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THE CONTRIBUTION OF FOREIGN DIRECT INVESTMENT AND ITS IMPACT ON ECONOMIC GROWTH AND INFLATION IN BANGLADESH

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Abstract:

This research examines the inflation and time-series data and explanatory variables covering 1975 to 2020. It had been discovered. that real effective exchange rate influences foreign direct investment in Bangladesh from diverse secondary sources to suit the study's objectives. Economic growth is an issue of concern for Bangladesh's development. Foreign direct investment (FDI) is a potential weapon for economic development, especially for Bangladesh. It can help us to build up physical capital, decrease the unemployment rate, increase production capacity and increase new products which people may enjoy different goods and create a good economic relationship between the domestic economies with the global economy. The study findings reveal that FDI has a negative sign, indicating an inverse relationship between FDI and economic growth. The negative sign of FDI supports that Bangladesh should attract FDI increasing human capital, creating a good political environment, and enhancing adequate infrastructure facilities, which will improve the economic growth of Bangladesh. It has been found that the inflation rate has a significant negative effect on FDI in the long run, but is negligible in the short run. If we do foreign direct investment in Bangladesh the inflation rate goes down and the exchange rate and economic growth go to increase. The results also show that the exchange rate has a significant positive relationship with FDI both in the long-run and short-run. This research described that foreign direct investment has a long-term impact on the real effective exchange rate and inflation. There is also confirmed that control variables such as annual growth and real interest rate are a long-run relationship. The approximated coefficients

show a little significant impact on the explanatory variable on FDI. The inflation rate has an enormous negative influence on foreign direct investment in the long run, but it has little effect in the short run. The findings revealed real effective exchange rate has a significant positive association with FDI because if the foreign direct investment is increasing in Bangladesh that's mean the exchange rate of foreign currency goes down so definitely exchange rate of Bangladesh goes up.

Introduction

Foreign Direct Investment (FDI) is critical to trade and industry performance, especially in developing economies. It is also theoretically evident that the substantial role of FDI in enhancing macroeconomic variables of the economy foreign direct investment give also impact on the price of goods, the demand of goods, supply of goods, and other microeconomics factors. The link between FDI and the Inflation rate of a country should be negative as local currency devaluation is intended to attract more FDI if the country currency or local currency goes down definitely foreign direct investment going to increase in this country and the inflation rate going to decrease because of the price of goods decrease with time if we increase foreign direct investment in Bangladesh(Sahoo, 2006)

The main assets of Bangladesh's economy are Good macroeconomic stability characterized by a high growth rate of 8.2% in 2019 and 3.8% in 2020 (International MonetryFund) as well as a satisfactory level of the public debt of 39.6% in 2020 (International MonetryFund). Investment in Bangladesh is an open and diverse economy and very low-cost workforce A strategic geographic position as a gateway to countries in the Asia-Pacific region and A strategic and competitive position in the value chain of the global economy. A globally favorable economic and legal environment for business Biodiversity and favorable climatic conditions. Even though foreign direct investment (FDI) remained at the heart of much significant development, especially in the developing economies, only a modest numeral of experimental research approximates the influence of real effective exchange rates on economic growth and FDI for underdeveloped economics

The body of empirical research on developing countries particularly remains unclear, as the findings of existing studies are country and methodology-specific. Since the early 1980s, FDI has become a popular tool for transferring resources outside national boundaries to boost Economic performance, industrial competitiveness, and global competitiveness are all factors that must be considered. There'd be no FDI in a fully competitive economy because investment is done by time by time so economic growth is also done with time so that's why because of foreign direct investment is not a fully competitive economy. So, scholars now prefer to explain FDI flows using information regarding market characteristics that are imprecise and asymmetric. Given the importance of FDI, several studies have tried to detect the characteristics that impact inflows of investment from abroad into economies, regardless of the markets. The exchange rate is one of the elements that has recently been a cause of contention.

Although a new phenomenon, several key factors are contributing to increased FDI inflows into Bangladesh such as trade and currency liberalization, current account convertibility, emphasis on private sector-led development, liberalization of the investment regime, public offering of infrastructure and services. domestic and foreign private sector and above all the interest of foreign investors in the energy and telecommunication sector. It is argued that more open trade

policies in developing countries such as Bangladesh are associated with the presence of foreign firms and technology and productivity gains throughout the economy. There is also evidence of a strong positive correlation between the increase in the share of FDI in GDP in countries with open trade regimes and the diversification of high-tech exports. Still, FDI accounts for a low share of the country's GDP or gross investment. Over the past decade, FDI as a percentage of GDP has ranged from 1.4 percent in fiscal 1998 to 0.5 percent in fiscal 2004. In fiscal 2005, the share rose to 1.3 percent, mainly due to large FDI inflows into the telecommunications sector (Chart 1). As a proportion of gross investment, FDI ranges from a low of 1.2 percent in fiscal 2004 to a maximum of 3.2 percent in fiscal 1998. Therefore, given its low share in GDP and gross investment, FDI is not expected to have a significant impact. Various sectors of the Bangladesh economy and key macroeconomic indicators.

.Overall, the growth in inflows shows that foreign investors are becoming more active in developing nations. With improved access to global and domestic capital markets, these inflows are typically more productive and lucrative, and they are projected to have significant growth benefits. As a result, they may assist developing countries in reducing the adverse effects of currency crises and exchange rate shocks.

As briefly described in the above introduction, there is a substantial nexus between FDI and significant macroeconomic variables in developing countries, resulting in positive economic advancement. Apart from collective macroeconomic models, it is imperative to individually target the most relevant variables to find comprehensive causality. For the period 1975 to 2020, this article investigated the probable association between FDI, rate of inflation, and exchange rate in the economy of Bangladesh. He used two variables as control variables; the growth rate of GDP and interest rate.

Some dominating factors like interest rate, inflation rate, GDP, trade openness, and exchange rate play an important role in attracting FDI. It has been demonstrated by(S.Bende-Nabende, 2002) that a higher rate of inflation resembles volatility in resource prices which may demotivate foreign investors. GDP is another key factor because higher or consistently improving GDP indicates higher investment opportunities (A.Gujrati, 1995). According to the investigation (J. Gross, P. Trevino,1996), there is a positive relationship between high interest rates and FDI inflows. It is because of the fact that foreign investors get a higher incentive for their investment. However,(D. Basu and A.Srinivasan, 2002) pointed out that an economy’s openness to the outside world is an effective factor to attract FDI. Furthermore, disruption in exports and investments may occur in an economy when higher levels of exchange rate volatility prevail(G.Asieude, 2003).

The primary objective of this study is to evaluate the impact of the key factors on FDI from Bangladesh's point of view. The micro empirical literature has found ambiguous results concerning the impact of key factors on FDI while macro empirical literature has found an exogenous positive effect(G.Asieude, 2003). The benefit or advantage of FDI may be limited to the host country’s absorption capacity and other macroeconomic factors. This study focused on investigating the impact of major macroeconomic variables on FDI apart from the interest rate.

Literature:

A thoeroticall view of literature:

The importance of foreign direct investment has grown in recent years in alleviating the overall lack of money available for investment in most developing nations has received greater attention. Although FDI is primarily intended to close the gap between current domestic savings and investment levels in an economy and planned levels of gross national investment, it also generates positive externalities that frequently act as a stimulant for the recipient country's overall development and economic growth.FDI inflow causes a direct change in the exchange rate. It is also intuitively beneficial to reduce unemployment and improve the BOP account situation caused by increased foreign reserves in an economy. Additionally, the help of technological advancement and efficient human capital resulting from FDI and other intangible experiences provide an opportunity for the host country's domestic firms to enhance profitability by implying more efficient and cost-effective factors of production. Many studies have discussed the same narrative with different methodologies; some studies have been reviewed below.

It has been evident in extant literature that investment could be viewed from two perspectives. One of the perspectives is Hayekian, and the other is Keynesian(S. Akinboade, 2006). From the Hayekian point of view, investment is considered as the optimal adjustment to equilibrium(A.Wintand G Williams, 1994). As a result, the optimal amount of investment is dependent on the optimal speed of investment. For example, if a firm intends to construct a factory the optimal investment decision will be dependent on how fast it intends to build it or how much it will spend in doing so. On the contrary, from the Keynesian point of view, investment is considered as a behavioral aspect. From this point of view, investment is largely dependent on the behavior of the businesses of what they think would be an optimal investment for a particular period(P. pigato,2011). (J.Jorgenson,1971) has critically examined more than 58 extant researches and has finally argued that much of the research that was conducted to find out the determinants of investment. They are developed based on the neoclassical theory of optimal capital accumulation.. According to the neoclassical theory of optimal capital accumulation, a firm's anticipated capital requirement is determined by neoclassical production function, profit maximization, factor prices, and degree of perfect competition. The neoclassical theory of optimal capital accumulation is considered as the close alternative to the views expressed by(J. Kenyes, 1936). However, some of the empirical studies have challenged this theory by claiming that a firm's anticipated capital requirement can be financed anyway(Y. Chakrabarti, A. Wintand G. Williams, S. Bende-Nabende). According to the investment by(J. Keynes, 1936) function proposed the relationship between investment and interest rate remains in naive form. Firms determine their investment needs and rank them according to their relative importance and then are faced with a given rate of interest(D. Basu and A. Srinivasan, 2002). When it comes to choosing an investment option foreign investors, analyze the host country's GDP potential and growth and compares it with their expected return(A. Gujarati, 1995). Besides, when the exchange rate remains reasonably high for the foreign investor, it motivates them to invest(P.Edward 1990). In addition, inflation rate and trade openness act as the measurement of sustainability of the economy and exposure to the outside world(K.Borenszteiin, 1998). (K.Borenszteiin, 1998)further argued that both trade openness and inflation are important factors of FDI.

Musyok and Ocharo (2018) examined yearly time series data from 1970 to 2016. Interest rates, real effective exchange rates, inflation rates, competitiveness/ease of doing business, and foreign direct investment (FDI) were all accurately measured. The influence of real interest rate, exchange rate, inflation, and competitiveness on FDI in Kenya was studied using the ordinary

least square regression approach. The study indicated that actual interest rates and exchange rates negatively impacted FDI inflows into Kenya based on the data. Furthermore, the study found that competitiveness influenced foreign direct investment inflows into Kenya favorably and substantially. Inflation, on the other hand, was shown to have a negligible impact on FDI.

Ahmed et al. (2016) looked into the possible link the relationship between FDI, economic growth, and exchange rates. They used the ARDL limits testing technique and the robust regression function to assess a long-run connection that included capital, openness, trade balance, and financial development as additional variables in the model. The findings show that depreciation of the exchange rate impacts the volume of FDI and, in the long run, boosts growth. Exchange rates were also linked to economic progress and inflows. The causality test also revealed that these three macroeconomic factors are interconnected in the long term. The findings were solid and trustworthy, according to the variance decomposition method's results.

Chingarande et al. (2012) tested the hypothesis that high-interest rates positively impacted FDI inflows. The data was examined using the ordinary least squares technique and the standard linear regression model. Interest rates have no substantial influence on FDI inflows, according to the study, and so cannot be utilized to make policy. According to the study, Risk factors have been revealed. To be the most critical influencer of FDI in Zimbabwe. If the economy sees long-term FDI inflows, policies that decrease country risk levels and initiatives that promote peace, anti-corruption, and transparency should be supported.

Naude and Krugell (2011) used a cross-country econometric method to determine foreign direct investment (FDI) drivers in Africa. It was a three-fold contribution. To begin with, they realized that other estimate approaches, such as conventional least squares, may be incorrect. They discovered numerous credible estimates using a dynamic one-step generalized method of moments (GMM) estimator. FDI drivers, inflation, investment, government consumption, inflation, initial literacy, and governance (regulatory burden, political stability, the rule of law, accountability). The location did not appear to have a direct impact on FDI flows to Africa, according to the study's conclusion. With varied policy approaches, neither market-seeking nor re-exporting FDI incentives appear to be dominant. Tools playing a role in the various specifications. It does not negate the value of excellent policies, but it does suggest that good policies enacted by good institutions are more critical. Political stability, as a result of institutions, was found to be a key predictor of FDI.

Anwar and Nguyen (2010) studied the connection using a newly available dataset to examine the relationship between foreign direct investment and economic development panel dataset covering 61 regions in Vietnam from 1996 to 2005. The analysis, which is based on a simultaneous equations model, indicates that FDI and economic development in Vietnam have a mutually reinforcing two-way relationship. However, this was not the situation in every part of Vietnam. According to this study, direct international investment in Vietnam's economic growth would be more important if more resources were invested in education and training, financial market development, and bridging the technical gap between foreign and domestic companies.

Dhakal et al. (2010) utilized panel data to investigate the impact of currency rate uncertainty on FDI inflows in Malaysia, Indonesia, China, Thailand, the Philippines, and South Korea, which have continued to attract significant FDI inflows high exchange rate volatility.

After establishing the data series' stationarity, a panel cointegration test was performed, developing and estimating an error correction model utilizing two-panel data sets. Overall, the findings of the estimation were in line with theoretical predictions. In our sample nations, The volatility of the exchange rate was demonstrated. To be beneficial to FDI.

Mottaleb and Kalirajan (2010) To find out what factors influence FDI influx, researchers looked at panel data from 68 low- and lower-middle-income developing countries. This study discovered that nations with certain characteristics, such as a faster GDP growth rate, larger GDPs, a more business-friendly environment, and a higher volume of international trade, attracted more FDI than other countries.

Kök and Ersoy (2009) To see if determinants of FDI influence FDI, the researchers used panel data (FMOLS) and cross-sectional SUR (seemingly irrelevant regression) for 24 developing countries from 1983 to 2005 for FMOLS and 1976 to 2005 for cross-section SUR. The interaction of FDI with some FDI drivers had a significant positive impact on economic growth in emerging countries.FDI's connection with total debt service/GDP and inflation, however, had a negative effect. The communication variable was the most important FDI factor.

Sayek (2009) developed a model for investigating multinational companies' investment-smoothing behavior when faced with inflation taxes in their home and host countries. The MNE was permitted to invest in both the home and host economies and fund its foreign direct investment (FDI) through local or international sources. The smoothing of MNE investments was examined. In both vertical and horizontal FDI scenarios. Even though there were no formal hedging procedures, the data imply that FDI was utilized as a hedging strategy, reducing the effects of inflation taxes. MNEs' investment smoothing response is influenced by the rationale for investment, FDI funding sources, and the substitutability of production components. Finally, this investment-smoothing option (FDI) minimizes inflation's real negative impacts.

Ang (2008) looked at the drivers of FDI in Malaysia to enlighten analytical and policy discussions. Real GDP was found to positively influence FDI inflows, as predicted by the market size theory. The research looked at the evidence that GDP growth has a minor beneficial influence on inbound FDI. In terms of policy, the findings showed that higher levels of financial growth, infrastructural development, and trade openness encourage FDI. Contrary to the factor which, on the other hand, are the possible reason to deter investment inflows is more than usual rates of statutory corporation tax and more expensive rate of real exchange. Surprisingly, it is also found that the uncertain situation in terms of macroeconomic variables in an economy is appeared to be an encouraging force to attract foreign investment.

Demirhan & Masca (2008) estimated a well fit econometric model aiming to study determinants that are focal in attracting the foreign direct investment toward developing countries for the period 2000-to-2004. They included data from 38 developing countries in a cross-sectional sample in their research. From 2000 to 2004, they used the average value of all data. FDI was included as a dependent variable in the models. Independent factors included the inflation, per-capita-GDP (growth rate), labor cost per worker in the manufacturing industry measured in logs, telephone mainlines per 1,000 people (in logs), corporate top tax rate, risk, and degree of openness. The core model's per capita growth rate, degree of openness, and main telephone lines all showed good indicators and were statistically significant, according to the econometric data. Statistically, both the tax and inflation rates are significant, having a minus(-)

sign. The cost paid to labor against their services was a good indicator, whereas the danger was a negative indicator. Both were, however, insignia.

B. Emperical literature review:

Several empirical types of research focused on studying the impact of different macroeconomic variables on FDI(K. Borensztein, S. Akinboade, P. Edwards, K. Hooda). By using simple and multiple regression analyses (K. Hooda,2009) analyzed the FDI scenario on the Indian economy. The study has found that major determinants of FDI in developing countries include inflation, political stability, infrastructural strength, labor cost, exchange rate, interest rate, and corporate tax rate. On the other hand, the investigation of (S. bande- Nabende, 2002) has found that trade liberalization is an important long-term determinant of FDI for African nations. Similarly, (G. asseidu, 2003) found that efficient investment policy and framework promote FDI in African nations. However, according (S.Akinboade, 2006) to lower level of inflation signals the internal economic stability of a country. In the case of FDI, the host country's internal economic stability is measured by observing the volatility in the inflation rate. . Foreign investors are always interested in the future profitability of their investments, and any instability can lead to uncertainty in attracting foreign capital (A. Wintand, 1994). (A. Wintand, 1994) also argued that a stable economy attracts more FDI and therefore a lower level of inflation is desired. Many empirical studies have acknowledged that economic growth and FDI are positively correlated. has found that GDP and FDI are positively correlated which implies that economies having continuous GDP growth are subject to higher FDI inflows. Similarly, have also argued that a higher level of GDP motivates foreign investors as a higher level of GDP is subject to a higher level of investment opportunities. On the contrary, according to researches, foreign direct investments can be affected by exchange rates through the imperfect channel of the capital market. If the host country's currency depreciates against foreign currencies, it increases the wealth of foreign investors and raises FDI, but domestic investors suffer loss. When overvalued exchange rates prevail in an economy, it links up foreign currency shortage, large current account deficit, corruption, and crises in the balance of payment. Therefore, empirically, FDI and exchange rate are negatively associated.

Data, Methodology, and Results:

The primary goal of this study is to analyze the impact of FDI inflow on Financial variables such as Exchange Rate and Inflation in the case of Bangladesh by taking data from FY-1975 to FY-2020. This country belongs to the Asian region. According to stated data, Bangladesh's economy got a large infusion of FDI after 2000, which can quickly enhance economic growth. Though the regional integration analysis encourages incorporating other countries from Asia, this study is limited to Bangladesh's economy. This study has considered data on different economic variables which are collected from the International Financial Statistical yearbook, World Bank Development Indicator, and Bangladesh Bank. This study aims to analyze the impact of key factors on foreign direct investment in Bangladesh using time series data. This study has used some proxy variables to assess the impact of FDI. GDP has been used as a proxy for market size, inflation (INF) has been used as a proxy for economic stability, the exchange rate (ER) has been used as a proxy for financial market variability, interest rate (IR) has been used as a proxy for central bank monetary policy tool, and trade volume (TO) has been used as a proxy for openness to the outside world. As time-series data constitute some problems, therefore, this study has performed several diagnostic tests to make the model and variables free from those problems.

This study has performed correlation matrix, stationary test, and multiple regression analysis. A correlation matrix has been used to test for multicollinearity, and the stationary test has been performed by using Augmented Dickey-Fuller (ADF) statistic. This study has utilized both SPSS and EViews software packages to perform the analyses.

Empirical Method:

In order to determine the relationship between key factors, FDI, and other explanatory variables, Ordinary Least Squares (OLS) was used. The model used in this study is specified below:

$$FDI = \beta 0 + \beta 1\ GDP + \beta 2\ INF + \beta 3\ IR + \beta 4\ ER + \beta 5\ TO + \mu$$

In this model, FDI is the parameter that has been estimated, and it measures the slope of the regression equation. GDP, INF, IR, ER, and TO are the independent variables used to measure their impact on FDI. And, μ is the error term of the model which captures other factors that may cause variation in dependent variable FDI but not included in the model

Data Description:

The variable of interest FDI inflow data is collected from Survey Reports of the Statistics Department of Bangladesh. The Explanatory variables such as real effective Exchange rate and Inflation data The World Development Indicators (WDI) were used to compile this list. The phenomena of FDI are multidimensional, and multiple factors have been involved in the determinants of FDI. This research considers two control variables: real interest rate and gross domestic product annual growth, for robust estimation and the model. It is standard practice in the literature related to FDI and growth relationships.

A detailed description of variables is used in the estimation procedure as following.

Dependent Variable	
FDI	Foreign direct investment, net inflows (BoP, current US$)
Independent Variable	
REER	Real effective exchange rate index (2010 = 100)
CPI	Inflation, GDP deflator (annual %)
Control Variable	
GDP	GDP growth (annual %)
RI	Real interest rate (%)

Econometric Methodology:

In the estimation procedure, this study applied the inferential statistics tools with the help of OLS. It revealed the relationship between foreign direct investment, inflation, and exchange rate with other control variables such as annual growth and real interest rate. The multiple linear regression specifications used in the estimation procedure areas follows.

$$FDI = f(REER, CPI) \quad \text{.....1}$$

$$FDI = f(REER_t, CPI_t) \quad \text{.....2}$$

To solve non-linear relationships, this study takes the logarithm of Explained and Explanatory variables into the regression specification. The following equation no. 3 is the form of the Cobb-Douglas function.

$FDI_t = \alpha REER_t^{\beta_1}, CPI_t^{\beta_2}, e^{\mu}$ ……..……....3

To takes the natural log ofequation no. Three variables, then possible outcome represent in equation no.4.

$LNFDI_t = LN\alpha_0 + LN\beta_1 REER_t + LN\beta_2 CPI_t + \mu_t$ ……....4

To summarize the regression specification model and assume that $\mathrm{LN}\alpha_0 = \beta_0$, equation no, 5 is the final form for estimation.

$LNFDI_t = \beta_0 + LN\beta_1 REER_t + LN\beta_2 CPI_t + +\mu_t$ ……...5

The final regression model is represented in equation no. 5, which takes the log of appropriate variables and estimated coefficients in elasticities due to the log-log model being considered for approximation.

Unit Root Test:

To make future predictions, time series analysis studies typically employ past data to create correlations between variables. Forecasting may not be appropriate if the variables are nonstationary and contain a unit root. In such instances, the estimate may produce erroneous conclusions with no economic significance. The Augmented Dickey-Fuller (ADF) test is used to check for stationarity in the variables in this study. For the ADF test, there are three fundamental regression models as follows:

No constant, no trend;

$\Delta Y_t = \vartheta Y_{t-1} + \sum_{i=1}^{p} \alpha_i Y_{t-1} + \varepsilon_t$…….6

Constant, but trend; $\Delta Y_t = \beta_1 + \vartheta Y_{t-1} + \sum_{i=1}^{p} \alpha_i Y_{t-1} + \varepsilon_t$……7

Constant withthe trend; $\Delta Y_t = \beta_1 + \beta_1 t + \vartheta Y_{t-1} + \sum_{i=1}^{p} \alpha_i Y_{t-1} + \varepsilon_t$……..8

So that $\Delta$is the difference operator, and Y_t is the variable of interest, p is the lag length, and ε_t is the stochastic error term, and β_1 and β_2 is the intercept term.

Cointegration Test:

Engle and Granger proposed the notion of cointegration in 1987. Cointegration between two-time series indicates that they have a long-term link. The cointegration test can be used if the variables are integrated in the same order. Because the Engle and Granger cointegration test works well for a single equation but not well for a multivariate VAR model, this study uses the Johansen cointegration method (1988) to test long-term equilibrium linkages across variables. The Johansen approach has the advantage of allowing all cointegrating vectors in a set of variables to be identified. The following equation considers for Trace Test in the Johansen cointegration test.

Trace Test Statistics

$\lambda_{trace}(r) = -T \sum_{i=r+t}^{n} \ln\,(1 - \hat{\lambda}_i)$…….9

Max-Eigen Value Test Statistics

$\lambda_{max}(r, r+1) = -T\,(\ln\,(1 - \hat{\lambda}_i)$……..……..……..10

The null hypothesis of Trace Test Statistics is, the number of cointegration vectors is less than or equal to r, but in the case of Max-Eigen values, the number of cointegration vectors is r.

Error Correction Methodology:

For static variables in their first differences, the vector error correction model (VECM) is a particular instance of the vector autoregressive (VAR) model. If the variables are determined to be cointegrated in the cointegration test, VECM is used to calculate the long-run causality and short-run dynamics of a time series. The following estimation equation of VECM for cointegrated series.

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \, \Delta Y_{t-1} + \sum_{i=1}^{n} \vartheta_i \, \Delta x_{t-1} + \lambda ECT_{t-1} + \mu_t \quad \text{.....11}$$

In the above equation, long-run cointegrating regression as flowing in equation no. 12

$$Y_t = \beta_0 + \beta_1 x_t + \varepsilon_i \quad \text{.....12}$$

The cointegrating regression model with a long-run coefficient is as follows.

$$ECT_{-1} = y_{t-1} - \beta_0 - \beta_1 x_t \quad \text{.....13}$$

The error correction term (ECT) refers to how the Explained variable short-run dynamics are modified by the last period deviation from long-run stabilization (the error). Now, we rewrite equation no. 5 for VECM estimation of short-run and long-run unbiased coefficients.

$$\Delta LNFDI_t = \alpha + \beta(LNFDI_{t-1} + \gamma_0 + \gamma_1 LNREER_{t-1} - \gamma_2 LNCPI_{t-1}) + \lambda \Delta LNFDI_{t-1} + \sigma \Delta LNREER_{t-1} + \vartheta \Delta LNCPI_{t-1} + \varepsilon_t$$

.....14

The above equation no. 14 is final for the estimation of ECM with adjusted parameters.

Residual Analysis Test:

After estimating the adjusted coefficient from VECM, some necessary tests must be considered to check whether the residual violates the assumption. The following test considers diagnosing the residual.

i. Serial Correlation ⟹ Breusch-Godfrey Test
   Null Hypothesis: TheSerial Correlation does not exist
   Alternative Hypothesis: The Serial Correlation exists

ii. Heteroscedasticity ⟹ Breusch-PaganTest
   Null Hypothesis: Residual isHomoscedasticity
   Alternative Hypothesis: Residual is Heteroscedastic

iii. Normality ⟹ Jarque-Bera Test
   Null Hypothesis: Residual isBell Shaped
   Alternative Hypothesis: Residual is not Bell Shaped

Empirical Estimated Results:

Descriptive Statistics:

Table no. 1 represents the various statistical values, such as central tendency and variation. The estimated results confirmed that the series is not normally distributed.All variables of interest such ad FDI, REER, and CPI confirmed that the series is positively skewed because the mean is greater than the median. The standard deviation is also low error shown from average values. The estimated value of skewness is also described as positively skewed, except for control variables suchas annual growth and the real interest rate. Only one variable shows series is leptokurtic compared to others due to the high calculated value of Kurtosis in inflation.

Table No. 1

	FDI	REER	CPI	GDP_G	RI
Mean	17.63414	50.02884	8.583764	4.859339	5.257769
Median	16.45812	46.30000	6.727852	5.121278	5.582356
Maximum	21.76395	84.90000	80.56976	7.863743	15.96632
Minimum	12.42081	14.73000	-17.63042	-4.088214	-12.26922
Std. Dev.	2.930912	23.00841	12.90368	2.094028	5.554482
Skewness	0.020799	0.033692	4.028927	-1.910139	-0.854843
Kurtosis	1.563257	1.637946	24.15246	8.986885	4.542722
Observations	43	43	43	43	43

Correlation Matrix:

The following table no.2 represents the estimated results of the correlation matrix. The correlation matrix explained the association between variables as well as describe the association of multicollinearity. The calculated results describe that Foreign direct investment and the real effective exchange rate have a favourable association, but inflation is negative. The control variable, such as the actual interest rate, is negative, but annual growth is positively impacted. The correlation coefficient values show a moderate association exists among variables except forthe real effective exchange rate.

Table No. 2

	FDI	REER	CPI	GDP_G	RI
FDI	1				
REER	0.8466	1			
CPI	-0.2527	-0.3063	1		
GDP_G	0.6512	0.5888	-0.1636	1	
RI	-0.0462	0.0371	-0.7452	-0.1819	1

Unit Root Test Results

Table no. 3 displays the findings of the dickey fuller enhanced test with constant and Trend. To check the series is stationary at level or first difference. The calculated results of this test are as follows.

Table No. 3

Variable	Test Trend	ADF Test Statistics	Critical Values (5% CI)	p-values	Decision
FDI	Series I (0)	-1.205292	-2.929734	0.6639	Not static
	Series I (1)	-7.715445	-2.931441	0.0000	Statics
REER	Series I (0)	-0.312785	-2.935001	0.9141	Not static
	Series I (1)	-4.863978	-2.960411	0.0004	Statics
CPI	Series I (0)	-17.38828	2.928142	0.0009	Not static

	Series I (1)	-19.38819	-2.929734	0.0001	Statics
GDP_G	Series I (0)	-7.743481	-2.988142	0.0000	Not static
	Series I (1)	-13.57864	-2.99734	0.0000	Statics
RI	Series I (0)	-4.52983	-2.928142	0.0007	Not static
	Series I (1)	-9.738286	-2.929734	0.0000	Statics

The calculated results from the ADF test confirm that most of the variables used in the estimation procedure are stationary at the level of expecting foreign direct investment and the real effective exchange rate.

Johansen Co-integration Test

The selection of lag length is the first stage in the cointegration test. The ideal lag period for the It's possible to figure out how to estimate a time series regression model. in multiple ways. Table 4 shows that all five approaches point to lag one as the best option. As a result, the best lag order for the estimation of the regression model is 1.

Table No. 4

Lag Selection Criteria
Variables: FDI REER CPI GDP_G RI
Sample: 1 46
Number of Observations: 37

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-454.7822	NA	42777.78	24.85309	25.07079	24.92984
1	-313.5719	236.6226	81.16743	**18.57146***	**19.87761***	19.03194
2	-276.1988	52.52439*	44.96134*	17.90264	20.29725	18.74685*
3	-255.8256	23.12631	71.36983	18.15274	21.63580	19.38068

Table No. 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.809896	128.9242	69.81889	0.0000
At most 1 *	0.613973	64.17699	47.85613	0.0007
At most 2	0.306323	27.05495	29.79707	0.1003

Table No. 6

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.809896	64.74723	33.87687	0.0000
At most 1 *	0.613973	37.12204	27.58434	0.0022
At most 2	0.306323	14.26423	21.13162	0.3437

The estimated results of both tests confirmed that the cointegration exists among variables because both can't accept the null hypothesis. At most, one cointegration rank must exist among variables.

Table No. 7

Normalized cointegrating coefficients (standard error in parentheses)				
FDI01	REER	CPI	GDP_G	RI
1.000000	-0.085594	-1.319885	-1.854245	-0.730887
	(0.02256)	(0.21255)	(0.43131)	(0.21951)

Vector Error Correction Model (VECM)

$ECT_{t-1} = 1.000\ LNFDI_{t-1} - 0.0855LNREER_{t-1} - 1.319CPI_{t-1} - 1.854GDP_{G_{t-1}} - 0.731RI_{t-1}$ …
……………………………………………………………………………………..15

$LNFDI_{t-1} = ECT_{t-1} - 0.0855LNREER_{t-1} - 1.319CPI_{t-1} - 1.854GDP_{G_{t-1}} - 0.731RI_{t-1}$...16

The estimated results from Johansen cointegration are described in equation no. 16 and interpretation of this estimated coefficient. Therefore, A 1% increase in the real effective exchange rate causes a 0.0855 percent drop in foreign direct investment. However, a one percent increase in inflation results in a 1.319 percent drop in foreign direct investment. The control variables such as annual growth and real interest rate also harm foreign direct investment.

Table No. 8

Vector Error Correction Estimates Sample Size (Adjusted): 4 44 Standard Errors in ( ) & t-statistics in [ ]	
Cointegrating Eq:	CointEq1
FDI01(-1)	1.000000
REER(-1)	-0.123910 (0.02041) [-6.07087]
CPI(-1)	-0.199046 (0.22703)

	[-0.87674]				
GDP_G(-1)	-0.449324 (0.43311) [-1.03745]				
RI(-1)	0.181411 (0.19624) [0.92446]				
C	-8.338477				
Error Correction:	D(FDI01)	D(REER)	D(CPI)	D(GDP_G)	D(RI)
CointEq1	-0.211951 (0.21297) [-0.99520]	0.619877 (0.37821) [1.63898]	1.858598 (0.62719) [2.96339]	-0.190801 (0.17240) [-1.10676]	-2.042961 (0.55722) [-3.66635]
D(FDI01(-1))	-0.128800 (0.21014) [-0.61293]	-0.354318 (0.37317) [-0.94947]	-2.794351 (0.61884) [-4.51550]	0.048236 (0.17010) [0.28358]	2.682809 (0.54980) [4.87961]
D(REER(-1))	-0.040972 (0.11800) [-0.34722]	0.006871 (0.20955) [0.03279]	0.059152 (0.34750) [0.17022]	-0.005190 (0.09552) [-0.05433]	-0.088524 (0.30873) [-0.28674]
D(CPI(-1))	-0.090285 (0.27360) [-0.32999]	0.523303 (0.48588) [1.07703]	-0.341226 (0.80573) [-0.42350]	-0.350989 (0.22147) [-1.58479]	0.360462 (0.71585) [0.50355]
D(GDP_G(-1))	0.044207 (0.14306) [0.30901]	-0.495682 (0.25405) [-1.95110]	0.914949 (0.42130) [2.17174]	-0.773191 (0.11580) [-6.67678]	-0.901169 (0.37430) [-2.40762]
D(RI(-1))	-0.070858 (0.28982) [-0.24449]	0.425162 (0.51468) [0.82608]	-0.311313 (0.85349) [-0.36475]	-0.396583 (0.23460) [-1.69046]	0.429858 (0.75828) [0.56689]
C	0.254858 (0.32123) [0.79338]	1.941739 (0.57046) [3.40381]	-0.027195 (0.94600) [-0.02875]	-0.051049 (0.26003) [-0.19632]	-0.115511 (0.84046) [-0.13744]

Above table no. 8 represent the parameters from the vector error correction model. The ECT term is negative, i.e., -0.211951, which means 21 percent of equilibrium each year by the change in foreign direct investment. The present period's divergence from the long-run equilibrium as an adjustment speed is 21%, indicating that the system is stable. They can't converge to their equilibrium since the

error term's coefficient is incorrect and the effective exchange is positive. The calculated coefficient for the rate of adjustment, in this case, is 1.8 percent, which is relatively low in comparison to their equilibration speed.The control variables such as annual growth as well accurate terms for interest rate mistake correction are negative. The speed of adjustment of both variables, such as annual growth, i.e., 19 percent, and in the real interest rate, i.e., 2.1 percent, is deficient compared to others.

Granger Causality

Table No. 9

Pairwise Granger Causality Tests
Sample: 1 46
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
REER has no effect on FDI	39	3.14358	0.0559
FDI does not affect REER		0.43132	0.6532
CPI has no effect on FDI	43	0.01040	0.9897
FDIdoes not affectCPI		3.22762	0.0507
GDP_G has no effect on FDI	43	1.86724	0.1685
FDIdoes not affectGDP_G		7.43660	0.0019
RI has no effect on FDI	43	0.11948	0.8877
FDIdoes not affectRI		1.97072	0.1533

The calculated results from causality confirmed that there is no bidirectional causality has been observed. Foreign direct investment and other factors like the real effective exchange rate, inflation, yearly growth, and genuine interest have a one-way causal relationship.

Residual Analysis

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.645206	Prob. F(2,34)	0.0856
Obs*R-squared	5.520607	Prob. Chi-Square(2)	0.0633

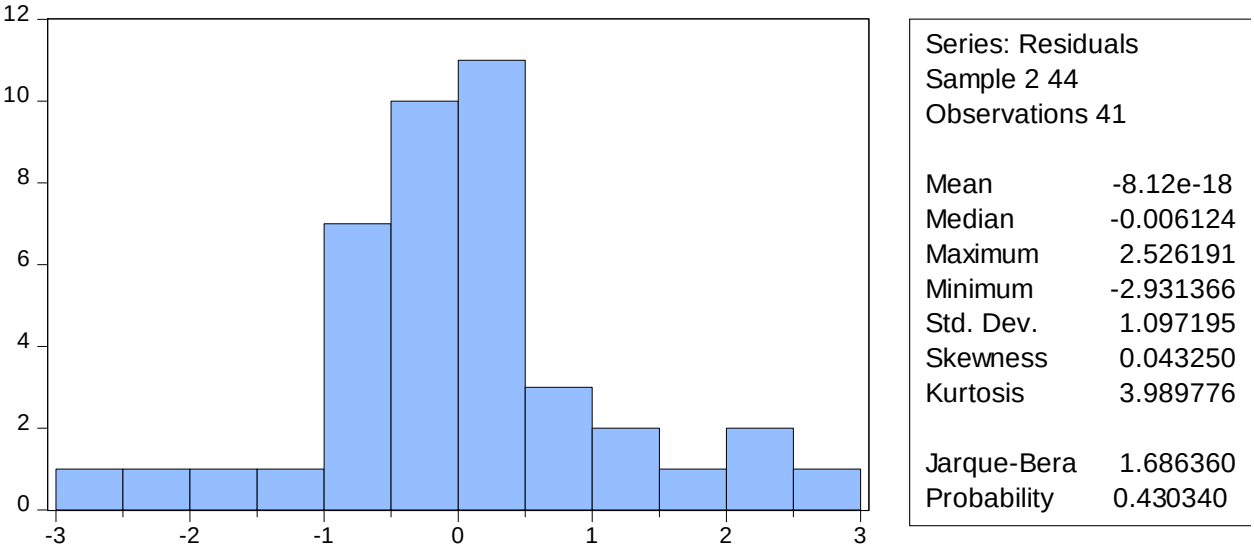
The approximated results of the Breusch-Godfrey test confirmed that at 95 percent confidence interval, residual could not violate the assumption of Serial Correlation.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.561692	Prob. F(4,36)	0.6919

Obs*R-squared	2.408504	Prob. Chi-Square(4)	0.6611
Scaled explained SS	2.775833	Prob. Chi-Square(4)	0.5960

The approximated results of the Breusch-Pagan-Godfrey test confirmed that at a 95 percent confidence interval, residuals are homoscedasticity and cannot violate the assumption of Heteroskedasticity.



The approximated results of the Jarque-Bera test confirmed that at 95 percent confidence interval, residuals are generally distributed because they accept the null hypothesis under the 95 [ercent confidence interval.

Conclusion:

This study aimed to look into the implications of two macroeconomic variables, such as inflation and Using time-series data from 1975 to 2020, to calculate the real effective exchange rate on foreign direct investment in Bangladesh. For Robust estimation, Consider the yearly growth rate and the real interest rate as two control variables. The estimate is based on a variety of econometric techniques, including the Augmented Dickey-Fuller test. (ADF), the Johansen Co-integration Test, and the Vector Error Correction Model (VECM), among others. According to the study's empirical findings, the approximated results confirmed that in the case of this study, Explanatory variables such as, In the long run, the real effective exchange rate and inflation have a considerable negative impact on FDI... As a result, low inflation means a cheaper domestic product for foreigners and directly raised the FDI inflow in Bangladesh.In the long and short run, the exchange rate appears to have a substantial positive relationship with FDI, according to the data.

According to the results of this research, trade openness and exchange rate are the main determinants of FDI inflows to Bangladesh. In contrast, GDP, interest rate and inflation are negligible in attracting FDI inflows to Bangladesh, although GDP and inflation have taken the expected signals.Based on this finding it could be inferred that this study could not found any significant impact on interest rate, GDP, and inflation rate on FDI in Bangladesh.

Recommendations:

Bangladesh's average inflation rate between 1980 and 2018 was 7.63 percent, with a low of 1.91 percent in 2001 and a high of 15.39 percent in 2011. In 2018, Bangladesh's inflation rate was 5.61 percent, much higher than the global average of 3.4 percent. The cause of Bangladesh's high inflation can easily be identified from this Inflation and FDI have a negative connection, implying that excessive inflation in Bangladesh is a barrier to FDI. As a result, to increase FDI inflows to Bangladesh, it is critical to take the required steps to reduce inflation. Except for a couple of occasions since independence, the Bangladeshi taka (BDT) has always depreciated against the US dollar. Since May 31, 2003, Bangladesh has operated under a floating currency rate regime. The dollar value against the taka has increased continually in fixed and floating exchange rate systems. This rise was sometimes excessive and unplanned. Our research shows that as the Bangladeshi taka depreciates versus the US dollar, FDI flows into Bangladesh increase. In order to attract more FDI inflows in Bangladesh, it is imperative to formulate sound foreign investment policy that protects foreign investment as well as the interest of the economy. The quality of foreign investment must be ensured by the government through mobilizing domestic resources and empowering private sector for productive investment. It is crucial to ensure an efficient domestic market to increase efficiency from both domestic and foreign investors. In order to make a sure effective performance by the domestic firms, the Government of Bangladesh must focus on increased trade openness. Increased openness towards the outside world will enable domestic firms to participate directly in the global economy. In addition to that, the government should focus on developing more liberalized foreign investment policies to attract more Foreign direct investment.

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