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Determinants of Foreign Direct Investment in Bangladesh: Evidence from ARDL Bounds Approach

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ABSTRACT

Foreign Direct Investment (FDI) plays a crucial role in the economic growth of developing nations like Bangladesh, enhancing capital, technology transfer, infrastructure development, and job creation. The study examines the influence of significant macroeconomic factors—exchange rate, interest rate, and trade openness—on foreign direct investment inflows in Bangladesh across a 50-year timeframe (1974–2023). This study utilizes the Autoregressive Distributed Lag (ARDL) bounds testing approach to examine these dynamics, drawing on annual time series data sourced from the World Development Indicators. The results from the Unit Root Tests ADF indicate that the variables are integrated at $I(0)$ and $I(1)$, thereby supporting the application of ARDL methodology. The ARDL Bounds Test validates the presence of long-term co-integration among the variables. The results indicate that a decline in the exchange rate has a notable positive impact on foreign direct investment, suggesting that a weaker currency may entice international investors by lowering relative production expenses. The analysis reveals that interest rates exert a considerable negative influence, indicating that elevated borrowing costs discourage investment activities. The relationship between trade openness and FDI is notably positive, highlighting the significance of global economic integration. The short-run dynamics further validate rapid adjustments moving towards long-run equilibrium. The findings emphasize the importance of ensuring macroeconomic stability and encouraging trade liberalization to secure ongoing FDI inflows. These insights provide essential direction for policymakers in crafting investment-oriented economic strategies that can foster sustainable development in Bangladesh.

1. Introduction

1.1. Backgrounds of the study

Since attaining independence, Bangladesh's economy has not had an easy ride. Since then, the nation's economic policies have undergone several modifications. For example, after adopting socialism shortly after obtaining independence, it nationalized all of its state-owned businesses (SOEs). The communist method of production, however, proved ineffective in generating the required economic growth, so the nation had to enter the privatization-led free-market economy in the early 1980s. The statistics show that even when one considers a free-market economy founded on privatization, the economy was underperforming. Among the many issues the economy was having were low GDP growth and guarantees of food security (Chowdhury, 2022). FDI's contribution is essential to boosting a nation's economic expansion. However, about one-third of the 160 million people who call Bangladesh home are living in abject poverty. The nation has limited resources and a dense population. Poverty is therefore a major issue. Without

consistent economic growth, it will be impossible to pull such a large number of people out of poverty; for this reason, trade and investment should be prioritized (Hussain & Haque, 2016).

Foreign Direct Investment (FDI) is shaped by various macroeconomic factors, including the exchange rate, interest rate, and trade openness (Cushman, 1985; Jannat, 2020). An increase in the exchange rate, which signals a depreciation of the host country's currency, may lead foreign investors to perceive greater appeal in making investments. This occurs as assets and production expenses in the host nation become comparatively less expensive when viewed through the lens of the investors' home currency, which may lead to enhanced investment returns (Froot & Stein, 1991). Excessive currency depreciation can adversely impact Foreign Direct Investment (FDI). Sudden or erratic depreciation introduces exchange rate risk, complicating the ability for investors to forecast returns (Bo, 2009; Goldberg &

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Kolstad, 1995). Excessive depreciation can indicate macroeconomic instability, ineffective monetary policy, or political risk, which may deter long-term investment (Busse & Hefeker, 2005). According to recent data spanning from 2015 to 2023, there was a gradual increase in Foreign Direct Investment (FDI) inflows to Bangladesh from 2015 to 2018, followed by a significant decline from 2019 to 2023 (The Business Standard, 2026). The COVID-19 pandemic during 2020-21 had a significant effect on investment inflows, showing only a slight recovery in subsequent years (World Bank, 2023). The exchange rate of the Bangladeshi Taka (BDT) against the US dollar (USD) has been depreciating since the last quarter of 2021, and has depreciated substantially by around 25% since then, amid declining foreign exchange reserves and remittances (The Financial Express, 2026). In 2023, the inflow of net FDI in Bangladesh declined by 16% year-on-year due to investment uncertainties during an election year and a volatile foreign exchange situation. Experts noted that the tight forex situation caused investors to adopt a "wait-and-see" approach toward new investments (The Business Standard, 2024).

A host country's interest rate affects its investment cost and risk-return forecasts. Investors might finance operations or growth at a lower cost. Lower rates often lead to consumer spending and economic growth, hence creating a larger market for goods/services. Higher borrowing rates also increase the cost of starting or expanding business, reduce consumer demand and economic activity. Investors are worried about macro instability. In recent year interest rate became lower than 9.55 in COVID-19 period and in 2023 it dropped to 7.57 that is a great indicator to FDI influx Sustaining FDI inflows into Bangladesh depends on macroeconomic stability and trade facilitation enhancement taken as a whole. During and after COVID-19, the trade percentage of GDP decreased to 26.27. In 2022, it rose significantly to 33.77, but in 2023, it decreased again to 30.98. Stability is essential for enhancing the flow of foreign direct investment. Trade openness, typically measured by the ratio of total trade (exports plus imports) to GDP, signals a country's integration into the global economy and its commitment to liberal trade policies (Mashrur, 2025). A more open economy generally indicates a more favorable environment for FDI, as it suggests easier access to international markets for inputs and outputs, reduced trade barriers, and potentially higher institutional quality and regulatory predictability (Megasari & Saleh, 2021). Bangladesh's trade liberalization policies are thus crucial in attracting FDI, as they can accelerate the inflow of foreign capital by enhancing export performance and fostering economic growth (Ahmed *et al.*, 2023). Empirical evidence from Bangladesh suggests that trade openness significantly impacts inward FDI (Biswas *et al.*, 2023).

Bangladesh has witnessed a fluctuating but generally upward trend in FDI inflows over the past few decades, driven by a combination of domestic reforms and global

economic shifts. The country's advantageous geographical location and a large, cost-effective labor force are consistently cited as primary pull factors for foreign investors (Chowdhury & Snigdha, 2023). While the absolute volume of FDI has increased, its proportion relative to GDP or when compared to peer economies often indicates untapped potential (Karim *et al.*, 2023). The government's initiatives to improve the investment climate, including establishing Special Economic Zones (SEZs) and streamlining regulatory processes, aim to bolster these trends further. However, persistent challenges such as infrastructure deficits, bureaucratic hurdles, and governance issues continue to moderate the pace of FDI growth (Chowdhury & Snigdha, 2023). Research in Bangladesh has explored the impact of exchange rate volatility on export performance, which is indirectly linked to the attractiveness of FDI, particularly for export-oriented sectors. For instance, studies have employed ARDL models to assess both the short-run and long-run relationships between exchange rate fluctuations and economic indicators, revealing a significant influence on trade dynamics (Khan & Ahmed, 2024). Therefore, a stable and predictable exchange rate regime is crucial for fostering a conducive FDI environment. The complex interplay between interest rates, inflation, and exchange rates creates a dynamic macroeconomic feedback loop that critically informs investment decisions. According to the covered interest rate parity principle, the forward exchange rate is structurally determined by the spot rate and the interest rate differential, indicating a direct link between interest rate movements and currency markets, subsequently influencing cross-border investments. Studies on the macroeconomic determinants of FDI in Bangladesh have often included interest rates as a key variable, analyzing their impact alongside other factors such as corporate tax rates and GDP growth (Akhter & Akter, 2024). Bangladesh's ongoing trade liberalization policies are therefore instrumental in attracting FDI, as they can accelerate the inflow of foreign capital by boosting export performance and stimulating overall economic growth. Empirical research from Bangladesh frequently indicates that trade openness exerts a significant positive impact on inward FDI. The ARDL approach has been utilized to examine the asymmetric effects of globalization and trade openness on FDI, providing nuanced insights into these relationships (Biswas *et al.*, 2023).

A significant number of studies have focused on Foreign Direct Investment (FDI) in the context of Bangladesh. The relationship between exchange rates, interest rates, and trade openness in relation to foreign direct investment remains an area that has not been thoroughly examined. This study examined the condition of FDI inflow through these macro determinants. Additionally, the majority of the papers analyze time series over a short period of time, typically 20-30 years. The impact of the exchange rate, interest rate, and trade openness in Bangladesh is too rare to encompass a 50-year time frame.

Therefore, this investigation has examined the influence of this variable on Foreign Direct Investment over a period of approximately 50 years (1974-2023). This study aims to analyze how significant macroeconomic factors—specifically exchange rate variations, interest rate trends, and trade openness—affect the inflow of Foreign Direct Investment (FDI) in Bangladesh. The study also seeks to examine the role of Bangladesh's geographical position in drawing foreign investment, especially regarding regional connectivity and export-focused industrial development. The specific Objectives are:

- To identify the macroeconomic variables that significantly influence FDI in Bangladesh.
- To examine the short and long run relationship between these variable (Exchange rate, Interest rate, and Trade) and Foreign direct investment.

By providing information on the nature of these interactions in the context of Bangladesh, this study adds to the body of knowledge already in existence. The results provide useful information for developing economic policies and investment plans that can help create an atmosphere that is favorable for luring in foreign capital, better controlling exchange rates, interest rates and maximizing trade openness. The current study significantly adds to the body of knowledge on international economics and investment trends with its exacting methodology and thorough examination of interest rates, trade openness, and exchange rates. The findings of this study can help guide investment planning and government policymaking, ultimately promoting Bangladesh's sustainable economic growth.

2. Literature review

Foreign Direct Investment (FDI) is a crucial external source of capital for Bangladesh, supporting industrialization, technology transfer, employment, and overall economic growth (Salan et al., 2025). Various studies have explored the relationship between the Exchange rate and FDI with many macroeconomic indicators from different perspectives. Research has indicated that foreign direct investment (FDI) is a key driver of economic growth in accelerating the economic success and wealth of a nation; since the start of the 1990s FDI has been the most vital source of foreign capital for emerging market economies (EMEs) of developing country like Bangladesh (Hussain & Haque, 2016).

If we look at foreign country, Mawutor et al., 2023 investigated how Ghana's growth was affected by FDI, actual exchange rate, payments, and imports. The study discovered that these elements are co-integrated with economic success, with remittances having a favorable and significant influence. Significant volatility has been a defining feature of Kenya's floating exchange rate regime, with recent highs and lows relative to other currencies. Furthermore, examining the connection between an operational exchange rate regime and foreign direct investment is warranted given that monetary policies routinely impact and modify exchange rates, either

purposefully or inadvertently, in order to make the economy competitive on a worldwide scale (Otieno & Aduda, 2022). World Bank. Likewise, studies have suggested that FDI could cause the transfer of technology, economic change, technological advancement, and human capital development (Nketiah et al., 2020). Another study emphasizes how FDI and FDI-generated spillovers affect the total factor productivity (TFP) growth of manufacturing companies spread across all eight areas of Vietnam. They discovered that FDI and FDI spillovers affected the TFP of manufacturing companies in Vietnam differently by area (Hussain & Haque, 2016). Using the internal rate-of-return technique, Alexander and Murphy (1975) looked at how changes in exchange rates affected capital flows; their results backed the claim that the US dollar devaluations of the 1970s drove FDI flows into the United States (Abbott et al., 2012).

Still, about one-third of Bangladesh's 160 million people live in severe poverty. The nation's limited resources and great population density are notable. Poverty thus becomes a major issue. Steady economic growth will make it hard to bring such a large number of people out of poverty, so investment and trade should be given top priority (Hussain & Haque, 2016). Between 1972 and 2011, Tabassum & Ahmed (2014) looked at the correlation between FDI and GDP growth in Bangladesh. These studies used multiple regression methods to assess the relationship between FDI and economic growth. Though their emphasis is on FDI influence on economic growth or determinant of FDI inflows in Bangladesh, a group of researchers conducted empirical studies focusing on FDI (Qamruzzaman et al., 2019).

They took into account the relationship between real gross domestic product, FDI, domestic investment, and trade policy regime openness.

In theoretical framing, Dunning's Eclectic (OLI) paradigm, FDI occurs when firms possess ownership advantages (O), find attractive location advantages (L) and benefit from internalization (I). Macroeconomic variables such as the exchange rate, interest rate and trade openness are central to the location (L) advantage, shaping profitability, risk, and market access in host economies (Otieno & Aduda, 2022). Stable, predictable macro conditions, open trade regimes and supportive infrastructure enhance location attractiveness (Adewole et al., 2025). Another theory The Mundell–Fleming model extends IS–LM to an open economy, emphasizing how interest rates, exchange rates and capital flows interact under different exchange-rate regimes and capital mobility. Higher domestic interest rates attract short-term capital but can appreciate the currency and dampen net exports; exchange-rate adjustments transmit monetary and fiscal policy to output and capital flows FDI can be added as a component of the financial account: interest rate differentials, expected exchange-rate paths and trade openness influence both the goods-market IS curve (via exports/imports) and capital flows in the balance of

payments (Navarro & Álvarez-Quiroz, 2022). Our study focused on three major variable such as exchange rate, interest rate and trade openness. (Ang, 2008) claims that the rise in the actual exchange rate seems to deter FDI inflows. (Faroh & Shen, 2015) concluded that other economic factors, including GDP, inflation, and interest rates, were not substantial enough to be considered predictors of foreign direct investment inflows. But other study demonstrated that trade openness, inflation, and exchange rates all had a major impact on FDI inflows.

A study using ARDL and NARDL for Bangladesh shows that the exchange rate and FDI are cointegrated, with real depreciation of the Taka (a higher BDT/US\$ rate) significantly increasing FDI inflows in the long run, consistent with the wealth-effect hypothesis of Froot and Stein, where a weaker host currency makes domestic assets cheaper for foreign investors and raises expected returns in foreign currency terms (Qamruzzaman et al., 2019). Osinubi (2017) discovered that the decline of the host country's currency versus the home currency increases the relative wealth of foreigners, hence increasing the attractiveness of the host country for foreign direct investment, since companies may buy assets at a relatively lower cost. Therefore, a depreciation of the host currency should boost FDI into the host nation; on the other hand, an appreciation of the host currency should reduce FDI (Mostafa, 2020). The interest rate enters the theoretical framework mainly through the cost-of-capital channel and its role as a signal of macroeconomic stability. Higher domestic lending or real interest rates raise the user cost of capital and can discourage projects financed in local currency, but empirical work for Bangladesh often finds statistically insignificant effects of interest rates on FDI, suggesting that multinational firms rely more on internal or foreign financing and are driven by other fundamentals (Islam et al., 2022; Khandoker et al., 2025). Where positive interest-FDI correlations appear, they are typically interpreted as reflecting a stable financial environment or broader macro strength rather than a direct price effect (Mukul & Soruar, 2025). This is consistent with panel evidence that real interest rates are not a robust long-run determinant of domestic investment once FDI and growth are controlled for (Islam et al., 2022). Trade openness is theoretically a key market-related determinant of FDI. In horizontal FDI models, openness enlarges market access and reduces trade costs, raising expected profitability; in vertical FDI models, liberal trade policy facilitates two-way trade in intermediate and final goods along global value chains. Empirically, Bangladeshi and emerging-market studies proxy openness by the trade-to-GDP ratio and repeatedly find a positive long-run association between trade openness and FDI, or between openness and growth in the presence of FDI, supporting the view that liberal trade regimes attract efficiency-seeking and export-oriented investors (Salan et al., 2025). There is also growing empirical data pointing to

trade openness's contribution to higher efficiency, production, technology, and development in both industrialized and developing nations (Mawutor et al., 2023). Nketiah et al. (2020) studied the causal link between trade openness, domestic investment, foreign direct investment, and economic growth in Bangladesh from 1976 to 2014. It was also added that enhancing a nation's economic development depends on FDI.

An overview of these studies shows that exploring such factors that actually attract and motivate foreigners to invest in the host country is crucial. The current body of research has thoroughly recorded a great number of studies examining the relationship between changes in exchange rates and FDI arrivals. This study aims to contribute to the present empirical debate by examining how changes in the exchange rate, interest rate and trade openness influence foreign direct investment inflows into Bangladesh. There are requirements to correct the variable, the model, and the methodology, and there are several terms to explore in the next part of the research. Additional independent variables utilized include the exchange rate, interest rate, and Trade. The aim of the diverse estimation models utilized in this work is the ARDL estimation approach for the timeframe from 1974 to 1923.

3. Methodology

3.1. Data source

This study uses only secondary data from 1974 to 2023, collected from the World Development Indicator (WDI) and other reputable sources. The empirical findings show that FDI flows in Bangladesh are mostly determined by the Exchange rate, Interest rate, and trade balance. FDI is included as a Dependent variable, and others are independent Variables. The selection of these variables is supported by both theoretical and empirical arguments, which are discussed below. The FDI inflows, Official exchange rate, loanable Interest rate and the trade % of GDP has taken form WDI. There have little bit limitation which is deposit interest rate has been use as a proxy variable for the proper study (Asiedu, 2002). These factors should be taken into account in further research.

3.2. Empirical model

Variables are a mix of I (0) and I (1), so this paper used an ARDL model. Natural logs were used to transform all variables. The generalized version of the empirical model based on research variables can be shown in the following manner.

$$FDI = f(EXR, INT, TR) \quad (1)$$

Transformed into a linear form, equation (1) may be shown as follows:

$$\ln FDI = \alpha_0 + \beta_1 \ln EXR + \beta_2 \ln INT + \beta_3 \ln TR + \epsilon_t \quad (2)$$

Where *EXR* is the exchange rate, *FDI* represents the foreign direct investment, *INT* denotes the Interest Rate, and *TR* is the Trade openness. Model coefficient of β_1, β_2 and β_3 in equation (2) signify long run elasticity ϵt denotes the error correction term in the equations.

3.3. Specification of the ARDL Model

The study utilizes empirical analysis through the ARDL model. The co-integrating method establishes long-term linkages among variables of various integration orders. It offers both long-term and short-term projections of the relationships among designated variables.

The general ARDL equation can be expressed as follows when two variables are employed, each possessing "n" lags for the independent and dependent variables.

$$\Delta y_t = c_0 + \alpha y_{t-1} + \beta x_{t-1} + \sum_{i=0}^{n-1} a_j \Delta y_{t-j} + \sum_{i=0}^{m-1} b_j \Delta x_{t-j} + \mu_t \quad (3)$$

The general ARDL equation, which defines a relationship between Macro-determinant & FDI is as follows:

$$\Delta \ln FDI_t = \alpha + \beta_1 \ln FDI_{t-1} + \beta_2 \ln EXR_{t-1} + \beta_3 \ln INT_{t-1} + \beta_4 \ln TR_{t-1} + \sum_{i=1}^{\alpha_1} \delta_1 \Delta \ln FDI_{t-i} + \sum_{i=0}^{\alpha_2} \delta_2 \ln EXR_{t-i} + \sum_{i=0}^{\alpha_3} \delta_3 \ln INT_{t-i} + \sum_{i=0}^{\alpha_4} \delta_4 \ln TR_{t-i} + \epsilon_t \quad (4)$$

Where, Δ denotes the first difference operator, α is the constant term, β_i ($i=1...4$) represents coefficients of the lagged levels, δ_i ($i=1...4$) signifies the coefficients of lagged variables, and ϵt implies the error terms, which are assumed to be serially uncorrelated (Chowdhury, 2022). The equation, though, may be split into two sections.

The first part, designated by β_i , reflects the long-run relationship. Conversely, the part with the summation sign would indicate the short-run dynamics of error correction.

To find the model's long-run parameters on Exchange Rate and Foreign Direct Investment, one might apply the following equation.

$$\Delta \ln FDI_t = \alpha + \sum_{i=1}^{\alpha_1} n_1 \ln FDI_{t-i} + \sum_{i=0}^{\alpha_2} n_2 \ln EXR_{t-i} + \sum_{i=0}^{\alpha_3} n_3 \ln INT_{t-i} + \sum_{i=0}^{\alpha_4} n_4 \ln TR_{t-i} + \epsilon_t \quad (5)$$

The following equation can be utilized to assess the model's short-term dynamics: exchange rate and foreign direct investment.

$$\Delta \ln FDI_t = \alpha + \sum_{i=1}^{\alpha_1} \gamma_1 \Delta \ln FDI_{t-i} + \sum_{i=0}^{\alpha_2} \gamma_2 \Delta \ln EXR_{t-i} + \sum_{i=0}^{\alpha_3} \gamma_3 \Delta \ln INT_{t-i} + \sum_{i=0}^{\alpha_4} \gamma_4 \Delta \ln TR_{t-i} + \omega ECM_{t-i} + \epsilon_t \quad (6)$$

The term for error correction in the equation represents the pace at which long-run equilibrium adjustments happen. Nonetheless, the approach towards the long-run equilibrium would take place if the error correction term

exhibits a negative sign and the coefficient associated with it is considered significant.

4. Results

4.1. Unit root test

The Augmented Dickey-Fuller (ADF) test actually identifies the stationarity of the time series data. The result shows that FDI, INT, and TR are not significant at level (P-value above 0.05), which rejects the null hypothesis of a unit root at the level. However, the exchange rate was found to be significant at that level. This indicate the mixture of the integrated order I (0) and I(1), absence of I(2) justifies the ARDL is appropriate for this analysis.

Table 1 Unit Root Test for Individual Series.

Variables	Level I(O)		At first Difference I(1)		Integration Order
	ADF Test	P-value	ADF test	P-value	
Foreign Direct Investment	-0.864623	0.7901	-5.090417	0.0002	I(1)
Exchange Rate	-3.923380	0.0038	-6.918877	0.0000	I(0)
Interest Rate	-1.935754	0.3135	-4.798163	0.0003	I(1)
Trade	-2.117878	0.2388	-9.461150	0.0000	I(1)

4.2. Co integration test

4.2.1. Lag selection criteria

Table 2 Optimal Lag selection Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-81.36991	NA	0.000756	4164386	4.164386	4.225263
1	80.93140	285.0169	6.04e-07	-2.972264	-2.136375*	-2.667879
3	-105.3168	38.06494*	4.11e-07*	-3.381305*	-1.876705	-2.833413*

* indicates lag Order selection by the Criterion

The chosen variable lag selection criteria are used the amount of lag sin the employed ARDL model. The number of lag length has chosen using Akaike Information Criterion (AIC) on the basis of minimum AIC value, lag length is chosen at 2.

4.2.2. ARDL bound test result

Table 3 ARDL bound test of co-integration

Table 3 presents results of the ARDL Bounds test for Co-integration. Even at 5% level of significance, the calculated F-statistic exceeds all critical values. Therefore, the null hypothesis for no Co-integration among variables is rejected.

It is verified that for the variables included in the study, a long-run correlation exists. study used bound test to find whether current variables correlate. Table 4 projected F-value of 3.832012 exceeds the top and lower bound value for 5% level of significance. Therefore, the analysis rejects the null hypothesis, which states there is no co integration among the variables, and accepts the alternatives indicating their long-term co-integration among variables.

Table 2 ARDL Bound Test of Co-integration

Test Statistic	Null Hypothesis (H0): No levels Relationship	
	Value	
F- Statistics Value	3.832012	
K	3	
Bound Critical Value		
Level of significance	Lower Bound I(0)	Upper Bound I(1)
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

4.2.3. Long-run analysis result

Table 1 Long Run Estimation Result

Dependent Variables: Foreign Direct Investment				
Ind. Variable	Coefficients	Standard Error	t-Statistic	P-values
LEXR	2.177775	0.879385	2.476476	0.0181
LINT	-4.23086	1.31886	-3.20797	0.0028
LTR	3.367338	1.565038	2.151601	0.0382
C	7.89989	5.746302	1.374778	0.1777

The long-run coefficients indicate the projected influence of each independent variable on FDI over an extended period, under the assumption that the system has reached equilibrium (i.e., when short-term variations have subsided and the error correction term equals zero). Often mentioned as a key factor of FDI is the exchange rate, or the rate at which one currency is traded for another. A stable exchange rate is good for FDI. As companies take advantage of fairly cheap costs in host countries to buy facilities, a weaker real exchange rate should be predicted to boost vertical FDI (Walsh and Yu, 2010). A real depreciation of the home currency boosts the wealth of foreign investors in relation to that of domestic investors and so promotes FDI (Mostafa, 2020). This study highlighted the fact that currency depreciation influences foreign investors, and the inflow of FDI increases in the long run.

FDI is significantly and negatively influenced by the interest rate in the long term. In the long term, a higher domestic interest rate (which frequently indicates tighter monetary policy or higher financing costs) is associated with a decrease in FDI. Quantitatively, the estimated coefficient indicates that a one percentage-point increase in the interest rate results in a substantial decrease in FDI inflows, subject to the same assumptions.

Trade openness has a highly significant and positive long-run coefficient, suggesting that FDI inflows are significantly increased by a more comprehensive integration with the global economy. FDI is relatively responsive to trade openness, as indicated by the

coefficient's magnitude. For instance, a 1% increase in trade (as a percentage of GDP) results in an approximately $\beta\%$ increase in FDI, where β is the estimated coefficient in percentage terms.

4.2.4. Short run analysis

In the event that variables are connected through Co-integration, an error correction model must be used. Table 5 illustrates the short-run dynamic growth equation's findings. The ECM value in this analysis is -3.393813, indicating a statistically significant negative correlation. The short-run (SR) is approaching the long-run equilibrium, as evidenced by the presence of a negative sign and statistical significance (Mustafa et al., 2024). FDI inflows dynamically alter to restore the long-run equilibrium when shocked, as evidenced by the significant error-correction speed.

The diagnostic tests confirm the reliability and validity of our estimation findings.

4.3.1. Serial correlation test

The LM test can be employed to evaluate the autocorrelation of the errors in a regression model. Serial correlation is the term used to describe it in the context of time series data. After estimation of the model, it is important to be sure that the residuals are uncorrelated with each other. If the p-value of the chi-square is less than 5%, it will reject the null hypothesis and accept the alternative hypothesis, which means that serial correlation exists. If they find a serial correlation, it means that the model is unspecified and there are some missing important variables that measures the significant relationship. In this research, the null hypothesis posits that there is no serial association. Based on the results of this LM test, the probability value of the Chi-square statistic, 0.1338, is greater than 5%. Consequently, the null hypothesis, which asserts that there is no serial correlation, can be reasonably accepted (Warren et al., 2023).

4.3.2. Heteroscedasticity test

This model uses the Brush-Pagan-Godfrey Test to detect the heteroskedasticity. The equal variance of residuals at each level of the predictor variable is crucial for linear regression analysis. This assumption is referred to as heteroscedasticity. The residuals are classified as heteroscedastic when we deviate from this assumption. When variables are not constant and the data point of this variable is not similar with each other that create a biasness, significant variable denote as an insignificant. The credibility of the results is compromised by regression. The models' probability does not reach significance at the 5% level, as indicated by the Chq statistic. This indicates that the models are free from heteroscedasticity. This reinforces the econometric assumption that heteroscedasticity is unlikely to pose an issue for a model (Sari et al. 2008).

Table 1 Short Run Estimation Result.

Dependent Variable: Foreign Direct Investment				
Regressors	Coefficient	Std. Error	t-Statistic	P Value
D(LFDI(-1))	1.992701	0.397479	5.013356	0.0010
D(LFDI(-2))	1.480497	0.372974	3.969439	0.0041
D(LEXR)	11.00499	2.599048	4.234239	0.0029
D(LEXR(-1))	-11.44280	-3.185195	-3.185195	0.0129
D(LINT)	-1.981399	0.825047	-2.401560	0.0431
D(LINT(-1))	3.608273	1.004557	3.591904	0.0071
D(LINT(-2))	6.111218	0.0909448	6.719699	0.0001
D(LTR)	-1.392252	0.835116	-1.667137	0.1340
D(LTR (-1))	-10.86428	1.889920	-5.748537	0.0004
D(LTR (-2))	-10.50835	2.244641	-4.681526	0.0016
CoIntEq(-1)*	-3.393813	0.498632	-6.806251	0.0001

R-squared 0.966633 & Adjusted R-squared 0.916583

4.3.3. Normality test

The Jarque-Bera test is employed to ascertain whether the residuals are normal. The null hypothesis regarding a normal distribution can be evaluated using Jarque-Bera statistics and computed P values. We adopt the null hypothesis for each variable based on the P-values that demonstrate its normal distribution (Nadine et al., 2021). If the p value is less than 5% it means that the residuals are not normally distributed and this study reach the decision that the residuals are normally distributed among 48 observation. P value of the Jarque-Bera is 0.0605609 so we cannot reject the null hypothesis and it means this follows a normal distribution.

4.3.4. Ramsey reset test

This is for the general specification error test of the regression, which determines whether the regression has been correctly specified. Additionally, identify the nonlinear relationship and missing variables, which are essentially errors in regression analysis. If the p-value is less than 5%, it indicates that the model is not accurately

specified, and the value specified is greater than 5% of the p-value.

4.4. Structural break test

4.4.1. CUSUM test

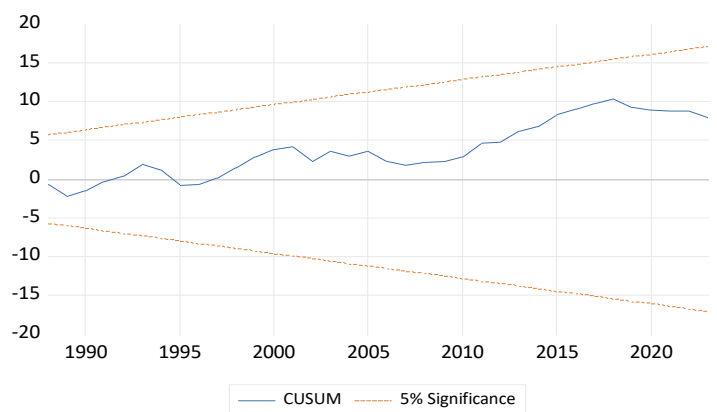


Figure 1: CUSUM Test

4.3. Diagnostic Test

	Test	Prob.	Conclusion	
	Serial Correlation Test	LM	0.1883	No serial Correlation
	Heteroscedasticity Test	BPG	0.1603	No Heteroscedasticity
	Normality test	JB	0.0605609	Normally Distributed
	Ramsey Reset Test		0.9985	Model is Correctly Specified.

To ascertain the stability of the connection between FDI and its determinants over the extended period from 1974 to 2023, parameter stability tests were performed utilizing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared recursive residuals (CUSUMSQ) methodologies. The CUSUM and CUSUMSQ plots consistently maintained under the 5% critical limits during the sample period, signifying the stability of the model's parameters and the absence of structural fractures. In summary, the regression coefficients exhibited no substantial variations over time; the influence of exchange rate, interest rate, and trade on FDI has remained mostly stable despite economic regime changes or shocks from 1974 to 2023. Should an instability or rupture occur (for example, if the relationship altered following an event such as economic liberalization or a financial crisis), the CUSUM or CUSUMSQ chart would have strayed beyond the confidence ranges.

4.4.2. CUSUM-square test

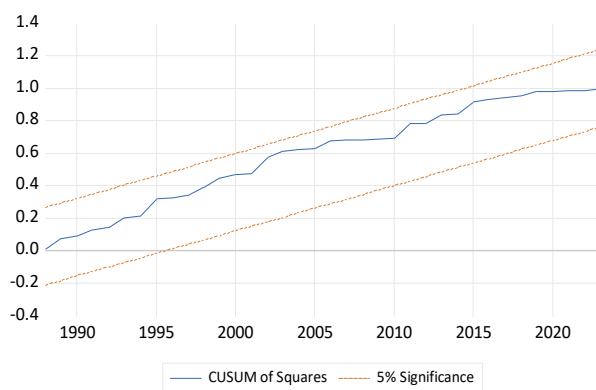


Figure 2: CUSUM-Square Test

Consequently, we deduce that the coefficients exhibit structural stability. This stability is essential for the credibility of the long-term results; it indicates that the findings may be generalized throughout the study time and that the model would be dependable for forecasting or policy analysis, provided there are no significant structural changes beyond the sample.

5. Conclusion

5.1. Conclusion & policy implication

This study examined the determinants of Foreign Direct Investment (FDI) in Bangladesh over the period 1974–2023 using the ARDL bounds testing approach. The empirical results confirm the existence of a long-run relationship between FDI and key macroeconomic variables such as exchange rate, interest rate, and trade openness. The findings indicate that exchange rate depreciation positively influences FDI inflows, suggesting that a weaker domestic currency may attract foreign investors by reducing relative production costs. In contrast, higher interest rates negatively affect FDI, as increased borrowing costs tend to discourage investment activities. Trade openness, however, shows a significant

positive impact on FDI, highlighting the importance of integration with global markets for attracting foreign investment. These findings are largely consistent with many previous studies on developing economies, which also report a positive relationship between trade openness and FDI inflows, as well as a negative impact of high interest rates on investment decisions. Similarly, several empirical studies on Bangladesh and other emerging economies have found that currency depreciation can stimulate foreign investment by improving cost competitiveness. However, some earlier studies report mixed or insignificant effects of exchange rate movements on FDI, indicating that the relationship may vary depending on economic conditions, policy environment, and investor expectations.

Overall, the results reinforce the importance of maintaining macroeconomic stability, promoting trade liberalization, and ensuring a favorable investment climate to sustain FDI inflows in Bangladesh. Policymakers should focus on designing policies that stabilize financial conditions, encourage openness to international trade, and strengthen economic fundamentals in order to attract long-term foreign investment and support sustainable economic growth.

5.2. Limitation of this study

A significant limitation of this study was the difficulty in acquiring comprehensive and consistent data for all pertinent macroeconomic variables throughout the entire 50-year span. Specifically, because reliable long-term data for the lending interest rate was not available, the deposit interest rate served as a proxy variable. This substitution was implemented due to the observed tendency for both deposit and lending interest rates in Bangladesh to fluctuate in parallel over time. Nonetheless, it is recognized that this may not entirely encompass the intricate impacts of lending rates on foreign direct investment. Future investigations with access to more detailed and precise lending rate data could yield deeper insights into the relationship between interest rates and foreign direct investment.

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