables and the equity market. In order to execute the research, the data were extracted for 2010-2018 on a monthly basis. This study chooses two macroeconomic variables including exchange rate and gold price. The reason for choosing the monthly basis data is to follow Chan & Faff (1998) as they explored the association among the capital market and exchange rate in the short-run by extracting the data on a monthly basis.

3.1 SOURCE OF DATA

The research seeks to assess the influence of macroeconomic indicators including gold prices and exchange rate on PSE 100 index for the time period starting from 2010 to 2019. Monthly data is collected from official websites of the relevant stock exchange, world Gold Council, Oanda, Yahoo Finance and Bloomberg.

3.2 MEASUREMENTS

3.2.1 EQUITY MARKET RETURNS

The underlying study has calculated the stock market return through

$$R_t = \ln (P_t / P_{t-1}) \quad (1).$$

The R_t indicates the return for the month represented as 't'; moreover, the P_t and P_{t-1} depict the closing Index values for the month 't' and 't-1' correspondingly.

3.2.2 CHANGE IN FOREIGN EXCHANGE RATE

The study has measured the variation in the foreign exchange rate by using the month-end Rupees / USD rate of exchange and the variation in value has been calculated through log differencing, viz.

$$\text{Exchange Rate} = \ln (\text{EXR}_t / \text{EXR}_{t-1}) \quad (2),$$

where the EX indicated the Exchange Rate of Rupees /USD

4. RESULT AND DISCUSSION

4.1 DESCRIPTIVE STATISTICS

Table 1 shows the descriptive statistic for this research. It is clearly presented that the Karachi Stock Exchange result of standard deviation amounts to 9.02 percent. Whereas, the return on equity amounts to 1.46 percent. It is not big enough to outweigh the associated risk. Moreover, the table shows that the Pakistan stock exchange has a maximum stock return of 24.1 percent. The minimal loss amounts to -0.44 in a 1-month period.

Table 1: Descriptive Statistics

	PSE	PKREX	USGOLD
Mean	0.014	0.003	0.012
Median	0.019	0.001	0.009
Max	0.241	0.061	0.102
Min	-0.448	-0.025	-0.124
SD	0.090	0.012	0.038
Skewness	-1.118	2.117	-0.268
Kurtosis	7.701	9.756	3.926

4.2 CORRELATION

From Table 2, it is clear that the Pakistan Stock Exchange has a negative association with the gold rate and exchange rate. However, the table also suggests a weak correlation association among the Pakistan stock exchange equity return and rate of exchange. It indicates that the variation in the PSE and rate of exchange is not intense. The correlational analysis is considered as a weaker method as only limited insights could be extracted from it. Hence, to overcome this weakness, the study employed the multivariate co-integrational analysis that could efficiently explore the causal association between stock markets and economic variables including gold rate and exchange rate. The co-integrational technique provides information regarding the short-term association between stock return and selected macroeconomic variables. The co-integrational technique involves two major steps. At first, the order of integration is determined by searching the time series. To find the integration order, the study has employed two different tests, including Phillips and Perron (1988) and Dickey and Fuller (1979) unit root test.

Table 2: Correlation

	PSE	PKREX	USGOLD
PSE	1		
PKREX	-0.225	1	
USGOLD	-0.046	-0.168	1

4.3 UNIT ROOT ANALYSIS

The first step involves the assessment of the index series' stationery. In order to do this, the present research has used the ADF unit root test at first difference and level. Table 3 indicates the findings of the ADF unit root test that openly demonstrates the time series non-stationary nature at the level. However, series' logarithmic transformations are stationary at the first level. Hence, series show integration at the order I (1). The ADF test entails the statistical independence of the error term. Moreover, it requires data homoscedastic. Anyhow, in some of the cases, such suppositions

might be wrong for some time series. In that scenario, another technique named as the Phillips-Perron test is executed to assess the time series stationary. The above table also shows the findings of this test that certifies the findings of the previous test. Hence, it can be concluded that the time series is I (1).

Table 3: Unit Root Analysis

	ADF-Level	ADF-1 st Diff	PP-Level	PP-1 st Diff
PSE	-0.847	-9.920	-0.944	-9.895
PKR Ex	0.136	-6.758	0.133	-6.904
US Gold	2.405	-10.343	2.530	-10.331
1% Critical Value	-3.480	-3.481	-3.480	-3.481
5% Critical Value	-2.883	-2.883	-2.883	-2.883
10% Critical Value	-2.578	-2.578	-2.578	-2.578

4.4 GANGER CAUSALITY TESTS

It is important to note that the variable coefficient reaches the significance at $\alpha = 0.05$. As per the representation theorem, in co-integration prevails among the two variables, then it indicates that at a minimum, Granger causality occurs in one direction. Table 4 reports the Granger Causality test results. As the null hypothesis has been rejected at 5 percent significance, it shows that the Granger causality prevails among the Pakistan stock exchange and exchange rate in one direction.

Table 4: Granger Causality Test.

Null Hypothesis	Obs.	F-Statistic	P-value
PKREX does not Granger Cause PSE	119	6.551	0.001
PSE does not Granger Cause PKREX		1.965	0.144
USGOLD does not Granger Cause PSE	119	3.638	0.029
PSE does not Granger Cause USGOLD		0.986	0.375
USGOLD does not Granger Cause PKREX	119	0.010	0.989
PKREX does not Granger Cause USGOLD		5.625	0.004

5. CONCLUSION

In the execution of this work, the investigators have assessed the relationship between two significant factors of an economy, including gold prices and stock prices. At first, the researcher employed the unit root test to explore the data series' stationery nature. The study findings exhibited that at first difference, all data series proved to be non-stationary. Afterward, the research employed the Johansen technique to assess any chance of a co-integrational association. Findings negated any possibility of such co-integrational relation among the stock price and gold prices, however; the study confirmed a co-integrational association among the gold prices and stock price. It proposes that investors cannot predict behavior and trend of one variable on the basis of other's information and no co-variation among the variables exists in the short-term. If no co-integrational association prevails among the variables, then in the absence of it, the researcher is advised to shift to a standardized Granger causality test to explore the chances of occurrence of any causal association among the gold price and stock prices. The findings exhibit that stock price does not Granger-cause the gold prices and gold prices do not Granger cause stock price. Hence, there is no chance of any sort of causal association among the gold prices and stock price.

A common belief prevails between the investors that a causal relation exists among the stock return and gold prices. And they can use the information of one market if they want to forecast the trend of another one. However, the study results have shown a contrast. As per research findings, no co-integration prevails among the study variables. It suggests that investors cannot predict one

variable by getting information about the past value of the other one. Moreover, the non-stationary results of data series also propose that investors cannot speculate profitably in the foreign exchange market or the stock market. As no possibility exists for the causal association among gold prices and stock return, market players would be unable to predict the behavior of one market on the basis of other market's information. In addition, policymakers in all investigated states cannot employ a rate of exchange as a strategic tool to appeal overseas portfolio investment. Instead of the exchange rate, state authorities can employ other policy tools including the production of a conducive investment environment, improvement in the country's law and order situation, reduction of political instability, efficient use of the rate of interest and much more.

6. AVAILABILITY OF DATA AND MATERIAL

Information can be made available by contacting the corresponding author.

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