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The Remittance, Foreign Direct Investment, Export, and Economic Growth in Bangladesh: A Time Series Analysis

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RESEARCH ARTICLE

Remittance, Foreign Direct Investment, Export, and Economic Growth in Bangladesh: A Time Series Analysis

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Abstract

This research empirically examined the effect of internal and external factors on the economic growth of Bangladesh using the annual data from 1976 to 2019. ARDL bounds tests were used to detect cointegration and understand the dynamic effect. This study mainly identified the positive and negative casualties because remittance and export have a significant positive role, and FDI has an adverse role in the economic growth process. Furthermore, this study recommends that the government take appropriate steps to increase export, the inflow of remittance and FDI to achieve long-run economic growth, considering the impact of COVID-19 and present Russia-Ukraine war.

Keywords: Remittance, Foreign direct investment, Export, Economic growth, ARDL

1. Introduction

Bangladesh has been robustly trying to achieve sustainable long-run economic growth like other developing countries since its independence. As a result, Bangladesh reached a low-middle-income position in 2015 and is on track to graduate from the United Nations Least Developed Countries (LDC) list in 2026; at the same time, Bangladesh wants to graduate to upper-middle-income country status by 2031 with significant economic growth, productive investments, skilled workforce creation, and poverty reduction (World Bank, 2021a,b). However, during globalization and anti-globalization sentiments, it becomes hard for Bangladesh to understand 'what determines economic growth.' It is well established by the economic literature that various factors can influence economic growth due to their complex nature. Domestic determinants such as human capital, savings, democracy, political stability, good governance, and robust macroeconomic policies are essential for sustainable economic growth (A. Mamun & Arfanuzzaman, 2020; P. Narayan & Smyth, 2005; Roubini & Wachtel, 1999).

Similarly, internal factors such as export and external factors like workers' remittance and foreign direct investment (FDI) are equally crucial for the sustainable economic growth of developing countries (Almfraji & Almsafir, 2014; Azman-Saini, Law, & Ahmad, 2010; Chen & Jayaraman, 2016). In addition, a country's sustainable economic growth is essential for unemployment reduction, quality education, better health facilities, and an ultimately better standard of living, which is preferable to a struggling economy. Moreover, modern social and economic research demonstrates that sustainable economic growth indorses human development, the ultimate objective of any economic activity worldwide (Nourzad & Powell, 2003).

This study examines the influence of internal and external factors on economic growth. Besides, this research will provide an experimental examination and enhance the existing literature on the influence of personal remittances, FDI, and export on the

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economic growth process of Bangladesh and developing countries. For this investigation, this study has used Bangladesh's yearly data from 1976 to 2019 of personal remittance, FDI, export, and gross domestic product (GDP), and the most prominent time-series econometric technique called Autoregressive Distributed Lag (ARDL) model. However, Bangladesh has received significant remittances from its foreign residents since the 1980s. As a result, Bangladesh holds the sixth-largest status by sending 7.8 million workers (UNDESA, 2019). Due to this significant number of workers, Bangladesh received $18.21 billion of personal remittances in FY2020, 6.6% of the total GDP, which increased to $24.78 billion in FY2021, astonishingly in COVID-19 periods (Bangladesh Bank, 2021a,b,c). However, remittances to Bangladesh will likely slow down if the Russia–Ukraine war is prolonged.

The economy of Bangladesh has failed to attract a significant amount of FDI in recent years. According to the UNCTAD (2021), FDI inflow declined to $2.9 billion in 2019 compared to $3.6 billion in 2018 and declined continuously by 11% to $2.6 billion in 2020 compared to 2019. The collapse reflects the general economic crisis caused by the Covid-19 pandemic, and it will take a long time for FDI inflows to recover as investment commitments remain weak. In addition, the recent Russia–Ukraine war could further weaken FDI inflows. Moreover, adequate infrastructure, power and gas supply shortage, port facility, bureaucracy problems, corruption, democracy, and law and order are the other reasons for continuously falling FDI. As a result, Bangladesh holds the lowest ease of doing business ranking, 168 out of 190 countries, which is significantly behind any South Asian country except Afghanistan (World Bank, 2020).

Furthermore, export also plays a significant role in the sustainable growth of an economy. For example, Bangladesh has recorded an average of 11% annual export growth since 2001 due to the large quantity of RMG production. However, Bangladesh exported a total of $41.32 billion in FY2019, and it declined to $36.92 billion (10.6% less) in FY2020 due to global trade flow slowing due to the Covid-19 pandemic (Bangladesh Bank, 2021a,b,c). In this situation, the World Bank, 2021a,b expects continued exports and consumption will help boost the growth rate to 6.4% in FY 2021–22. Despite the increase in exports in recent years, there is a high possible chance Bangladesh's export is likely to be affected due to the Russia–Ukraine war. Therefore, examining the long-run association between remittance, FDI, exports, and economic growth is indispensable, considering the impact of the COVID-19 pandemic and the Russia-Ukerian war, which will be helpful for policymakers and the government of Bangladesh. The policymaker and government will consider the recent issues and initiate suitable policy action on internal and external determinants by considering their comparative significance to sustainable economic growth for Bangladesh and other developing countries. However, considering all the issues, this article's core objective was to scrutinize external factors' (remittances and FDI) and internal factors' (Export) effects on economic growth.

The rest of this study has been arranged as follows: The next section of this paper discusses relevant literature; the econometric model and model specification are explained in the subsequent section; the next section presents the results and discussions; and the last section provides a conclusion, including policy recommendations.

2. Literature review

Numerous studies in the economic literature have looked at how external (remittance and FDI) and internal (export) factors affect long-term economic relationships and economic growth, particularly in large emerging and developed economies. For example, the literature has extensively examined the nexus between remittances and economic growth. The findings show that remittances have an optimistic solid impact on economic growth, with a few exceptions, such as Barajas, Chami, Fullenkamp, Gapen, and Montiel (2009), where they demonstrated that remittance flows do not affect economic growth. However, numerous studies support a positive nexus between remittances and economic growth (Driffield & Jones, 2013; Hassan & Shakur, 2017; R. R. Kumar & Stauvermann, 2014; Nwaogu & Ryan, 2015; Siddique, Selvanathan, & Selvanathan, 2012; Tahir, Khan, & Shah, 2015a). Their principal findings were (i) an increase in labor migration which has increased the remittance flow of workers in Bangladesh; (ii) Skilled migrants, return on investment in the host countries, stable exchange rate, and improvement in Bangladesh's economic condition play a decisive role in explaining the more elastic flow of remittances; (iii) Other determinants of strong remittance flow in Bangladesh are agricultural production and relative yields on the host and domestic investment.

Furthermore, in recent and essential studies, Uddin and Sjö (2013) explore the relationship between remittances and economic growth in Bangladesh from 1976 to 2011 by applying Johansen's Vector Autoregression (VAR) method. They

argued that workers' remittances inflow and the expansion of the financial sector drive GDP growth in the long run, but remittances act as a shock absorber to income changes in the short run. They concluded that workers' remittance is a significant source of national income and a source for financing consumption and investment in Bangladesh.

However, several studies on developing countries explore the relationship between workers' remittance and economic growth. For example, Siddique et al. (2012) argue that there appears to be no causal association between remittances and economic growth in India; however, a two-way directional causality was found in Sri Lanka. Another study on South Asian developing countries found a significant positive long–run relationship between workers' remittances and economic growth for Nepal, Sri Lanka, India, and Bangladesh. However, a significant negative relationship was found in Pakistan (Jawaid & Raza, 2016). Outside of South Asian countries, a study was conducted by Tehseen Jawaid and Raza (2012) to know the association between remittances and economic growth in Korea and China. Their cointegration results confirm that Korea has a significant positive long–run relationship between remittances and economic growth. In contrast, a significant negative long–run relationship is found for China.

The scullers have long argued that the outflow of FDI and spillover boost economic growth and is an important external factor for long-term sustainable growth (Easterly, King, Levine, & Rebelo, 1994; Lucas, 1988; Romer, 1986; Solow, 1956; Swan, 1956). External and spillover effects include capital transfers, advanced and new technologies, job creation, further research and development growth, and indigenous human capital development. Nonetheless, many small developing economies suffer from a lack of productive and development resources that hinder the productivity deficit of countries and the overall economic growth performance. These deficits in productive resources could explain and possibly justify the flow of FDI to close these necessary deficits in small developing economies (Todaro & Smith, 2012). According to endogenous growth theory, there are four critical mechanisms through which FDI impacts the economic growth of small developing countries. For example, first, FDI fills the capital deficit and supports domestic investment; second, it reduces the foreign exchange deficit through the direct inflow of foreign capital and increases export, which helps to enhance paying the foreign debt; third; it increases government revenue through direct and indirect taxes from foreign companies, which allows the government to expend more into the development sector; and lastly, it helps the host country to increase productivity, knowledge through skill transfer and labor training, and technological improvements (Makun, 2018a; Pailwar, 2004; Todaro & Smith, 2012; Wan, 2009). Other empirical studies, such as Kalai and Zghidi (2019), found that using the autoregressive distributed lag (ARDL) test, FDI can generate positive spillover externalities for the MENA countries. A few years before, using Vector Error Correction Model (VECM), Hussain and Haque (2016a,b) revealed that FDI significantly positively impacts per capita GDP growth and has a long–term relationship. Similarly, Adhikary (2010), Almfraji and Almsafir (2014), Borensztein, De Gregorio, and Lee (1998), and Sarker and Khan (2020) also revealed a significant favorable influence of FDI on economic growth. These studies also demonstrated that FDI and economic growth heavily depend on moderating factors such as satisfactory levels of domestic human capital, the development level of the financial market, exchange rate policies, legal framework, and domestic investment.

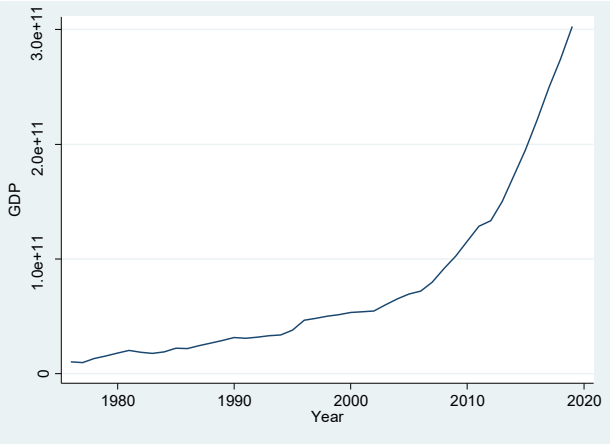
Focusing on developing countries' research, it can be seen that there is a positive relationship between FDI and economic growth. For example, Gupta, Yadav, and Jain (2022) found a positive long–run relationship between FDI and economic growth in India despite the Covid-19 pandemic (using the data for the period 1995–2019 and ARDL approaches). Similarly, another Indian study has investigated the relationship between outward foreign direct investment (OFDI) and economic growth using the nonlinear ARDL approach and time series data from 1990 to 2019; and found a positive long-run and short-run bi-variate relationship (N. Kumar & Singhal, 2022). Using a similar method (ARDL), Ahmad et al. (2022) established that FDI will stimulate the economic growth of Pakistan. Another recent study found that outward foreign direct investment (OFDI) significantly impacts Romania's economic growth (Amin, Anwar, & Liu, 2022). This empirical conclusion was drawn using the data from 1990 to 2019, and the nonlinear autoregressive distributive lag (NARDL) approaches. Another study was conducted by Ibrahiem (2015) to know the relationship between FDI and economic growth in Egypt. He found a long-run positive and significant relationship using ARDL approaches. On the other hand, several other recent studies broadly present a negative relationship between the FDI and economic growth nexus for many countries (Saqib, Masnoon, & Rafique, 2013; Siddiqui & Iqbal, 2010; Tahir & Khan, 2014).

Different literature acknowledges that export plays a substantial role in the economic growth of

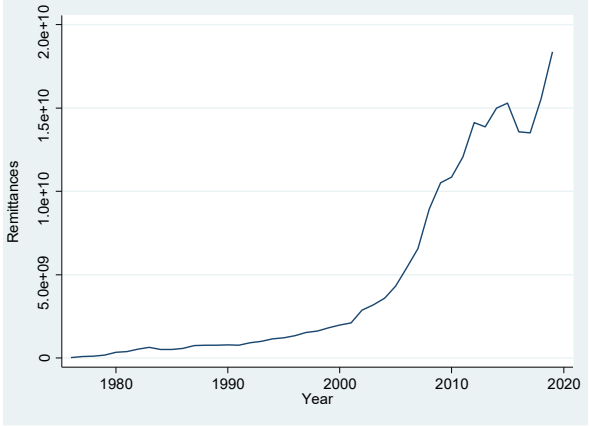
Table 1. Summary statistics.

Variable	Observation	Mean	SD
GDP	44	75,100,000,000	74,900,000,000
Remittances	44	4,770,000,000	5,700,000,000
FDI	44	600,000,000	884,000,000
Export	44	11,000,000,000	13,200,000,000

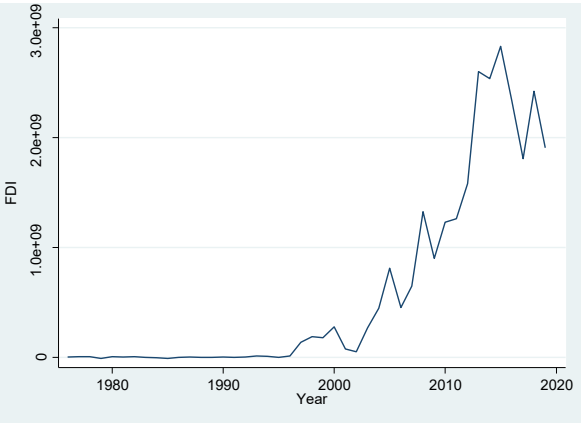
developing countries, and its impact depends on the number, quality, price, and volume of exports of different types of products (Jordaan & Eita, 2007; Mah, 2005; Siddiqui & Iqbal, 2005; Tang, 2006; Vohra, 2001). However, Begum and Shamsuddin (1998a,b) investigate the effect of exports on economic growth in Bangladesh, using a two-sector growth model and annual data from 1961 to 1992. This article captures Bangladesh's economic volatility by estimating an Autoregressive Conditional Heteroscedastic economic growth model. The results advise that an increase in the share of investment in GDP significantly increases GDP growth in average years but negligibly increases GDP growth in abnormal years (war, political turmoil, and natural disasters). The critical finding of this study is that export growth has significantly increased economic growth by positively impacting the total factor of productivity. Hossain and Dias Karunaratne (2004) used vector error correction modeling (VECM) and quarterly data from 1974 to 1999. They found that total and manufacturing exports have had positive and statistically significant long-term and short-term impacts. They conclude that manufacturing exports have become the sole determinant of Bangladesh's export-led growth. Muhammad Adnan Hye (2012) used the ARDL approach and annual time series data from 1978 to 2009 and determined the significant long-run positive relationship between export and economic



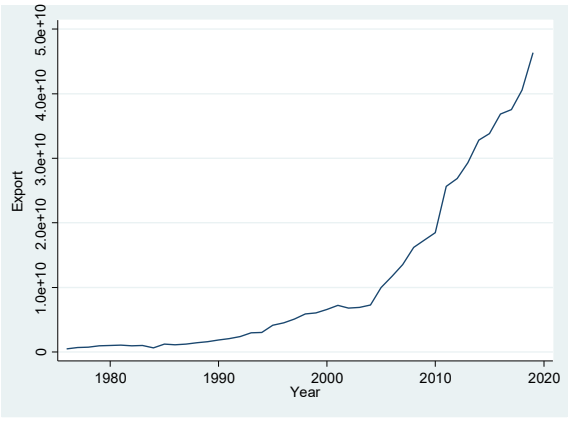
a: Bangladesh GDP from 1972 to 2019



b: Remittance Inflow in Bangladesh from 1972 to 2019



c: FDI Inflow in Bangladesh from 1972 to 2019



d: Export in Bangladesh 1072 to 2019

Fig. 1. GDP, remittance, FDI, and Export in Bangladesh from 1972 to 2019.

Table 2. Gregory–Hansen test for cointegration with regime shifts (break in constant and slope).

Testing Procedure	Test Statistic	Breakpoint	Date	Asymptotic Critical Values 1%	5%	10%
ADF	−4.87	27	2002	−6.51	−6.00	−5.75
Zt	−7.51	35	2010	−6.51	−6.00	−5.75
Za	−47.73	35	2010	−80.15	−68.94	−63.42

Note: The regime shift (break in the constant and slope) equation, including the error term, can be written as $Y_t = \alpha_1 + \alpha_2 \Upsilon_{t\sigma} + \beta_1^T \beta^T X_t + \beta_2^T \beta^T X_t \Upsilon_{t\sigma} + e_t$, where Y is ln GDP, X is the ln of remittances, FDI, and export, t is time subscript ($t = 1,2,\ldots,n$), σ is the break date, and $\Upsilon_{t\sigma}$ is a dummy variable ($\Upsilon_{t\sigma} = 0$ *if* $t \leq \sigma$ *and* $\Upsilon_{t\sigma} = 1$ *if* $t > \sigma$). Similarly, α_1 and α_2 areas in the level shift model (α_1 represents the intercept before the shift, α_2 represents the change in the intercept at the time of the shift); β_1 denotes the cointegrating slope coefficients before the regime shift, β_2 denotes the change in the slope coefficients, and e_t is $I(0)$.

growth in China. Another study on the Malaysian economy found similar results using the same methodology (Adedoyin, Afolabi, Yalçiner, & Bekun, 2022). A recent study has conducted by Saleem, Sial, and Cheema (2022) using ARDL approaches and annual time series data from 1973 to 2020. In this study, asymmetric cointegration between variables is ensured by the nonlinear ARDL method with a structural break. The main finding is that the impacts of exports on economic growth are asymmetric, and Pakistan's economic growth responds positively to export growth and decline. However, this research suggests that the country should adopt and implement an export growth strategy to achieve economic prosperity as a part of Pakistan's development policy.

The previous studies have not provided consistent evidence supporting a robust relationship between external and internal determinants with economic growth for Bangladesh's economy. Some studies show that internal and external determinants influence economic growth positively, while others show that internal and external determinants adversely affect economic growth. However, there are minimal studies about Bangladesh's economy, and the previous studies cannot represent the present status. Therefore, an empirical investigation of the relationship between external and internal determinants of economic growth is essential.

3. Data and empirical model

3.1. Data and variables

The empirical investigation has conducted using annual observations for 44 years, from 1976 to 2019. Based on the accessibility of data, aggregate gross domestic product (GDP), export, private remittance inflow, and FDI were utilized. The data has been collected from World Bank's website (https://data.worldbank.org/country/BD, accessed August 10, 2021) and considered personal remittances, FDI, and exports to examine the influence of exogenous determinants on economic growth.

Table 1 provides summary statistics of all selected variables. The average GDP from 1976 to 2019 was UD$75,100 million. At that time, the personal remittances inflow in Bangladesh was on an average of US$4770 million, over 155% higher than the FDI and 79% less than the export income. Therefore, an essential predictor of economic growth is export income which shows the mean export earnings were UD$11,000 million, which is the maximum, 79% higher than personal remittances and over 179% higher than the FDI. Another vital variable for GDP growth is FDI, the lowest average inflow of external determinants, counted as US$600 million − over 155% lower than personal remittances and over 179% lower than export income. However, the graphical plots of the series are presented in Fig. 1.

Fig. 1 shows the upper trend in raw data, including a possible structural break. To primarily understand the structural break, Fig. 1a will be ideal because GDP is the dependent variable in this study. Therefore, it can be assumed from the plot of GDP that after 2010, there might be a structural break because of a sharp increase in GDP.[1] However, structural breaks can create complications in unit root tests. This study has tested Gregory and Hansen's (1996) cointegration technique with regime shifts for the structural break. The test statistic considers the null hypothesis as no cointegration at the breakpoint and the alternative hypothesis as cointegration. Therefore, this study has chosen Gregory and Hansen's (1996) tests for regime shift.

Table 2 shows the estimated result of regime shift (break in the constant and slope), where the Zt test rejects the null hypothesis (test statistic > critical value), indicating cointegration at the breakpoint of

[1] The structural break occurs when an event has affected the trend of a particular series, when movement in a particular series is destroyed or truncated, and when there is a visible difference between the past and future movements in a particular series.

2010, which implies that the linear combination of the variables exhibits stable properties in the long run, but with a structural break. However, a sudden jump or break may be occurred due to the Bangladesh government's robust macroeconomic policy to graduate from the United Nations Least Developed Countries (LDC) list in 2026 (World Bank, 2021a,b). Since the ADF and Za tests cannot reject the null hypothesis of no cointegration with a structural break, Zt tests can do. Thus, it can be decided to use 2010 as the year in which the structural break occurs in the cointegrating equation; then, the value of 1 from 2010 to 0 for all other above years can be considered. As a solution, this study has included four dummy variables for the breakpoint, first generating a dummy variable (Dummy 2010) and then interacting the break dummy with each of the regressors in the model, such as the interaction break dummy for lnRemittances, lnFDI, and lnExport (Gregory & Hansen, 1996).

3.2. Model and methodology

3.2.1. Model specification

The key objective of this study is to investigate the effect of external (remittance and FDI) and internal (export) determinants on economic growth in Bangladesh using the available 44 years of yearly data from 1976 to 2019. First, however, the following model is specified for the econometric analysis:

$$lnGDP_t = \alpha_0 + \beta_1 lnREM_t + \beta_2 lnEXP_t + \beta_3 lnFDI_t + \beta_4 D2010_t + \beta_5 IBDlnREM_t + \beta_6 IBDlnEXP_t + \beta_7 IBDlnFDI_t + e_t \quad (1)$$

where lnGDP is the log of GDP (Gross Domestic Product), lnREM is the log of foreign personal remittances, lnEXP is the log of aggregate export, lnFDI is the log of foreign direct investment (FDI). Similarly, D2010 is the breakpoint dummy variable, IBDlnREM is the interaction break dummy of log aggregate foreign personal remittances, IBDlnEXP is the interaction break dummy of log aggregate export, and IBDlnFDI is the interaction break dummy of log FDI. On the other hand, α and β are the intercepts and slope parameters, and e is the error term.

In equation (1), the GDP is used as a dependent variable — remittance, export, FDI, and all slope and interaction dummy as the independent variables. Moreover, GDP, remittance, export, and FDI are measured as millions of US dollars.

3.2.2. Estimation methodology

Estimating an appropriate model using time series data is crucial because time series data needs special care before the analysis. Generally, time-series data contained a unit root and was habitually non-stationary. Therefore, checking the possible non-stationary problem and identifying each variable's integration order is essential. Ignoring the stationarity or unit root problem can lead to spurious regression. Gujarati and Porter (2012) argued that series must be stationary to avoid inconsistencies in coefficient estimation. If time series variables are non-stationary, the recommended procedure is to use cointegration techniques or differentiate the data according to the order of integration and use the differenced data in the analysis instead of the original data (Tahir et al., 2015a,b). Before the stationarity test, it is essential to pre-estimate lag order because too many lags selection increase error in forecasting. In this study, Lütkepohl's (2013) three commonly used methods have been selected are - Schwarz's Bayesian Information Criterion (SBIC), Akaike's Information Criterion (AIC), and the Hannan and Quinn Information Criterion (HQIC), which help to get a fair number of lags.[2] However, this study used Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit-root tests for potential non-stationary concerns.[3]

There are numerous time-series econometric methods such as fully modified ordinary least square (FMOLS), LSE-Hendry's GETS, Johansen maximum likelihood (JML), Engle-Granger (EG), Johansen multivariate cointegration test, and the recently developed Autoregressive Distributed-lag (ARDL) procedure for analyzing time-series data (Makun, 2018a,b; Tahir et al., 2015a,b). For example, bPesaran, Shin, & Smith, 2001a designed the ARDL method of cointegration, which is considered very effective because the method is capable of dealing with different order of cointegration, can correct possible endogeneity, and work well in infinite and small sample sizes (M. H. Pesaran et al., 2001a,b; Tahir et al., 2015a,b). Moreover, Shrestha and Bhatta (2018a,b) argued that if all the selected variables are stationary ordinary least square (OLS) or vector autoregressive (VAR) to use. Similarly, suppose all the variables of interest are non-stationary. In that case, the Johansen test is more appropriate than the

[2] Lütkepohl's (2013) three commonly used methods: $AIC = -2\left(\frac{LL}{T}\right) + \frac{2t_p}{T}$; $SBIC = -2\left(\frac{LL}{T}\right) + \frac{\ln(T)}{T}t_p$; and $HQIC = -2\left(\frac{LL}{T}\right) + \frac{2\,ln\{\ln(T)\}}{T}\,t_p$

[3] $ADF: \Delta y_t = \mu + \sigma y_{t-1} + \sum_{i=1}^{k}\beta_i \Delta y_{t-i} + e_t$; $PP: \Delta y_t = \sigma y_{t-1} + \beta_i R_{t-i} + e_t$; $KPSS: Y_t = X_t + e_t$

OLS or VAR models, and if some variables are stationary and some are not, ARDL will be the best solution. Therefore, this research will prefer the ARDL procedure to cointegration for detecting the long–run relationship if some variables are stationary and some are not.

3.2.3. Cointegration analysis (ARDL)

To analyze the relationship between economic growth and external and internal determining, this study applied an augmented ARDL bound test method for cointegration proposed by Pesaran et al. (2001a) was updated by McNown, Sam, and Goh (2018). Besides, Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990) provide various cointegration methods, although applying these models requires a unique order of integration of the data series. Thus, the application of the ARDL model is flexible and reliable when the data set follows a unique order of integration and when the data set is small (Haug, 2002). Moreover, ARDL gives more options in the case of lag length selection for both predictand and predictors, and it can handle the endogeneity issue. The recently developed ARDL approach for cointegration is a step-by-step procedure (McNown et al., 2018; Pesaran, Shin, & Smith, 2001b). In the first step, this study examines the presence of long-run cointegration by rewriting equation (1) as an unrestricted error correction model (UECM) in the ARDL framework as below:

$$\begin{aligned}\Delta lnGDP_t = {} & \alpha_0 + \beta_1 (lnGDP)_{t-1} + \beta_2 (lnREM)_{t-1} \\ & + \beta_3 (lnEXP)_{t-1} + \beta_4 (lnFDI)_{t-1} + \beta_5 (D2010)_{t-1} \\ & + \beta_6 (IBDlnREM)_{t-1} + \beta_7 (IBDlnEXP)_{t-1} \\ & + \beta_8 (IBDlnFDI)_{t-1} + \sum_{i=1}^{n} \beta_9 \Delta (lnGDP)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{10} \Delta (lnREM)_{t-1} + \sum_{i=11}^{n} \beta_9 \Delta (lnEXP)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{12} \Delta (lnFDI)_{t-1} + \sum_{i=1}^{n} \beta_{13} \Delta (D2010)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{14} \Delta (IBDlnREM)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{15} \Delta (IBDlnEXP)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{16} \Delta (IBDlnFDI)_{t-1} + e_t \end{aligned} \tag{2}$$

where delta (Δ) is the difference operator and signifies short-run dynamics, the coefficients attached with one period-lagged variable measure long–run relationships. This study will test the null hypothesis of no long–run relationship ($H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$), and oppositely the alternative hypothesis of the existence of a long–run relationship ($H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq 0$). However, if the null hypothesis is rejected, that indicates an establishment of a long-run cointegrating relationship and vice versa. On the other hand, the coefficients such as $\beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}, \beta_{16}$ will capture the short-run dynamics.

In 2001, Pesaran, Shin, and Smith generated lower-bound critical values (F-test) and upper-bound critical values (F-test). The bound F-test procedures impose restrictions on the long-run coefficients by using the Wald coefficient restrictions test, obtaining the Wald F-statistic, and comparing the F-statistic with the lower and upper bound critical values (Pesaran et al., 2001b). This procedure has three possible consequences of the cointegrating relationship among the variables. First, when the calculated Wald F-statistics surpass the upper bound I(1) critical value, it can be concluded that there is cointegration (H_0 is rejected), and that is, there is the existence of a long-run association between the variables. In addition, the process estimates the long-run error correction model (ECM) model. Second, if the calculated Wald F-statistics is less than the lower band I(0) critical value, the null hypothesis is accepted (no level relationship). In this case, it can be concluded that there is no cointegration or long–run relationship, estimating the short-run autoregressive distributed lag (ARDL) model. However, if the F-statistics fall between the lower bound I(0) and upper bound I(1), the test is inconclusive. P. K. Narayan (2017) regenerated the critical values for the ARDL approach for small samples (for 30 to 80 observations) and argued that the critical value of Pesaran et al., 2001a,b has designed for large sample sizes and concluded that studies using small sample size might give misleading outcomes. However, this study has 44 years of observations, so the Narayan (2005) critical values approaches will be appropriate. Consequently, the estimated Wald F-statistic will be compared to P. K. Narayan's (2017) critical values to decide the cointegrating relationship.

The second step will estimate the short-run and long–run relationships through the ARDL model. Duasa (2007) argued that various optimal lag orders are possible through the ARDL approach. The long-run coefficients can be calculated based on the ARDL unrestricted regression estimates by dividing the coefficients of each explanatory variable by the first lag value of the response variable and multiplying it by the minus symbol (Khatun & Ahamad,

2012). Consequently, the long-run coefficients for export, personal remittances, and FDI, including the dummy variables, are calculated as follows: $\left(\beta_2/\beta_1\right) - 1$, $\left(\beta_3/\beta_1\right) - 1$, $\left(\beta_4/\beta_1\right) - 1$, $\left(\beta_5/\beta_1\right) - 1$, $\left(\beta_6/\beta_1\right) - 1$, $\left(\beta_7/\beta_1\right) - 1$, and $\left(\beta_8/\beta_1\right) - 1$, respectively.

Finally, the short-run error correction model will be estimated, where the short-run dynamic will identify and verify the robustness of the estimated coefficients in the long run. However, the error correction model is specified based on equation (2):

$$\begin{aligned}\Delta lnGDP_t = {} & \alpha_0 + \sum_{i=1}^{n} \beta_9 \Delta (lnGDP)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{10} \Delta (lnREM)_{t-1} + \sum_{i=11}^{n} \beta_9 \Delta (lnEXP)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{12} \Delta (lnFDI)_{t-1} + \sum_{i=1}^{n} \beta_{13} \Delta (D2010)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{14} \Delta (IBDlnREM)_{t-1} + \sum_{i=1}^{n} \beta_{15} \Delta (IBDlnEXP)_{t-1} \\ & + \sum_{i=1}^{n} \beta_{16} \Delta (IBDlnFDI)_{t-1} + (ECM)_{t-1} + e_t \end{aligned} \tag{3}$$

where ECM represents the error correction term computed from the long-run estimated parameters in equation (2), the error correction term expects a significant and negative relationship with regressand.

4. Results and discussion

4.1. Lag length selection

The initial lag length is required for stationarity tests. It is essential because too many and too few lags could increase the error in the forecasts and leave out relevant information, respectively (Stock & Watson, 2006). Initial lag length selection is also required to estimate the ARDL model, which is necessary for performing the bounds cointegration test and evaluating the error correction model. Usually, the best way to determine the required number of lags is experience, knowledge, and theory. However, CEPR (2001) suggested taking a maximum lag of 1–2 in the lag operation for annual data (Ivanov & Kilian, 2001). So, this study has run standard unrestricted VAR and identified the number of optimal lags. Table 3 shows the lag-order selection statistics of FPE, AIC, HQIC, and SBIC for a series of vector autoregressions of order 1, with a maximum lag of order 2. Therefore, the result shows that all the criteria suggest the optimal lag length of 2 for further operations except SBIC. In the case of conflicting results, CEPR (2001) suggested following the SBIC for any sample size for the quarter and annual data (Ivanov & Kilian, 2001). This study has yearly data of 44 observations, so we follow the SBIC criterion and the optimal lag length of 1 for further operations.

4.2. Unit root test for stationarity

The unit root test on the yearly series of GDP, Remittances, FDI, Export, and Dummy variables at transformed series by taking the log, first difference and including intercept, and both trend and intercept has been carried out separately on the three popular test methods, such as ADF, PP, and KPSS. The unit root test results are presented below in Tables 4–6.

The Augmented Dicky Fuller (ADF) tests for stationarity shows that all the variables are non-stationary (Table 4). Therefore, after taking the first difference, the variables become stationary. Similarly, none of the series is trend stationary since they were still non-stationary after the inclusion of time trends in the ADF test equation, except FDI (stationary at 5% level). However, all the non-stationary variables become stationary at the first difference if both trend and intercept are included. Similarly, the Phillips–Perron (PP) test results also show that all the variables are stationary at the first difference (Table 5). Therefore, the results are consistent with the ADF test results.

On the other hand, the KPSS test for stationary shows similar results of stationarity of all the series

Table 3. Obtain lag-order selection statistics (obtain optimal lag for each variable).

Lag	LL	LR	FPE	AIC	HQIC	SBIC
0	−124.576	NA	0.00536	6.12266	6.18332	6.28816
1	51.7408	352.63	2.60E-06	−1.51146	−1.20817	−0.684003[a]
2	79.5843	55.687[a]	1.5e-06[a]	−2.07544[a]	−1.52951[a]	−0.58601

Note: LR: Likelihood ratio, FPE: Final prediction error, AIC: Akaike information criterion, HQIC: Hannan and Quinn information criterion, and SBIC: Schwarz's Bayesian information criterion.

[a] Optimal lag length: Significant at 5% or lower level.

Table 4. Augmented Dicky Fuller (ADF) test results.

Variable	Intercept				Trend and intercept			
	Level		First difference		Level		First difference	
	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
lnGDP	0.038	0.9615	−4.63	0.0001	−1.716	0.7438	−4.884	0.0003
lnRemittances	−1.411	0.5768	−4.139	0.0008	−2.558	0.2994	−3.955	0.0102
lnFDI	−1.155	0.6927	−7.047	0.0000	−5.328	0.0000	−6.993	0.0000
lnExport	0.068	0.9638	−4.736	0.0001	−2.231	0.4723	−4.7	0.0007
Dummy 2010	−0.488	0.8944	−4.528	0.0002	−1.697	0.7521	−4.631	0.0009
Dummy_lnRemittances	−0.451	0.9013	−4.493	0.0002	−1.671	0.7634	−4.605	0.0010
Dummy_lnFDI	−0.449	0.9017	−4.482	0.0002	−1.659	0.7686	−4.589	0.0011
Dummy_lnExport	−0.436	0.9039	−4.497	0.0002	−1.661	0.7675	−4.616	0.0010

Note: H_0: variable is not stationary or has a unit root, and H1: the variable is stationary or has no unit root. Therefore, if the absolute critical value is greater than the absolute value of the test statistic, then the test suggests rejecting the null hypothesis, meaning stationary.

Table 5. Phillips-Perron (PP) test results.

Variable	Intercept				Trend and intercept			
	Level		First difference		Level		First difference	
	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
lnGDP	0.591	0.9874	−5.734	0.0000	−1.253	0.899	−5.668	0.0000
lnRemittances	−3.855	0.0024	−8.589	0.0000	−6.865	0.0000	−8.207	0.0000
lnFDI	−1.773	0.3941	−10.761	0.0000	−6.371	0.0000	−10.655	0.0000
lnExport	−0.38	0.9133	−9.422	0.0000	−2.843	0.1817	−9.316	0.0000
Dummy 2010	−0.509	0.8902	−6.481	0.0000	−1.737	0.7343	−6.549	0.0000
Dummy_lnRemittances	−0.467	0.8979	−6.457	0.0000	−1.707	0.7477	−6.535	0.0000
Dummy_lnFDI	−0.469	0.8979	−6.479	0.0000	−1.699	0.7511	−6.554	0.0000
Dummy_lnExport	−0.443	0.9026	−9.422	0.0000	−1.688	0.7559	−6.483	0.0000

Note: H_0: the variable contains a unit root (the variable is non-stationary), and H1: the variable was generated by a stationary process. Therefore, the variable will be stationary if the absolute critical value is greater than the absolute value of the test statistic.

Table 6. KPSS test results.

Variable	LM Statistics KPSS test			
	Intercept		Trend and intercept	
	Critical value @ 5% = 0.463		Critical value @ 5% = 0.146	
	Level	First difference	Level	First difference
lnGDP	2.21	0.171	0.335	0.0973
lnRemittances	2.17	0.517	0.121	0.208
lnFDI	2.03	0.0401	0.111	0.0334
lnExport	2.27	0.0502	0.155	0.0515
Dummy 2010	1.36	0.169	0.405	0.0498
Dummy_lnRemittances	1.36	0.176	0.407	0.0499
Dummy_lnFDI	1.36	0.176	0.408	0.0517
Dummy_lnExport	1.36	0.179	0.409	0.0502

Note: H_0: the variable is level stationary or trend stationary, and H_1: the variable is not level or trend stationary. So, if the test statistics value exceeds the critical value, the variable is non-stationary and vice versa.

after taking the first difference, consistent with the ADF and PP test (Table 6). Before taking the first difference, non of the series is stationary in intercept, but after including the time trend, the remittance, FDI, and export are stationary. We have seen before that remittances and FDI are stationary at the level after including the time trend in ADF and PP tests.

Although non-stationary properties can be confirmed by any available test method, sometimes, making those variables stationary and re-testing them for confirmation may show inconsistent results. In general, we need to be careful about variables that cannot be stationary at the first difference and the borderline of decision points. So that the significant way might be choosing the

property that has been repeated or are similar in different test results. However, this study found mixed variables (some are stationary before taking the first difference), suggesting selecting the ARDL model (Shrestha & Bhatta, 2018b).

4.3. ARDL model estimation

The ARDL (1 1 1 0 0 0 1 0) model was selected based on the SBIC information criterion with dummy variables (Table 7). This step estimates the ARDL model using the appropriate lag length of one. This result indicates that the GDP growth is affected by itself in a lagged period (t_{-1}); the remittance, FDI, and interaction dummy of FDI are considered in up to a lagged period (t_{-1}), and the export, break dummy 2010, interaction break dummy of remittance, and export in 0 lagged periods (t_{-0}). Furthermore, this ARDL (1 1 1 0 0 0 1 0) model will perform to estimate the existence of cointegration by the approaches of bound cointegration test, estimates the long-run and short-run coefficient, coefficient of Adjustment, as well as a diagnostic test.

4.4. ARDL bounds test for cointegration

This study analyses the existence of any cointegration among the variables using the ARDL bounds test approach, which is based on the error correction representation (M. H. Pesaran et al., 2001a,b). The bounds test is generally based on the joint F-statistic whose asymptotic distribution is nonstandard under the null hypothesis (H_0) of no cointegration or no level relationship against the alternative hypothesis (H_1) of a cointegrating relationship. Furthermore, the bounds test assumes that the model comprises lower bound I(0) and upper bound I(1) variables and obtains two levels of critical values. At the first level, the calculation assumes that the variables of the ARDL model are integrated into order zero. In contrast, the variables are integrated into order one at the second level. Thus, the process is to approximate the equation by ordinary least squares (OLS) and examine the collective significance of the variables' lagged levels. However, the results of ARDL bounds testing are shown in Table 8.

Table 8 shows the F-statistics is 7.251, and the critical values range are I(0) = 2.96 and I(1) = 4.26 at a 1% level of significance. The result shows that the F-statistic is larger than the critical values at a 1% significant level, suggesting the null hypothesis of no cointegration is rejected and indicates a long–run relationship between the dependent and independent variables (P. K. Narayan, 2005). Therefore, the null hypothesis of zero cointegration has been discarded, implying a single cointegration, long-term, economic relationship between the variables when normalized on economic growth. However, this study concludes that a long–run relationship exists between GDP growth with Remittances, FDI, and Export in Bangladesh.

4.5. ARDL and ECM results

This study examined the cointegration in the preceding section and found that the selected variables are cointegrated in the long term. In the following step, this study examined the log-level ARDL error correction approach and estimated the long–run relationships and short-run dynamics between predictand and predictors.

The long-run results of the economic relation between predictand (economic growth) and predictors (export, remittances, and FDI) are illustrated in Table 9. The results demonstrate remittances' significant positive effect on Bangladesh's economic growth (GDP). The estimated coefficient of remittances suggests that a 1% increase in remittances

Table 7. ARDL model estimation.

Variable	ARDL Estimation
L.lnGDP	0.291*
	(0.107)
lnRemittances	−0.114
	(0.0633)
L.lnRemittances	0.200***
	(0.0455)
lnFDI	0.00344
	(0.00689)
L.lnFDI	−0.0119
	(0.00615)
lnExport	0.316***
	(0.0459)
Dummy 2010	−15.43**
	(4.322)
Dummy_lnRemittances	−0.278
	(0.240)
Dummy_lnFDI	−0.0413
	(0.0762)
L.Dummy_lnFDI	−0.0149**
	(0.00423)
Dummy_lnExport	0.965***
	(0.206)
Constant	8.740***
	(1.374)
N	43
R-squared	0.998
Adjusted R-squared	0.997
Root MSE	0.0496

Note: Standard errors in parentheses.
*p < 0.05, **p < 0.01, & ***p < 0.001.

would influence economic growth by 0.12, which is statistically significant at a 1% level. This outcome is compatible with the findings of Mannan (2017) and Islam (2020). Remittances support disadvantaged families, supplement domestic savings, and increase economic growth in Bangladesh. Since remittances are in foreign currency, therefore, remittances help to increase foreign exchange reserves, which cushions the heavy import bill and stabilizes the domestic economy. The total amount of remittances inflow in Bangladesh has increased significantly from the fiscal year 2009–10 (US$10987.40 million) to 2020–21 (US$24777.71 million) (Bangladesh Bank, 2021a,b,c). This significant remittance growth helps Bangladesh hold a competent foreign reserve, US$46391.4 in FY2020-21, during the COVID-19 pandemic (Bangladesh Bank, 2021a,b,c). In addition, Bangladesh is relatively well enriched with labor and human capital due to its higher population. It has a worm-friendly relationship with oil-richer countries in the Middle East, like neighbor countries Pakistan and India (Tahir et al., 2015a,b). Therefore, the government and policy advisers should further develop the platform for citizens to work abroad and provide facilities for existing migrants so that the flow of emigration can be positively impacted.

This study found evidence of a negative relationship in the long run between FDI and economic growth in the context of Bangladesh's economy, although the finding is not statistically significant. Nevertheless, it shows a bit negative impact on economic growth because this study was not able to include human capital (a particular characteristic of FDI) with FDI (Borensztein et al., 1998) and enhances the beneficial effect of FDI (Makun, 2018a,b). The estimated coefficient of −0.012 advocates that FDI negatively impacted economic growth. However, Adnan Hye and Islam (2013) found a similar result, although Hussain and Haque (2016a,b), Adhikary (2010), and Sarker and Khan (2020) found a significantly opposite result. Nonetheless, there are various ways in which the host country benefits from the FDI inflow. For example, an efficient production system and new technologies can only be acquired and adopted by attracting FDI from developed countries that will help Bangladesh to graduate from the LDC list in 2026. Therefore, the government of Bangladesh should put more effort into attracting FDI through various incentives such as building confidence in the economy through improved law & order and political stability, legal reforms to provide security to foreign investors, and providing a suitable physical and financial infrastructure, including uninterrupted energy supply. In addition, Bangladesh should consider investing significantly more in the energy sector to reduce the gap between supply and demand and invest in the infrastructure sector for smooth communication. Considering the global impact of the Covid-19 and Russia–Ukraine war, these successful initiatives will help Bangladesh attract FDI, which will contribute significantly to sustainable economic growth and lead to graduation from the LDC list.

This study has found robust evidence of a positive relationship between economic growth and export in Bangladesh. For example, the estimated coefficient suggests that a 1% increase in export contributes to GDP growth by 0.446 in the long run. Although, it has to be noted that the export coefficient is significantly higher than the other coefficients. It is because the country enjoys a competitive advantage in RMG, jute goods, tea, seafood, and leather. Among them, the RMG sector predominates in export growth and contributes 84% (USD 32 billion) to commodity exports, but growth is likely to slow down in the long run (TextileToday, 2019). To come out of the dominance of an industry, Bangladesh has to emphasize its jute goods, tea, seafood, leather, pharmaceutical, footwear, processed food, and shipbuilding industries. Like this study, Begum and Shamsuddin (1998a,b) and Al Mamun and Nath (2005) examined the relationship between export and economic growth in Bangladesh and found that increasing export has a significant positive impact on economic growth. However, the contribution of exports to economic growth was more spoken about during 1982–90 when the government pursued trade liberalization policies and deregulation of the economy. On the other hand, the economic reform process continued in the early 1990s, and the contribution of exports to economic growth was nearest zero in 1990–91 and 1991-92 because of intense political turmoil in these years (Begum and Shamsuddin (1998a,b)).

The dream of graduating from LDC status in 2026 can only be true if the government provides an investment-friendly environment and adequate facilities for export-oriented industries considering the global impact of the Covid-19 and Russia–Ukraine war. The government can attract domestic and foreign investors by providing facilities and developing energy and infrastructure sectors. Bangladesh is a labor-intensive country and mainly exports RMG to Europe and USA. By diversifying export-oriented production using cheap labor, this country can increase export significantly in different countries. In this case, china can be the model country, where they produce products based on countries' demands.

Gregory–Hansen's test for cointegration with regime shifts found a possible structural break in the data series and was considered a dummy variable in the structural break in 2010. The break dummy (Dummy2010) is statistically significant (at a 1% level) and has a negative coefficient, indicating a negative effect on economic growth in the long run. However, the interaction breaks dummy remittance (Dummy2010#lnRemittances) and FDI (Dummy2010#lnFDI), which are not statistically significant and have negative results, which points out that the structural break does not significantly affect the independent variables such as Remittances and FDI. On the other hand, the export dummy (Dummy2010#lnExport) is statistically significant and implies that the structural break identified significant effects on export in the long run.

The error correction term (Adjustment, the first leg of GDP) is also shown in Table 9. The non-negative Adjustment suggests there will not be long-run convergence, and the model will be exclusive. On the other hand, the negative coefficient means that there will be long-run convergence among the variables and indicates that the previous errors are corrected in the current period. The result was negative (−0.709) and statistically significant at a 1% level. This error correction term shows the swiftness of the adjustment process to restore equilibrium after a shock in the long-run equilibrium relationship. The statistically significant and negative error correction term suggests how rapidly variables return to equilibrium. The relatively higher error correction coefficient (in absolute terms) designates a quicker adjustment process. However, the result suggests that 71% disequilibrium of the previous year's shocks is corrected back to the long-run equilibrium in the current year.

Further, the short-run coefficients show that remittances (significant at a 1% level) adversely influence economic growth in the short run, while FDI's influence is positive but insignificant. Although, the interaction dummy of FDI (D.Dummy2010#lnFDI) is statistically significant, which points out that the structural break significantly affects FDI in the short run.

4.6. Diagnostic tests results

The last issue is related to the goodness of fit of the ARDL-error correction model. For this purpose, a series of diagnostic tests are carried out, then stability tests. However, Table 10 provides different diagnostic test results to check the model's reliability and shows that the estimated ARDL model is free from severe econometric issues. For example, the Durbin–Watson statistic shows that the model is free from serial correlation or autocorrelation problems. Similarly, the Breusch-Godfrey statistic shows that the model has no higher-order autocorrelation. Besides, there is no evidence regarding heteroscedasticity in the

Table 8. ARDL bound test for cointegration.

Significance level	Critical value		Calculated F statistic
	Lower band I(0)	Upper band I(1)	
1%	2.96	4.26	7.251
2.5%	2.60	3.84	
5%	2.32	3.50	
10%	2.03	3.13	

Note: * The variables' lag length (1 1 1 0 0 0 1 0).
**H_0 (no cointegration) is accepted if F < critical value for I(0) regressors (Lower band); and rejected if F > critical value for I(1) regressors (Upper band) (Belloumi, 2014).

Table 9. Long-run elasticities and error correction results (predictand: lnGDP) ARDL (1 1 1 0 0 0 1 0).

Variable	Estimated coefficient
Long-run estimates:	
lnRemittances	0.121**
	(0.0423)
lnFDI	−0.0119
	(0.0128)
lnExport	0.446***
	(0.0469)
Dummy2010	−21.76***
	(5.067)
Dummy2010#lnRemittances	−0.392
(0.336)	
Dummy2010#lnFDI	−0.0791
	(0.105)
Dummy2010#lnExport	1.360***
	(0.202)
Adjustment:	
L.lnGDP	−0.709***
	(0.107)
Short-run estimates:	
D.lnRemittances	−0.200***
	(0.0455)
D.lnFDI	0.0119
	(0.00615)
D.Dummy2010#lnFDI	0.0149**
	(0.00423)
Constant	8.740***
	(1.374)
N	43
R-squared	0.661
Adjusted R-squared	0.541
Root MSE	0.0496

Note: Standard errors in parentheses.
*p < 0.05, **p < 0.01, & ***p < 0.001.

Table 10. The results of the diagnostic test.

Specification	chi2	p-Value	Conclusion
Durbin–Watson statistic (autocorrelation)	1.636	1.148	No autocorrelation
Breusch-Godfrey statistic (autocorrelation)	1.617	0.204	No higher-order autocorrelation
Heteroscedasticity	38.17	0.416	No heteroscedasticity
Ramsey RESET test	1.75	0.180	No omitted variables
Jarque-Bera normality test	2.385	0.303	No omitted variables

Note: Significant at 5% and the d -statistic used for Durbin–Watson.

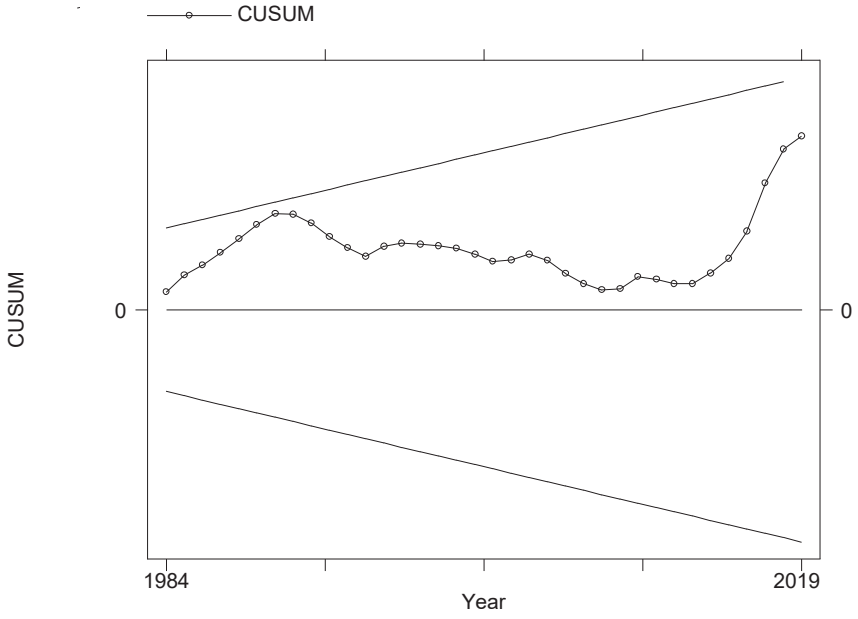


Fig. 2. CUSUM Test

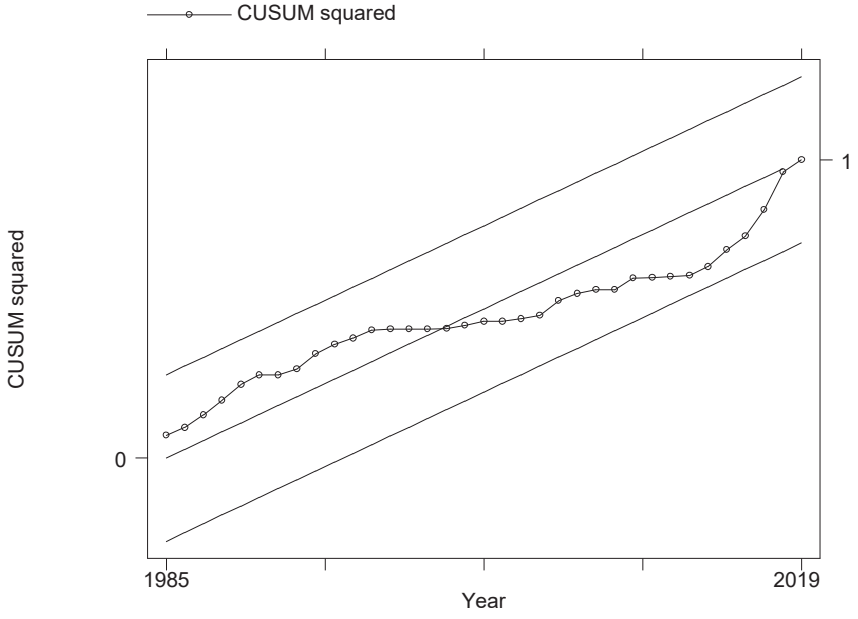


Fig. 3. CUSUM-square Test

model because the White test is statistically insignificant at a 5% level. The results of the Ramsey RESET and Jarque-Bera normality tests show correct functional form and normal distribution. Thus, the estimated ARDL model is found to be reliable (see Table 10).

4.7. Stability checking

The cumulative sum (CUSUM) and the cumulative sum of squares (CUSUM-square) tests have been performed to check the stability of the model. Figs. 2 and 3 illustrate the plots of the CUSUM and CUSUM-square tests, respectively. The figures demonstrate that the estimated lines, both CUSUM and CUSUM-square, pushed through the critical limits at the 5% significance level. Therefore, it can be determined that the estimated models appeared to be stable and reliable.

5. Conclusion and policy recommendations

The key objective of this study is to discover the effect of internal (export) and external (remittance and FDI) factors on economic growth. This research focused on Bangladesh's economy and used yearly data from 1976 to 2019. The econometric analysis was carried out using the well-known time series technique called ARDL approaches of cointegration. In addition, several dummy variables were also included in the ARDL model due to a structural break.

The study argues that the external and internal determinants matter for achieving long-term economic growth in Bangladesh. Export and remittance have significantly elevated economic growth. This continuum of growth may be similar in other developing countries. However, Bangladesh is distinguished among developing countries because the economic growth process is strongly linked to remittances and export, holding the seventh position in remittance earnings and the second position in RMG product export (World Bank, 2021a). In the RMG sector, approximately 4.22 million workers are working (1.72 million are male and 2.50 million are female) (ACD, 2020), and around 7.8 million workers are working abroad, usually in Gulf countries (UNDESA, 2019). In recent years, due to the COVID-19 epidemic, many workers have returned to the country, and the pace of sending workers abroad has slowed; similarly, overall exports also declined significantly, negatively affecting workers' remittances. However, this study failed to capture economic growth's impacts due to the unavailability of data during the COVID-19 period. Therefore, the policymakers and the government need to work together meticulously, with other developing countries, by pursuing appropriate policies to diversify the export basket and outflow of workers. The robust policy will ultimately help Bangladesh achieve long-term sustainable economic growth and LDC graduation by overcoming the nightmare of COVID-19. However, the findings of this research are consistent with previous empirical studies. This study found a negative relationship between FDI and economic growth. The explanation of these findings is quite tricky; however, Bangladesh lacks adequate infrastructure (roads, power supply, and port facilities), and bureaucracy issues may reduce FDI. Moreover, labor rights, work environment, law enforcement, policy continuity, protection of intellectual property, speedy settlement of disputes, and speedy and easy business start-up process are the other reasons that create barriers to attracting FDI in Bangladesh. Its reflection can observe in the World Bank's ease of doing business ranking, where Bangladesh ranks 168 out of 190s countries, significantly behind any South Asian country except Afghanistan (World Bank, 2020).

This study's findings recommend that Bangladesh emphasize export to enhance economic growth because the country enjoys a competitive advantage in RMG, jute goods, tea, seafood, and leather; besides having other potential industries such as pharmaceutical, footwear, processed food, and shipbuilding industries can also play a vital role in export. In addition, the country also can focus on the IT and military industries soon. However, the RMG sector predominates in export growth and contributes 84% to commodity exports, but growth is likely to slow down in the long run. Therefore, the need for export and destination diversification, establishing export-led industries, increasing technological goods, producing quality goods rather than quantity, and balancing export and import tariffs to mitigate the challenge.

Based on the findings, the study suggests that Bangladesh needs to attract more FDI to boost export-led economic growth due to the country's lack of resources and financial capacity. To do so, Bangladesh has to ensure a business-friendly environment, uninterrupted power and gas supply; upgrade existing infrastructures; encourage legal reform to protect investors and their investments, and ensure the country's political stability. Additionally, the country has to develop new infrastructures such as roads, highways, and ports that will improve connectivity and communication and support the country as a new hub of business. Most importantly, Bangladesh has to attract foreign

entrepreneurs to reverse back to invest in its own country, like China, which will ultimately pull the country into long-term FDI growth and ensure sustainable economic growth. Besides, sending skilled workers globally through proper training based on the requirements has to increase, considering the present COVID-19 situation, which will help solve the country's unemployment problem, increase the inflow of remittances, and boost long-term sustainable economic growth. Finally, the government will have to ensure the appropriate use of remittance, considering the global impact of the Russia–Ukraine war. However, to do so, robust policy actions must be introduced by identifying all the problems and providing all the facilities required by a remittance fighter.

However, this study explored the effect of external (remittance and FDI) and internal (export) determinants on economic growth in Bangladesh, and this investigation identified the relationship between variables (predictand and predictors) but failed to explore the reasons behind the relationship. For example, this study found a long-run negative relationship between FDI and economic growth but failed to provide research-based information on why this occurred. Hence further research is required for the policy purpose to explore the reasons why the relationship between FDI and economic growth is negative.

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Conflict of interest

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