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The impact of foreign direct investment on stock market growth: Evidence from Pakistan

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ABSTRACT

This paper aims to investigate the impact of foreign direct investment (FDI) on stock market growth in Pakistan from 1990 to 2020. The study aims to evaluate the impact of FDI on stock market growth in both the short and long term, as well as examine the impact of economic growth on stock market growth. The study uses an Autoregressive Distributed Lag (ARDL) model to analyze the long-term impacts of FDI on the stock market and an Error Correction Model (ECM) to evaluate the short-term impact. The study reveals a substantively significant and positive influence of Foreign Direct Investment (FDI) on the growth of the stock market, observed from both a short-term and long-term perspective. Gross National Income (GNI) and Exchange Rate (ER) also have a significant bearing on stock market growth, while Interest Rate (IR) is found to have a negative impact but is statistically insignificant. The findings also confirm the impact of economic growth on stock market development, establishing a triangular relationship between FDI, Economic Growth, and Stock Market Growth. The study concludes that FDI has a significant positive impact on stock market growth in Pakistan in both the short and long term. It further suggests that macroeconomic policies should be developed and a tax-free market environment should be created to stimulate and encourage foreign direct investment for economic growth and stock market growth. The study's policy implications suggest that government officials should implement viable macroeconomic policies and create a tax-free market environment to encourage foreign direct investment for economic and stock market growth in Pakistan.

Contribution/Originality: The study's originality lies in its evaluation of the impact of economic growth on stock market growth and the establishment of a triangular relationship between FDI, Economic Growth, and Stock Market Growth. The findings of the study provide valuable insights into the factors that influence stock market growth in Pakistan.

1. INTRODUCTION

The financial system of any country is an indicator of that country's economic health. A well-regulated system can ensure proper resource allocation, investment opportunity creation, and profitability potential in a country's

capital market. An efficient capital market is crucial for financial sector growth because it is more likely to witness higher capital inflows. It has been well established that capital inflows promote economic growth in a country (Gurley & Shaw, 1955). Capital inflows promote capital market growth in developing countries (Chen & Nie, 2022; Sajid, Hashmi, Abdullah, & Hasan, 2021).

Foreign Direct Investment (FDI), Portfolio Investment (PI), and foreign remittances account for capital inflows. Capital inflows are directed into capital markets through various channels, and the Stock Market is one of them. Moreover, Cross-border investments are swiftly increasing as a result of economic liberalization, capital market integration, and globalization. It is because FDI is a major driver of economic growth for developing countries (Aladejare 2022; Dinh, Vo, Vo, & Nguyen, 2019). FDI attraction, therefore, is the core objective of developing countries financial policies. Alajekwu, Ezeabasili, and Nzotta (2013) documented the positive impact of FDI on stock market growth and economic growth in developing countries. Adam and Tweneboah (2009) assert that there exists a triangular relationship among FDI, economic growth, and stock market development where (1) FDI propels economic growth, (2) Economic growth promotes stock market development, and (3) FDI endorses stock market growth. In the case of developing countries, FDI affects the host country's stock market significantly (Badr, 2015). It has been documented by Shahbaz, Hooi Lean, and Kalim (2013) that FDI is vital for stock market growth in Pakistan.

Although various studies conclude a positive or complementary role for FDI in stock market growth, certain studies propose otherwise. The alternative theories suggest that with FDI inflows, enhanced technology, skilled labor, and business practices make their way into developing countries. This has an upsetting effect on pre-existing technology, human resource capital, and business practices. The findings about FDI's impact also vary to a great degree, from having a significant positive impact to having no impact at all. In the case of Pakistan, Sajid et al. (2021) and Zafar, Qureshi, and Abbas (2013) concluded that there was no impact of FDI on stock market growth.

Given the complexity of the previous findings, the main objective of this study is to assess the impact of FDI on stock market growth. Furthermore, it endeavors to explain the impact of three macroeconomic variables on the stock market to validate whether economic growth promotes stock market development. To analyze the impact, this study hypothesizes that:

H1: FDI plays a complementary role in stock market growth.

H2: Economic Growth promotes Stock Market Development.

The study undertakes three other macro-economic variables, GNI, ER, and IR, in order to investigate the impact of these on stock market development, along with the major variable FDI from 1990 to 2020. The economy of Pakistan has undergone various shocks during these times, from withstanding the global financial crisis of 2007-08 to being gray listed by the Financial Action Task Force (FATF). The objective of undertaking a larger data set is to scrutinize the nature and extent of the relationship between FDI and stock market growth and whether or not the relationship remains innate given the economic shocks.

2. DATA COLLECTION AND METHODOLOGY

This study attempts to determine the impact of FDI on stock market growth in the context of Pakistan by undertaking the data from the period of 1990 to 2020, for a total of 311 years. The study further examines key macroeconomic variables, i.e., GNI, ER, and IR.

2.1. Research Data and Variable Justification

Given the secondary nature of the study, the research examines 5 key variables, including Market Capitalization (MCAP), Foreign Direct Investment (FDI), Gross National Income (GNI), Exchange Rate (ER), and Inflation Rate (IR).

2.1.1. Market Capitalization (MCAP)

Market Capitalization is used as a proxy for stock market development and is taken in millions. MCAP data is taken from the Pakistan Stock Exchange (PSX) and the State Bank of Pakistan (SBP). MCAP has been extensively used by researchers as a proxy for stock market development (Claessens, Klingebiel, & Schmukler, 2006; Malik, 2015; Raza, Ahmed, Ahmed, & Ahmed, 2012).

2.1.2. Foreign Direct Investment (FDI)

FDI is the net investment for at least a 10% stake in a business entity in the host country. FDI is an essential determinant of stock market growth. FDI is used as a percentage of GDP and is obtained from the World Bank Database (WBD). Shahbaz et al. (2013) and Sajid et al. (2021) used FDI as a determinant of stock market development and confirmed the complementary role of FDI in capital market growth.

2.1.3. Gross National Income (GNI)

GNI is the sum of all the income of the residents and investments from other countries. GNI data is taken from the World Bank Database (WBD). GNI per capita is calculated by converting GNI into PKR and dividing it by the population in that particular year.

2.1.4. Exchange Rate (ER)

The central bank of any country, keeping in view the demand and supply of money in money market, determines the exchange rate for local currency against a foreign currency. ER has a significant impact on stock market growth since exchange rate volatility negatively affects stock market development. Hoque and Yakob (2017) and Lawal and Ijirshar (2013) documented the significant negative impact of exchange rate volatility on the capital market's performance.

The greater the ER volatility, the greater the currency devaluation risk. This drives investors to take a risk-averse approach and thus not invest in the capital markets of that country. The ER data is collected from the State Bank of Pakistan (SBP).

2.1.5. Inflation Rate (IR)

The Inflation Rate is an indicator of a country's macroeconomic stability, and it has been well established that macroeconomic stability has a paramount impact on stock market growth. Boyd, Levine, and Smith (2001) stated that higher inflation rates would have a negative impact on a country's capital market performance. Garcia and Liu (1999) also documented the negative impact inflation has on stock market development. Ghazouani and Naceur (2004) studied the impact of inflation on stock market performance in Middle East and North Africa (MENA) countries and concluded a negative impact. The data for the inflation rate is collected from the State Bank of Pakistan (SBP) and Pakistan Bureau of Statistics (PBS). The inflation rate is measured as an annual percentage average in the Consumer Price Index (CPI).

2.2. Model Specifications and Econometric Technique

The study endeavors to explore the impact of FDI on stock market growth in Pakistan. Following is the regression equation used to evaluate the impact of FDI on stock market development.

$$MCAP = \beta_0 + \beta_1 FDI + \beta_2 GNI + \beta_3 IR + \beta_4 ER + \varepsilon$$

Where, MCAP= Market Capitalization used as Stock Market growth proxy and FDI=Foreign Direct Investment as a percentage of Gross Domestic Product, (GDP) GNI=Gross National Income, IR=Inflation Rate as annual CPI average, ER=Exchange Rate and ε is the error or noise term.

The study employs the ARDL long-run and bound tests to determine the long-run elasticities of the independent variables. This approach is chosen because it can be used for variables with integration at level I (0) and first difference I (1). In addition, the co-integration of the variables at each level is confirmed using the F-bound test and F-statistics. To assess the impact of independent variables in the short run, an Error Correction Model (ECM) is used. The equation for the ECM is presented below.

$$\Delta LMCAP = \beta_0 + \beta_1 T + \beta MCAP\ LMCAP_{(t-1)} + \beta FDI\ LFDI_{(t-1)} + \beta GNI\ GNI_{(t-1)} + \beta LER\ LER_{(t-1)} + \beta LIR\ LIR_{(t-1)} + \beta_5\ ECT_{(t-1)}$$

The shot-term relationship is evaluated using the ECM. The levels equation (βMCAP=βFDI=βGNI=βLER=βLIR=0) is tested to check the possibility of the short run co-integration among variables. The magnitude and influence of the co-integrated variables are calculated considering the dynamic nature of co-integration in the short-term.

3. ANALYSIS AND EMPIRICAL RESULTS

ARDL long-run bound testing approach is used to determine the impact and magnitude of the independent regressors. Though ARDL does not need pre-requisite tests specifically, a descriptive analysis and unit root tests are recommended to check the normal distribution of the data and the order of integration, respectively.

In Table 1, the insignificant probability values for all 5 log-transformed variables suggest that the data may be normally distributed.

Table 1. Descriptive analysis.

Variables	Mean	Max.	Min.	Std. dev.	Skew.	Kurtosis	JB	Prob.	Obs.
LMCAP	6.130	6.980	4.730	0.630	-0.290	1.890	2.050	0.360	31
LFDI	-0.050	0.560	-0.430	0.250	0.960	3.550	5.170	0.080	31
LGNI	4.650	5.330	3.940	0.430	-0.030	1.730	2.070	0.350	31
LER	1.790	2.210	1.340	0.240	-0.230	2.180	1.130	0.570	31
LIR	0.870	1.310	0.400	0.230	-0.490	2.260	1.950	0.380	31

Note: Run market capitalization (MCAP), Long foreign direct investment (FDI), Gross national income (GNI), Exchange rate (ER) and Inflation rate (IR), Long run (L).

3.1. Descriptive Analysis

The variables have been log-transformed. The fact that the probability is insignificant for all 5 variables indicates that the data is normally distributed. The mean shows the average number, or the most commonly undertaken method for determining central tendency. The standard deviation measures how widely distributed the data is in relation to the mean. A low standard deviation shows that data is clustered around the mean, while a high standard shows that data is spread out. Similarly, skewness measures the asymmetric distribution of data. In addition, it also assesses how the probability distribution deviates from the normal distribution. Moreover, kurtosis determines the tailed or light-tailed distribution in relation to the normal distribution. The Jarque-Bera test is commonly used to test the normality of a dataset by assessing its skewness and kurtosis. A positive Jarque-Bera test statistic suggests that the dataset is not normally distributed. The rule of thumb is that if the p-value is less than 0.05, the null hypothesis of normal distribution is rejected, and if it is greater than 0.05, the null hypothesis is accepted.

3.2. Unit Root Test

Although the ARDL-bound testing approach does not require a unit root test as one of its pre-requisites, it is recommended to check the order of integration of variables to rule out the possibility of second-order integration I (II). Pesaran, Shin, and Smith (2001) have established that if a variable is stationary at the 2nd difference, the F statistic becomes invalid. The Augmented Dickey Fuller Test is employed to check the unit roots of the variables. The results of the ADF tests are given in Table 2.

Table 2. Unit root results.

Test: Augmented dickey-fuller (ADF) test					
Variable	**At level**		**At 1st difference**		**Order of integration**
	T-statistics	**Prob.**	**T-statistics**	**Prob.**	
LMCAP	-2.0460	0.552	-5.214	0.001	I (1)
LFDI	-2.0986	0.525	-4.818	0.003	I (1)
LGNI	-1.1630	0.898	-7.576	0.000	I (1)
LER	-2.707	0.240	-3.578	0.049	I (1)
LIR	-3.968	0.024	N/A	N/A	I (0)

The results of the unit root test support the implementation of the ARDL as none of the variables has 2nd order of integration.

3.3. Optimal Lag Selection

The Akaike Information Criterion is used to select the optimal lag for the given model. Optimal lag selection is an essential pre-requisite for determining co-integration among variables. The ARDL bound test employed in this paper is ARDL (a, b), where 'a' is the optimal lag of the dependent variable and 'b' represents the optimal lag for all the independent regressors. The optimal lag selection criterion is given below.

Figure 1 presents the AIC criterion for the optimal lag employed for ARDL (1,0,0,1,1).

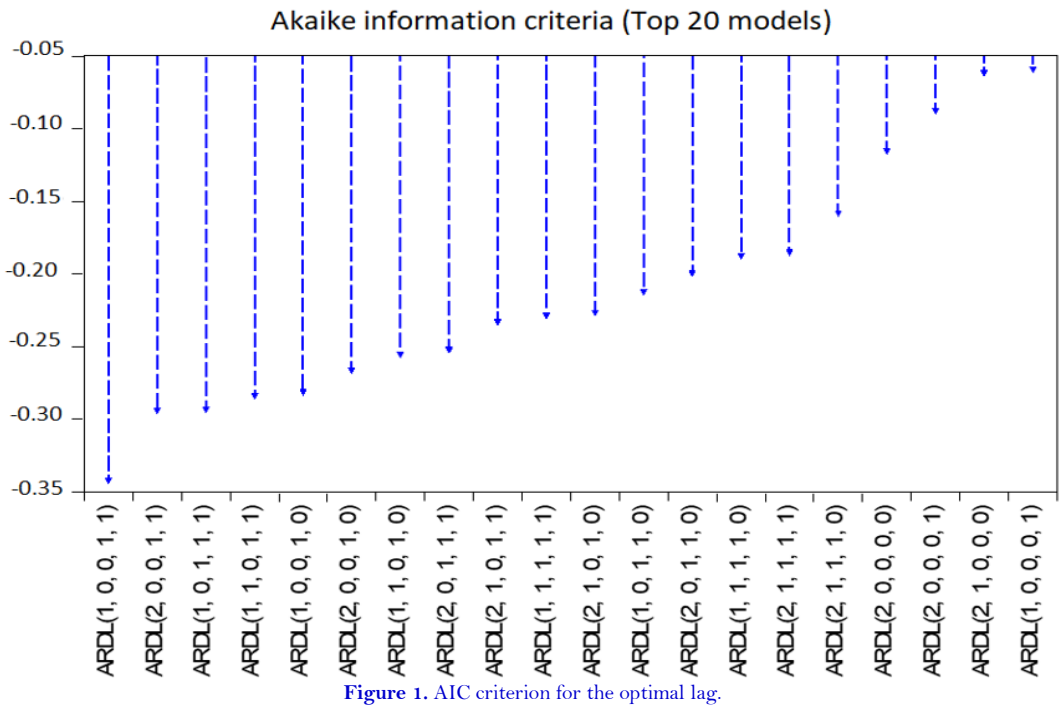

Figure 1. AIC criterion for the optimal lag.

From the graph, based on the AIC criterion, the optimal lag for the employed ARDL is (1,0,0,1,1).

3.4. Long-Run Co-Integration Using ARDL Bound Testing Approach

Long-run co-integration is tested to validate the association between the variables in the long run. Variables, when co-integrated, tend to shift towards equilibrium in the long-term. Hence, the bound testing approach to determining co-integration can predict the behavior of the variables in the long run.

The long-run elasticities are given below in Table 3.

Table 3. ARDL long run form and bounds test.

Dependent variable= LMCAP				
Variable	**Co-efficient**	**Std. error**	**T-statistics**	**Prob.**
C	-1.108	0.386	-2.868	0.009
LMCAP(-1)*	-0.713	0.121	-5.889	0.000
LFDI**	0.210	0.087	2.417	0.024
LGNI**	2.029	0.370	5.479	0.000
LER(-1)	-2.109	0.473	-4.452	0.000
LIR(-1)	-0.096	0.090	-1.065	0.298
D(LER)	-3.992	0.671	-5.946	0.000
D(LIR)	0.066	0.113	0.586	0.563
The results of the F-Bound tests are given below,				
Test-statistic	Value	Significance	Upper bound	Lower bound
Asymptotic: n=1000				
F-statistic	16.22799	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Note: The * symbol next to LMCAP (-1) indicates that the lagged value of LMCAP is included as a regressor in the model. This means that the current value of LMCAP is explained, in part, by its previous value. The ** symbols next to LFDI and LGNI indicate that these variables are significant at the 5% level, based on their respective p-values.

The value of the F-Statistics is above the critical bound, which indicates the co-integration among variables.

Based on the results of the ARDL Long Run and Form Test, it can be concluded that FDI has a significant positive impact on stock market development in Pakistan. A 1 percent change in FDI leads to a 0.21 percent change in the stock market, which is consistent with the findings of previous studies such as Saqib, Masnoon, and Rafique (2013), Raza et al. (2012), and Shahbaz et al. (2013). However, this contradicts the results of Zafar et al. (2013). GNI also has a significant positive impact on capital market growth, with a 1 percent change in GNI leading to a 2.02 percent change in the stock market. On the other hand, the Exchange Rate is negatively related to capital market performance, which is consistent with the findings of previous studies such as Lawal and Ijirshar (2013), Hoque and Yakob (2017), and Subair and Salihu (2010). IR, on the other hand, has a negative but statistically insignificant impact on capital market performance.

Considering the behavior of the three variables taken as measures of economic stability, it can be concluded that economic growth has a significant influence on stock market development. This confirms the existence of a triangular relationship between FDI, economic growth, and stock market growth, as proposed by Adam and Tweneboah (2009). Positive impacts of economic growth on stock market development have also been documented in previous studies on Pakistan, such as Ahmad, Khan, and Tariq (2012) and Muhammad, Haseeb, Samsi, and Raji (2016).

Table 4 documents the results of the Error Correction Model used to evaluate the short-term impact, which are given below.

Table 4. Short run results using ECM.

Dependent variable = LMCAP				
Variable	**Co-efficient**	**Std. error**	**T-statistics**	**Prob.**
C	0.083	0.038	2.173	0.039
D(LFDI)	0.325	0.109	2.981	0.006
D(LGNI)	1.736	0.966	1.796	0.085
D(LER)	-3.202	0.897	-3.567	0.002
D(LIR)	0.014	0.114	0.129	0.897
ECT(-1)	-0.773	0.149	-5.182	0.000

The Error Correction Term (ECT), bearing significance and a negative value of -0.773884, confirms the possibility of long-term adjustments. The deviance will force the variable to adjust in the long term, and the speed of

adjustment as indicated by the value will be 77.3% on an annual basis. FDI is significant in the short-run as well. Interestingly, the impact of FDI in short-term is greater than that in long-run, owing to market sentiment. In short run, FDI works like an instant booster for the capital market. The impact of FDI in the short run is 0.32, indicating a 0.32 percent change in stock market growth for every 1 percent change in FDI. In the short-run, GNI becomes insignificant because it is normally spread over at least a year and does not provide an instant stimulus to the capital market. Exchange rate volatility asserts an even stronger negative impact in the short run than in the long run, owing to the perceived currency devaluation of the country and a negative sentiment towards country's macroeconomic stability. The inflation rate remains statistically insignificant in the short run as well. Thus, we can conclude that FDI influences stock market growth both in the short and long term. The significance of GNI and ER also establishes the tantamount impact of economic growth on stock market development.

3.5. Diagnostic Tests

To validate the fitness of the model, these diagnostic tests are employed.

- Serial Correlation Lagrange Multiplier (LM) Test.
- Heteroskedasticity.
- Auto-Regressive Conditional Heteroskedasticity (ARCH).

The results of these tests are given below.

Table 5. Breusch-godfrey serial correlation LM test.

Breusch-Godfrey serial correlation LM test			
F-statistics	0.802	Prob. F(2,20)	0.462
Obs.*R-squared	2.227	Prob. chi-square (2)	0.328

Table 5 presents the results of the Breusch-Godfrey serial correlation LM test. The test evaluates the presence of serial correlation (autocorrelation) in a regression model. The corresponding p-value for the F-statistic is 0.462, which indicates that there is no significant evidence of serial correlation.

The probability being insignificant indicates no serial correlation in the model.

Table 6. Heteroskedasticity test: Breusch-Pagan-Godfrey.

Heteroskedasticity test: Breusch-Pagan-Godfrey			
F-Statistics	1.099	Prob. F(7,22)	0.397
Obs*R-squared	7.776	Prob. chi-square (7)	0.352
Scaled explained SS	3.718	Prob. chi-square(7)	0.811

Table 6 presents the results of the Heteroskedasticity test using the Breusch-Pagan-Godfrey method. The corresponding p-value for the F-statistic is 0.397, indicating that there is no significant evidence of heteroskedasticity. The probability is insignificant, and hence there is no Heteroskedasticity in the model.

Table 7. ARCH test.

ARCH test			
F-statistics	0.121	Prob. F(1,27)	0.729
Obs.*R-squared	0.130	Prob. chi-square (1)	0.718

Table 7 exhibits the results of the ARCH test, which is used to detect the presence of autoregressive conditional heteroskedasticity (ARCH). The corresponding p-value for the F-statistic is 0.729, indicating that there is no significant evidence of ARCH.

No ARCH presence was detected in the model, as the probability is insignificant.

3.6. Sensitivity Analysis

Since the model passed all the diagnostics, its fitness is established. The stability of the model is assessed using the Cumulative Sum (CUSUM) and sum of Square Tests. The Results of the CUSUM Tests are given below.

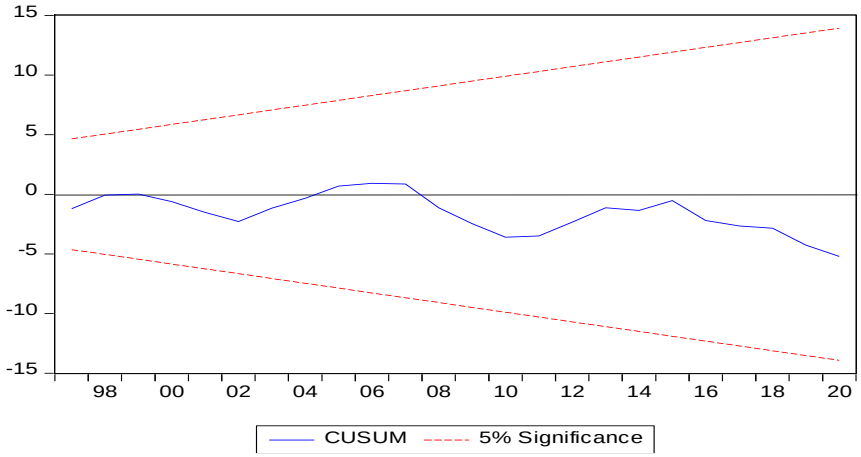

Figure 2. Plot of cumulative sum of recrusive residuals.

Figure 2 displays the Cumulative Sum of Recursive Residuals, which assesses coefficient changes. The CUSUM Test, conducted at a 5% significance level, reveals that the plot stays within the lower and upper critical bounds, indicating model stability. The Cumulative Sum of Recrusive Residuals evaluates the changes in the coefficients. The CUSUM Test indicates that at a given 5% significance level, the plot remains within the lower and upper critical bounds, indicating that the model is stable. The results of the CUSUM of Squares are given:

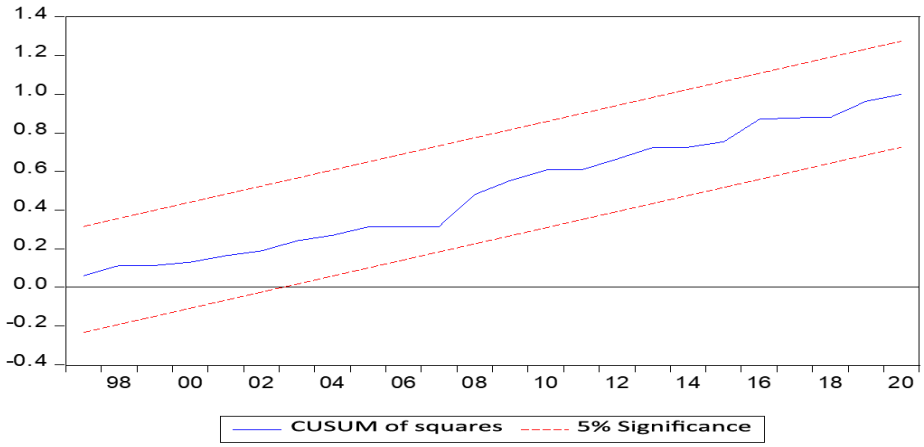

Figure 3. Plot of cumulative sum of squares of recrusive residuals.

Figure 3 depicts the CUSUM of the Square test, which confirms the model's stability. The plot consistently stays within the critical bound range, indicating the absence of sudden changes in the model. Therefore, it can be concluded that the model remained stable throughout the analysis. CUSUM of the Square test confirms the stability of the model, as the plot remains well within the range of the critical bound. CUSUM of square test is used to detect any rapid and sudden changes in the model. Since the plot remains within the critical bound limit, it is confirmed that no sudden changes in the model are detected, and hence, the model is stable.

4. CONCLUSION AND IMPLICATIONS

The study empirically investigated the impact of FDI on stock market development while also determining the macroeconomic determinants of stock market development. It utilized annual secondary data from 1990 to 2020 for

a period of 31 years. The ARDL Bound testing approach is employed for gauging long-run results and ECM for short-run results. A total of 3 macroeconomic variables, along with the major variable FDI, were taken into consideration. The results of the study support the complementary role of FDI in stock market development. FDI contributes significantly to stock market growth, both in the short run and the long run. The stock market, being dynamic and robust, responds swiftly to FDI because of market sentiment. Therefore, the impact of FDI in the short run is greater than in the long run. Shahbaz et al. (2013) also documented the positive impact of FDI on stock market growth. GNI has a significant positive impact on capital market growth in the long-run; however, it becomes insignificant in the short run as GNI is not an instant booster for the stock market in the short run. ER shows a substantial negative impact both in the short run and the long run. It is because ER volatility has a negative impact due to perceived currency devaluation risk by investors and a reluctant approach to investing in such a capital market. Our findings confirm previous studies exploring the impact of ER volatility on stock market growth (Hoque & Yakob, 2017; Lawal & Ijirshar, 2013). IR has a negative yet statistically insignificant role in the stock market's development. A number of studies establish that the IR must not cross a critical threshold since it would then have a negative impact on stock market development. The results of the three macroeconomic variables taken as a measure of a country's macroeconomic stability also confirm the presence of a triangular relationship between FDI, stock market growth, and economic growth as proposed by Adam and Tweneboah (2009). Hence, economic growth, is vital for the capital market's development. The findings of the study have two important implications. Given that FDI asserts a positive influence on stock market growth, policies should be devised as such to attract maximum FDI into a country's capital market. Tax-free zones, tax benefits, and various other incentives can be given as part of devising such policies. On the other hand, as economic growth has a positive impact on stock market growth, the economic outlook for the country should be positive. Political stability is part and parcel to the country's positive economic outlook. Hence, Pakistan needs to work on various fronts to achieve the desired results.

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