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Influences on Investment decision in the Pakistan Stock Exchange

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ABSTRACT

The research is intended to determine factors affecting Investors at Pakistan Stock exchange, and for this purpose four macroeconomic variables; interest rate, inflation rate, exchange rate and FDI were selected as predictors and return of KSE 100 was included as a dependent variable. Meanwhile, the time frame of the study was from January 2001 to December 2015 and the frequency of the data was monthly. The preliminary testing and diagnostic analysis suggested towards Johansen Cointegration which further suggested VECM and Granger causality. Empirical findings of the study suggest that there are cointegration equations within the variables, implying that variables can be used to perform estimation and prediction of another variable. Meanwhile, VECM model reveals no significant effect of the macroeconomic variables on the stock market in long-run at lag 1; but at lag 2 interest rate and FDI shows a negative and significant effect on the KSE 100 returns. In addition to this, granger causality also shows no short-run bi-directional interrelation of macroeconomic variables with KSE 100 returns. Therefore, it is concluded that in Pakistan macroeconomic variables does not influence investor's behaviors and do not affect investing trend in KSE 100 index. Meanwhile, implications for policymakers, investors, regulatory authorities, government and for researcher have also been discussed in the paper.

| **KEYWORDS** | ADF, GCT, KSE-100 Index, Macroeconomic Factors, PSX, VAR, VECM |

Introduction

The area where the nation's economy truly appears is on the stock market. The nation's stock market assists various investors in forecasting the economy, securities prices, and returns.

Economists and investors in financial matters were interested in the stock market for three reasons. First, officials and researchers became interested in the relationship between macroeconomic issues and the stock market. To begin with, decision-makers would project the actual effects of current and upcoming laws and policies. Secondly, by fully understanding this link, investors may be able to lower their risk exposure and make better informed decisions. Third, enable us to assume that the general public is aware of possible alterations to the financial markets or the economy. In that scenario, people will take preventative action and the element of surprise will drop.

Macroeconomic variables that impact the performance of the stock market and investors in the KSE 100 index include interest rates, inflation rates, exchange rates, and foreign direct investment (FDI). The impact of the Pakistan stock market's various macroeconomic consequences is examined by Liu and Shrestha (2018). According to the research, stock prices are inversely correlated with inflation, interest rates, and exchange rates. The performance of the stock market will suffer if interest rates rise. Additionally, a decline in the interest rate on deposits will have a beneficial impact on the performance of the stock market, encouraging investors to increase their capital market investments. On the

other hand, the money supply and output have a positive relationship with stock prices. A rise in production has an impact on how investors view return.

Literature Review

Attari and Safdar, (2020) found the relationship between macroeconomic volatility and stock market volatility. They took data from December 1991 to august 2012 monthly wise. They used three variables; inflation rate, interest rate, and gross domestic Product and performed exponential generalized Autoregressive Conditional Heteroskedasticity technique. They concluded that stock prices affect the economics level of country.

Al-Mutairi and Al-Omar (2018) used Vector auto regression techniques in their thesis and concluded that money supply, interest rate, government expenditure and inflation rate has little effect on Kuwait stock exchange. For the study they used monthly wise data from 1995 to 2005.

Omisakin et al., (2015) used wavelet phase angle and wavelet coherency technique to analyze the relationship between movements in stock price and inflation rate in Pakistan. Based on the overall results of both, inflation measures the consumer price index and the producer price index, the study found that inflation has no effect on stock price estimation in Pakistan and that stocks might be used as a hedge against inflation in the long run.

Alam (2020) attempted to analyze the relationship between share market returns and exchange rates but found no significant association between the two variables. Similar results were reported by Maheen (2013), who observed independence between the two variables. Consequently, various research studies have investigated the influence of exchange rates on share market returns, with Maheen's (2013) Asset Market Approach revealing weak associations due to other predetermined variables affected by exogenous factors rather than econometrics/regression   theory.

According to Erdem et al., (2005) currency depreciation results in significantly lower product pricing in the international market, resulting in increased demand for those goods and higher cash inflows into the country. Currency depreciation makes imported commodities more expensive therefore, if a country relies substantially on imports of manufacturing inputs, currency depreciation will badly affect the economy of the country.

Adjasi, Agyapong, and K. Harvey, (2008) discovered that volatility of exchange rate is inversely connected to stock market volatility as assessed by stock return changes. It was also discovered that currency depreciation leads to higher stock market returns in the long run but lower returns in the short run. Acikalin, Aktas, and Unal, (2008) observed the long-term unidirectional effect of exchange rates on the Istanbul Stock Exchange (ISE) Index in a study on the Turkish Stock Market. The impact was tested by using co-integration test, which revealed that historical changes in exchange rate have a negative impact on current ISE Index movements.

Hamid (2017) investigated the relationship between stock market development and FDI with economic growth rate, research finding suggests a significant positive relationship between FDI and economic growth rate for the specified period. Torre, Gozzi and Schmukler, (2018) investigated whether privatization and regulatory policies of the country changes in some investment decisions or possible expansion in investment which results in improved stock markets. FDI has also a favorable impact on stock market development as concluded by Kalim & Shahbaz, (2009), Baker, Foley & Wurgler, (20014) and Frank (2016)

Material and Methods

In this research study monthly time series data have been collected through secondary sources like official website of State Bank of Pakistan (SBP) from its economic data and its quarterly and monthly published journals and reports, international financial

statistics and official website of Pakistan Stock Exchange (PSX) and Pakistan Bureau of Statistics (PBS).15 years data period from 2001 To 2015 have been collected of 4 selected independent variables and one dependent variable i:e: KSE 100 Index.

The present study employs quantitative method of analysis in determining the important macroeconomic factors that influences the investors at PSX - KSE 100 index.

Different statistical tools and techniques e.g., Multiple Regression, Johansan Cointegration, ADF test, serial correlation LM Test, Granger casualty test, VECM are used to obtain the results of the study. Entire statistical analysis for this study is performed through E.Views.

Results and Discussion

Table1
Unit root Testing - ADF

Variable	t-Statistic	Prob.
Index Return	-9.712	0.00
Interest Rate	-1.367	0.60
Inflation Rate	-1.22	0.66
FDI	-2.076	0.25
Exchange Rate	-0.1065	0.94

The null hypothesis of the ADF test is that data contains unit root and alternate hypothesis states that data does not contain a unit root. Meanwhile, referring index return, it has t-statistic -8.852 with sig value 0.00 suggesting to state that there is no unit root in the data and makes data stationary since outcome successfully rejects null hypothesis that unit root is present in the data. Hence, it can be stated index return time series variable does not have unit root and this makes the series stationary. In contrast, referring to other variables of the study; then sig value of interest rate, inflation rate, FDI and exchange rate is 0.6, 0.66, 0.25 and 0.94 respectively, suggesting to state that unit root is present in the dataset and data is non-stationary. Therefore, outcome of the test fails to not reject the null hypothesis that unit root is present in the data (Paparoditis and Politis, 2018). Therefore, it can be stated that there is a unit root in the data-streams of interest rate, inflation rate, FDI and exchange rate, therefore, this makes these variables non-stationary. Hence, it is evident that only one variable is stationary and other variables are not stationary; thus, use of regression for the purpose of estimation and prediction would be useless and inappropriate.

Table 2
BG Autocorrelation LM test

BG Autocorrelation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.068592	Prob. F(2,172)	0.3458
Obs*R-squared	2.196866	Prob. Chi-Square(2)	0.3334

The table above provides results of the serial correlation, and the null hypothesis of the test is that no serial correlation at up to 2 lags; since f-statistic is 0.979 and prob. f (2,172) is 0.377 hence null hypothesis of the test is accepted. Therefore, there is enough evidence to state that there is no serial autocorrelation problem in the data, and this allows to use regression as an estimation method and that results of the prediction would not be biased (Asumadu-Sarkodie and Owusu, 2016). However, application of this method is also subject to compliance with other assumptions of regression.

Table 3
Johansen Cointegration Results of four Series

No.	Series	Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**

01	KSE_RETURN	None *	40.82	15.49	0.00
	INTEREST_RATE	At most 1	2.56	3.84	0.11
02	KSE_RETURN	None *	46.05	15.49	0.00
	INFLATION_RATE	At most 1 *	7.41	3.84	0.01
03	KSE_RETURN FDI	None *	46.40	15.49	0.00
		At most 1 *	7.51	3.84	0.01
04	KSE_RETURN EXR	None *	37.85	15.49	0.00
		At most 1	0.00	3.84	0.96

Cointegration test was conducted four times to examine if at least two cointegrating vector equations are present in the variables on which estimation process can be continued through another advanced econometric technique. The first time series of KSE and returns reject the null hypothesis of no equation present with the variables but second null hypothesis can be rejected given that it has its prob is 0.11 which is greater than alpha 0.05. Based on results of first time series, it is evident that variables contain a cointegrating equation which can be used to start an estimation process; where the presence of Cointegration equation is evidence of a long-term interconnection between the variables (Agu, 2015). Presence of cointegration equation within the variables states that long-term movement of KSE returns could be used to estimate interest rate in Pakistan. Similarly, the cointegration is bi-directional implying that interest rate can also be used to estimate the performance of the index.

On the other hand, the second series contains KSE return and the interest rate on which Johansen cointegration is conducted, and the result of this time series is presented by the second number column in above table. There are two null hypotheses in second-time series and both are accepted at 0.00 and 0.01 respectively, and hence this implies that there are at least two cointegrating equations that can be used to estimate bi-directional interrelation of one variable with another variable (Agu, 2015). Therefore, KSE return's movement can be estimated or predicted by the inflation rate of the country, and KSE can also be used to predict the inflation in the country. Meanwhile, the presence of association is an indication of a long-term relationship in movement's and implies that investor's behaviour can be influenced by the movement of either of the variables.

Higher inflation in the country is described as higher demand for products and services due to increased money supply in the country. Therefore, inflation in single digits can be justified and considered imperative to boost economic activity in the country. However, consistently rising inflation is not a good sign for an economy since it could affect the economic objectives in the short-term and also in the long-term (Ali, Mahmood and Bashir, 2015). Thus, the presence of long-term interrelation between the inflation and stock market performance could suggest that the stock market's performance could be affected in either direction due to inflation. On the other hand, it has also been empirically found by Megaravalli and Sampagnaro (2018) that rapid rise in the inflation negatively influence the performance of the stock market since it is perceived as unfavourable news for the economic conditions which makes investors insecure regarding their investment.

Furthermore, the third series used for Johansen Cointegration is KSE return and foreign direct investment; where the null hypothesis for a cointegrating equation that none cointegration equation is present; it has trace statistic 46.40, critical value 15.49 prob. 0.00; indicates that there is cointegration equation that can be used for estimation (Agu, 2015). Therefore, it can be determined that FDI in the country can be used as a predictor of stock market return in Pakistan since movements of the variable are associated in long-term. In this regard, it has been suggested by Raza et al., (2015) that FDI increases economic activity in the country which creates a positive wave among the investors and they are attracted to invest in the stock market. Since strong economic growth is denoted by the manufacturing of the goods and services and these goods and services are produced by companies listed on the stock exchange, hence this turns a positive momentum for the stock exchange. Therefore, FDI can be used to estimate the KSE return given that FDI has a long-term interconnection

with the KSE return; and there is two cointegration equation present within the variables that can be used for estimation.

Lastly, the fourth cointegrating equation consists of KSE returns and exchange rate; the results suggest that only one hypothesis is rejected which states that none cointegrating equation is present since prob. 0.00 hence it can be evidently stated that there is a one cointegration equation between the variable suggesting a long-term interconnection (Agu, 2015). Therefore, based on the cointegration results exchange rate is said to have a long-term interrelation with KSE index return; where the movement of KSE return can be predicted based on the movement of the exchange rate. This is also suggested by Barakat, Elgazzar and Hanafy (2016) that a positive change in the exchange rate (national currency improves against foreign currency) lead to decline in stock's prices given that investment for the foreign investors turns very expensive. It is because foreign investor's investment in the country declines in value and this often creates uncertainty and may cause foreign capital flight.

Table: 4
Vector Error Correction Model's Explanatory Power

Error Correction:	D(KSE_RETURN)	D(INTEREST_RATE)	D(INFLATION_RATE)	D(FDI)	D(EXR)
R-squared	0.582628	0.156540	0.120365	0.284945	0.332497
Adj. R-squared	0.554634	0.099967	0.061365	0.236984	0.287726
Sum sq. resids	5.026779	43.68739	0.017812	114.2283	4058866.
S.E. equation	0.175075	0.516126	0.010422	0.834574	157.3187
F-statistic	20.81227	2.767020	2.040092	5.941178	7.426528
Log likelihood	63.16882	-127.1118	559.7232	-211.6921	-1133.775
Akaike AIC	-0.581464	1.580816	-6.224127	2.541956	13.02017
Schwarz SC	-0.365294	1.796986	-6.007958	2.758125	13.23634
Mean dependent	-1.30E-05	-0.034091	-4.49E-05	0.223993	1.605682
S.D. dependent	0.262340	0.544035	0.010757	0.955428	186.4046
Determinant resid covariance (dof adj.)	0.014349				
Determinant resid covariance	0.010081				
Log likelihood	-844.1166				
Akaike information criterion	10.33087				
Schwarz criterion	11.50179				
Number of coefficients	65				

VECM corrects the disequilibrium and improves the model where OLS and VAR model cannot improve the model. During the preliminary testing and diagnostic analysis, OLS regression was conducted to proceed with the diagnostic tests. The result that OLS showed that the model was insignificant, and no regressor had a significant effect on the KSE return; whereas the r-square of the model was very low and adjusted r-square was negative. These properties of the OLS clearly indicated that model itself was not correctly specified given that explanation power of the independent variables was inconsiderable, and indicating that interest rate, inflation, FDI and exchange rate cannot significantly predict the KSE return. However, theoretically, it was not possible since macroeconomic variables have been playing a critical role in the development of the capital market of the respective country. Indeed, literature also suggests that there is a bi-directional interrelation between the capital market and macroeconomic variables (Megaravalli and Sampagnaro, 2018). Therefore, practically it is not possible to have the worst results as results of OLS provided, and it also has a negative adjusted r-square indicating that variable's explanatory power is negligible.

In pursuance of the appropriate model for the empirical analysis of the capital market of Pakistan and macroeconomic indicators in another direction, cointegration suggested cointegrating equations in the variables that could be used to construct a model to estimate one variable from another. Therefore, VECM model was chosen for the estimation under the given conditions and VECM model has r-square of 0.5826 or 58.26% which means that after error correction, independent variables of the model can explain

58.26% variability of the KSE return but remaining variability is residual which can be explained by the other macroeconomic variables (Ikeora, Igbodika & Andabai, 2016).

Discussion

Interest rate is an agreed proportion of the principal amount that serves as a revenue stream for the banks and financial institutions. Interest rate is determined by the central bank of the country, and its purpose is to serve investors by compensating them against the inflation in the country. Alquraan, Alqisie and Shorafa, (2016) regarding the behaviour of investors over the interest rate, and the author states that increasing interest rate increases cost of borrowing for the companies listed in the stock exchange. In this condition, expenditure for the capital expenditure is to be slowed due to the unavailability of additional funds, and this directly affects the firm's expansion and growth of the operations. Hence, it is perceived by the investors during high policy rate growth and corporate earnings are restricted, and these sentiments among the investors motivate them to take a short position by selling partial or all stakes of the portfolio.

Investment in stocks is subject significantly volatility, but investment into the government securities is free from any risk and volatility including highly liquid as well. Therefore, it can be hypothesized that the interest rate has a significant impact on the investor's investment decision at KSE 100 index return. In this regard, Johansen's Cointegration test reveals that the KSE 100 index return and interest rate have one cointegrating equation which suggests that later can be predicted by former and vice-versa. On the other hand, VECM model results further eveals that a positive parentage change in the interest rate is associated with a change of -1.9% change in the KSE returns. It also indicates that there is a long-run effect of interest rate on the KSE returns,.

Inflation has been defined as an increase in the price of level of goods and services produced in the domestic market, and this is often triggered by two factors either lower supply or demand. The causes of inflation are simple in nature but hold critical implications for the overall economy based on its negative long-term effects (Pradhan, Arvin and Bahmani, 2015). The quantity theory money (QTM) states that price levels of goods and services are directly proportional to the supply of money in an economy. It further reveals that if the money supply in the economy increases then this increases purchasing power of the individuals leading to lower supply of goods and services and causing inflation gradually increase for long-run if not controlled by a regulatory authority (Johnson, 2017).

Similarly, VECM model suggests that a positive percentage change in the inflation rate is associated with an increase of 16.85% [p>0.05) in KSE return; this implies that there is an insignificant and positive impact of the inflation rate on the KSE return. Therefore, it can be interpreted as that inflation positively but insignificantly affects the stock market of Pakistan in long-run, but the granger causality reveals that inflation has no short-run effect on the stock exchange. Hence, it is evident to state that inflation can positively influence the stock market's return in long-run but the effect is not present in short-run.

The third objective of the study was to determine the influence of exchange rate on investment decision trend at KSE100 index, for which empirical testing was conducted and was successfully achieved. The exchange rate is the value of a currency against the value of another currency belonging to another economy. The value of one's currency is determined through demand and supply of currency which is closely related to the concept of inflation and consumer market. In this regard, the theory of purchasing power parity (PPP) states that inflation is a key driver being the difference in the money of one country to another country. The theory argues that a country's purchasing power against another country's product should be same; for instance, if the cost of a vehicle is $5000 in the United Kingdom, then the price of the same vehicle should also be same in Pakistan (Jolliffe and Prydz, 2015).

However, if the price of the same vehicle in Pakistan is much higher; then this indicates the presence of inflation in Pakistan which has reduced the value of its own currency. Similarly, if the United Kingdom purchases the same vehicle from Pakistan, then it would have to pay a higher cost for that vehicle than the original cost. Therefore, the PPP argues that level of inflation in the country is the main driver behind the value of the currency; but this is a hypothesis which has been critically debated by scholars and no consciences are found among them. In contrast, previous studies have provided mixed results, where it was found by Suriani (2015) that there is no short or long-run effect of exchange rate on the stock market of Pakistan.

On the other hand, a comprehensive study conducted by Zarei, Ariff and Bhatti (2019) on multiple countries found a significant effect of exchange rates on the stock market returns of the countries. Therefore, contradicting findings suggests that rising stock markets give a positive signal to investors that the economy is rising which increases the confidence of the investors either domestic or foreign into the economy. In contrast, when investors find stock market falling or performing poor then this influence investors to withdraw their investment into their own currencies. Hence, on one hand, already plumping exchange rate further declines due to capital flight from the stock market. Similarly, this inverse relationship has also been found in Japan; where Kikkei stock exchange has an inverse relation with the USD/JPY given that when investors perceive that Japanese economy is having positive momentum then investors sell USD dollars and invest into the Japanese Yen which strengthen Japanese Yen against US dollar (Schlossberg, 2017).

In this way, the stock market is used as a great source of motivation for the investors if it has been gaining positive momentum. Similarly, referring to the empirical findings of this study, it is found through Johansen's cointegration that there is one cointegrating equation between the KSE return and exchange rate; hence that equation can be used to estimate effect one variable on another, and that due to mutual movements within the series could also help to predict one series from another. Similarly, VECM model results suggest that a positive percentage change in the exchange rate is associated with change -1.2% [p>0.05] in stock market returns, and this implies that there is a negative insignificant and long-run effect of exchange rate on the stock returns in Pakistan.

FDI is an investment made by a person or a firm into the businesses located into a country other than own. Foreign investment into the country is considered one of the most important streams of foreign currencies within the country that assist in meeting with the balance of payment obligations during the fiscal period. In an integrated global economy, foreign investment is always made into the countries that have the skilled workforce and that have growth prospects greater than average (Raza et al, 2015). Meanwhile, foreign investment is also being attracted by easier regulatory requirements and no tight economy; many countries welcome foreign investment wholeheartedly given that FDI not only brings foreign capital into the country but also brings technology, skills and expertise (Barakat, Elgazzar and Hanafy, 2016). Therefore, from the perspective of investors, foreign investment into the country is a positive signal which represents the interest of foreign investors into the country; and gives a strong hope to domestic and foreign investors that economy is towards the positive trend.

In addition to, previous studies have also found no significant effect of the foreign direct investment (FDI) on the stock market Omisakin, Adeniyi and Omojolaibi (2009). In contrast, Raza et al., (2015) explored the FDI and its relation with the development of stock market of Pakistan and author concluded that there is positive and significant effect of the foreign investment on the development of stock market of Pakistan. Therefore, it can be hypothesized that effect of the FDI on the stock market differs by status of country, either it is underdeveloped, developing, developing or highly developed. Similarly, type of investors into the market also have important role in development of stock market; such as if the

investors are highly risk-averse and risk takers then development of stock market is subject to decision of investors.

Theoretically, the FDI should positively contribute to the growth of stock; whereas empirical findings of following study suggests there are two cointegrating equations present in the KSE returns and FDI; therefore either of the time series can be used to estimate one another. Similarly, the VECM model suggests that there is negative effect of the FDI on the stock market returns. This can be also be interpreted as that there is a negative long-run association of the FDI on the stock market returns of the country. Similarly, the granger causality results reveals that there is no short-run association of the FDI with the stock market returns. Therefore, it can be determined that effect of FDI on the stock market returns of the Pakistan is negative but the effect is -0.00034% which is inconsiderable and insignificant.

Presence of long-run relation of FDI with the stock market returns is insignificant hence it could be ignored. However, from this finding the implications for the governments can be drawn that FDI has been found empirically positive related with the stock market development of the country. However, in case of Pakistan, no effect or insignificant effect is only due to ineffective regulatory policies in facilitating the foreign investors into the country. Similarly, ineffective strategy to tackle the issues being faced by foreign investors in form of political instability, law and order, lengthy processes for approvals and also insecurity issues.

Conclusion

The economic development of a country depends on the development of the financial sector of the economy in which its stock market is one of the most important parts. In general, money market also plays an important role in an economy, but the capital market injects significant capital into the market through IPO's and other offerings (Komal, R. and Abbas, 2015; Durusu-Ciftci, Ispir, and Yetkiner, 2017). The capital market works as a major purpose vehicle, intact to transfer financial resources from investors to companies in need of funds, and providing a return in terms of dividends and capital gain. However, dividend growth and capital gain as a measure of the stock's performance are based on how well a company performs in the market. In addition to this, it has also been hypothesized that the market is efficient and it is not possible for the investors to beat the market but through investing in risky assets (Caporale et al., 2015; Kenourgios and Dimitriou, 2015).

It is suggested by efficient market hypothesis and this can also be linked with the association of the economy and stock market performance; where it has been evidently found by previous studies that macroeconomic indicators are major triggers of capital market performance (Hamid et al., 2017; Pevzner, Xie and Xin, 2015). Similarly, it has been theorized by Tuyon and Ahmad (2016) that macroeconomic variables influence the behaviour of investors, and this relates to the behavioural finance that to what extent indicators meet with the investors' perspective. It is because investors are categorized by the ability to take the risk; where some are risk aversion and some are risk-takers. Therefore, their investment decisions are subject to changes into the macroeconomic factors, and this could also drive their decision regarding their investment. In addition to this, risk-averse investors always prefer to remain at least risk and achieve the safest return they can; and for them, risk-free investment instruments are more preferable, but are attracted by capital markets when risk-free instruments are no longer attractive (Nofsinger, 2017).

This behaviour is often found among the investors when risk-free instruments do not meet with the risk-averse investors and they find the stock market more attractive but risky to some extent. Meanwhile, a shift in the investor's decision making is also triggered by external economic factors such as interest rate in the country, and interest rate is often strongly associated with the inflation rate (Alquraan, Alqisie and Shorafa, 2016; Gay, 2016).

Ultimately the association of variables tend to shift investor's behaviour from one market to another; in this way, the pattern in stock market prevails based on the changes in the economic policies. Therefore, in order to predict the behaviour of investors in the market, it is critical to comprehend the dynamic behaviour of the stock market, and triggers of its volatility.

In addition to this, investors are highly interested in understanding how volatility in the stock market takes place since their investment decisions are mainly guided by volatility patterns (Barakat, Elgazzar, and Hanafy, 2016). Consequently, to empirically estimate how macroeconomic variables have been driving the investor's decision and stock market's performance, the study incorporates appropriate measures and statistical tests to depict investors' behaviour, policies of macroeconomic and stock market's performance.

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