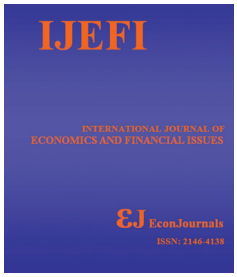


International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2025, 15(3), 244-253.

Economic Alchemy: Unraveling the Nexus between Trade Openness, Inflation, Exchange Rates, and Economic Growth in Bangladesh

Mohammad Ridwan[1], Muhtasib Sarker Tahsin[2], Mujeeb Saif Mohsen Al-Absy[3], Md. Eleais[1], Abdul Rahim Ridzuan[4,5,6,7], K. P. Jaheer Mukthar[8]*

[1]Department of Economics, Noakhali Science and Technology University, Sonapur, Noakhali-3814, Bangladesh, [2]Department of Business Administration and Management, International American University Los Angeles, California, United States, [3]Department of Accounting and Financial Science, College of Administrative and Financial Science, Gulf University, Sanad 26489, Kingdom of Bahrain, [4]Institute for Big Data Analytics and Artificial Intelligence, Universiti Teknologi MARA, Shah Alam, 40450, Malaysia, [5]Faculty of Business and Management, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia, [6]Accounting Research Institute, Universiti Teknologi MARA, Shah Alam, 40450, Malaysia, [7]Centre for Economic Development and Policy, Universiti Malaysia Sabah, Kota Kinabalu, 88400, Malaysia, [8]Kristu Jayanti College Autonomous, Bengaluru, Karnataka, India. *Email: jaheermukthar@gmail.com

Received: 19 October 2024 **Accepted:** 11 March 2025 **DOI:** https://doi.org/10.32479/ijefi.17779

ABSTRACT

This empirical research explores the impacts and causality relationship between Bangladesh's trade openness, exchange rate, inflation, population, and economic development using yearly time series data from 1990 to 2020. Inflation, exchange rate, and population were also included as explanatory variables in this research. Throughout this time frame (1990-2020), Bangladesh implemented various trade liberalization policies to grow trade and stimulate the economy. This research used the ARDL bound test and found that economic growth is cointegrated with independent variables. This study also utilized DOLS to observe the long-run relationship. FMOLS and CCR estimators were used to check robustness. The Granger Causality test was used to demonstrate unidirectional causality between trade openness and economic growth, while the Augmented Dickey-Fuller unit root test, Philips-Perron, and IPS unit root test were used to detect stationary. The outcome of this model exhibits that, except for population, all independent variables have a significant long-run relationship with economic growth. Trade openness has a negative association with economic growth and is significant. Meanwhile, inflation, exchange rate, and population have a positive relation with economic growth. The impact of inflation and population coefficients is significant. The robustness results are matched with the baseline DOLS model. This empirical study demonstrated that all variables are stationary, with or without a trend, and a unidirectional causal relationship was detected between trade openness and economic growth, with trade openness boosting economic growth. To boost Bangladesh's economic development, policymakers should prioritize export promotion strategies. To ensure a high level of national output, it is necessary to maximize the utilization of capital goods and decrease reliance on noncapital items. The volatility of exchange rates and the inflation rate must be incorporated to foster economic growth.

Keywords: Trade Openness, Inflation, Exchange Rate, Economic Growth, Bangladesh
JEL Classifications: F43 , F41, E31, O53

1. INTRODUCTION

Does the economy grow faster in open economies than in closed ones? The overwhelming majority of studies that have looked at this question from a growth perspective have reached a positive conclusion. The findings of previous studies have indicated that economies with an external focus will have consistently higher growth rates than those with an internal focus. This is a significant

factor contributing to a contemporary tendency toward trade liberalization. Most notably, after the tragic 1980s failures of import-substitution schemes, this hope was elevated (Grossman and Helpman, 1990). The advantages of openness are consistently overestimated in research pertinent to the policy and World Bank and IMF publications (Rodriguez and Rodrik, 2000). This contrasts with the benefits of import-substitution programs, which were understated. On the other hand, there is a mountain of data and debates concerning the connection between economic progress and the liberalization of trade.

An economy with a market-oriented exchange rate system is a policy that every government aspires to have, even though there is a debate between protectionism and trade openness (Doğanlar, 2002). Because of Bangladesh's status as a developing nation, its overall economic condition is not sustaining at a constant rate (Amna Intisar et al., 2020). Yet, the country has maintained an impressive track record in economic growth. While Bangladesh has always had a trade imbalance, the nation has successfully reduced poverty as envisioned by Vision 2021 and has had GDP growth of 6% or more per year on average over the last 5 years (Khanom, 2020). Numerous factors have a direct and indirect effect on this development. In the 1960s, Bangladesh was still known as East Pakistan, and the economy expanded at a rate of around 4% per year on average (Manni et al., 2012). The Liberation War of 1971 created massive dislocations that led to the destruction of around one-fifth of that sector, which slowed Bangladesh's development for the following two decades. Then, in 1990, the economy flourished rapidly due mostly to trade liberalization and the restoration of democracy. Bangladesh employed a protectionist trade policy in the post-independence era between 1972 and 1980. High tariffs and non-tariff impediments marked this approach in addition to an inflationary currency rate regime (Raihan, 2008). However, during the 1980s, the government of Bangladesh decided to adopt a trade policy that was more open to creating a more sustainable trade balance. As a result, the country experienced economic success. In the 1980s, RMG and knitwear items dominated foreign trade, and thus, the current scenario is a result of a shift, as described by Khanom (2020), "Exports of RMG and textiles account for 75% of overall exports." Bangladesh's per capita income and annual GDP are consistently rising as a consequence of the development of domestic and international trade. Bangladesh's economy throughout the last two decades has been marked by the export-oriented growth of its textile sector, high-yield rice cultivation, leather goods, tea, and remittances (BBS, 2021). As the worldwide market for Bangladesh's once-reliable exports of jute and jute textiles declined, the country was able to reallocate its resources following its comparative advantage because of this (Manni et al., 2012).

Nonetheless, the extent of trade openness relies on the governing government's international trade, cost, and remittance flow policies. Government policies on international trade, remittances, and business expenses all impact trade openness. In the previous decade, Bangladesh's degree of economic openness showed a varied pattern. Bangladesh's ratio of exports to GDP was 36.76% in 2019, down 1.49% points from 2018 and up 2.94% points from 2017. In 2018, the ratio was 38.24%, up 2.94 points from 2017 (Bangladesh Bank Data, 2022). Since frequent capital constraints limit the amounts of investments, which can be compensated by growth through the inflow of funds from foreign investments, FDI has played a remarkable role in the Bangladeshi economy over the last two decades.

FDI has been treated as a driver for economic growth, especially for developing countries, Ridzuan et al. (2018). Besides, from past research, FDI can improve income distribution (Shaari et al., 2022) and reduce environmental degradation (Gyamfi et al., 2023). To support a favorable investment climate in the nation, the government has been more flexible with FDI policies. These policies include trade and exchange reforms, current account convertibility, fewer barriers to investment regimes, privatization, and many others. As a result, the infrastructure of the country, employment, capability, and worker skills have significantly improved through technological and managerial prowess to facilitate the integration of the domestic and global economies (Demir, 2010). Over time, Bangladesh's prohibitions on the outflow of capital and profits were eventually lifted, and the regulations for industrial investment were made more attractive to foreign investors. Besides that, a handful of financial and non-financial incentive schemes have been offered, such as tax concessions, import tariff deductions, tax holiday programs, no duty fee on the import of capital machinery, no limitation on incoming and outgoing modes, and the eradication of administrative difficulties, enables quick approval of foreign investments projects (Raghutla, C. 2020).

As trading expanded in foreign countries, Bangladesh began to export human resources formally in 1976, primarily to nations in the Middle East. In terms of human resources, 461829 human resources were exported from this country in the fiscal year 2014-2015, bringing in USD 15316.91 million (Bangladesh Bank Data, 2022). This way, remittance increased approximately at the same rate. Six Middle-East nations contributed about 58% of the remittance. Average remittances to Bangladesh were $1368.22M from 2012 to 2022, with a high of $2598.21M in July 2020 and a low of $856.87M in September 2017 (Khanom, 2020). An increase in remittance causes a large amount of capital inflow in Bangladesh's economy. This situation contributed to the increase of the total level output of Bangladesh annually after its independence. In the same way, the long-term living standard of Bangladeshi citizens has been achieved. It can be reflected in SDG's target of Bangladesh and how Bangladesh achieved enviable success in SDG's requirements in the last four fiscal years. The country has grown at a rate of more than 7% for 3 years in a row, achieving an all-time high of 8.15% in FY19, the highest in the Asia-Pacific region (Ahmed and Islam, 2020). Due to the COVID-19 pandemic, trade has contracted, contributing to the declining GDP of Bangladesh during the pandemic years. Thus, the linkage between the openness of trade and the economic development of Bangladesh cannot be ignored since they are parallels and depend on each other.

As much as the hypothesis of trade-led growth supports the liberalization of trade policies, there is also a line of arguments about the harmful impact on the domestic market (Bhagwati, 1978). The more open the trade, the domestic market faces the

more competition and inflation and reduced employment can be the consequences (Coe and Helpman, 1995). Still, there remains the question of whether Bangladesh should pursue broader wholesale trade openness or embrace a much more pragmatic approach. Therefore, it is essential to research to determine the extent to which increased trade liberalization has aided the expansion of Bangladesh's economy.

The following principal purposes of this study include (a) to ascertain the effects of trade openness on economic growth in Bangladesh, (b) to explore the impact of inflation and exchange rate on economic growth in Bangladesh, (c) to detect the causality between economic growth, trade openness, inflation and exchange rate in Bangladesh. Thus, the current study intends to assess the linkage between economic growth and trade liberalization in Bangladesh between 1990 and 2020, adjusting for the influence of inflation, exchange rate, and population. In the following ways, the research contributes to the body of literature as there are lack of studies on trade openness and economic expansion in Bangladesh.

This study utilized sophisticated econometric techniques for precise estimation. In this study, we used DOLS and ARDL bound tests for the first time to find out the long and short-run impacts of trade openness on economic growth in Bangladesh. Second, this study employed FMOLS and CCR to verify DOLS result validity. Third, the causality test developed by Granger was employed to find out the causal linkage between economic growth and other variables. Fourth, the study also employed structural break analysis to detect a structural break in the time frame. Fifth, as the government of Bangladesh has adopted numerous trade policies, such as the National Industrial Policy of 2016, the Export Policy of 2018-2019, and the One-stop Shop (OSS) Act, to enhance trade, no current research relating to trade openness and economic development is available. Thus, we analyzed data from 1990 to 2020 to determine the impact of contemporary economic policies on economic growth. We expect that our study will aid policymakers in observing the impact of trade openness on economic development and in making policy decisions.

2. LITERATURE REVIEW

Bangladesh, like many other developing nations, focuses its policy on achieving high and sustained development (Mallik and Chowdhury, 2001). Policymakers require knowledge of expansion opportunities and policy effects on development to achieve and keep the growth rate high (Moyo and Khobai, 2018). The 1990s trade expanding initiatives gave Bangladesh the potential to increase economic growth and boost overall development. A nation's economic growth, FDI, remittances, exports, imports, and may all benefit from trade openness (Krueger, 1978). The economic history of Bangladesh began in the 1960s when East Pakistan's economy expanded by an average of 4% each year. The Liberation War of 1971 devastated almost one-fifth of that economy, and the significant disruptions created by that conflict slowed Bangladesh's economic development during the subsequent two decades. Then, in 1990, the economy grew rapidly as a result of trade liberalization and the restoration of democracy. In the previous two decades, Bangladesh's economy has been differentiated by the growth of an export-oriented RMG sector, high-yield rice cultivation, livestock and leather goods, tea, and remittances. Factors like these made it possible for Bangladesh to continue exporting jute products, even as the global jute market began to decline. This allowed Bangladesh to reallocate resources following its comparative advantage. Numerous scholars see this tendency as a good effect of open trade policies (Ahmed and Sattar, 2004, p. 2). The association between trade liberalization and economic development has gained much scholarly attention. Recent research has examined regional and national experiences, including additional, social, institutional, technological, and economic variables (Khan and Hye, 2014; Zahonogo, 2017; Mireku et al., 2017; Keho, 2017; Shayanewako, 2018; Idris et al., 2018; Benita, 2019; Çevik et al., 2019; Guei and le Roux, 2019; Burange et al., 2019; Rana, 2020; Dritsaki and Dritsaki, 2020; Duodu and Baidoo, 2020; Saleem et al., 2020; Malefane and Odhiambo, 2021; Tan et al., 2021; Bunje et al., 2022). It is essential to take note of the other empirical study on the dynamic relationship between the growth of the economy and trade liberalization. Yanikkaya (2003) explored the impact of trade liberalization on economic progress between 1970 and 1997 using a panel of more than one hundred countries. Empirical evidence shows that trade restrictions significantly and positively affect economic development in low-income nations, contradicting the theoretical growth literature. Dowrick and Golley (2004) explained that the benefits of trade openness are not uniform for all countries. However, developed economies have reaped significant benefits from increased trade openness since 1980 owing to their higher levels of productive capacity. Zombe and Seshamani (2014) utilized a panel of twenty-one nations to demonstrate that trade-led development theories in Africa had low validity. Ghana's situation was examined between 1984 and 2018 by Duodu and Baidoo (2020), with a focus on the impact of institutional quality. The ARDL model's short-run and long-run estimates showed that trade openness and institutional quality both had a positive impact on economic growth, but their combined effect was insignificant.

Al Mamun and Nath (2005) used quarterly export and industrial production data for Bangladesh from 1976 to 2003. The period covered by their study was from 1976 to 2003. They used the number of units produced in factories as a proxy for GDP and growth in the economy since quarterly GDP numbers were not available. Although there was no short-term correlation between export and industrial output, the Engle-Granger cointegration test performed as part of this study did find a Positive correlation over time between the two variables. Again, the ECM showed that there are long-term correlations that only go one way between exports and industrial production. Using the OLS approach, Manni et al. (2012) analyzed the economic effect of trade liberalization on Bangladesh from 1980 to 2010. The results of the analysis show unequivocally that the liberalization boosted GDP growth without impacting inflation. The quantitative analysis also suggests that more openness has contributed to economic progress, with both real imports and exports rising as openness has increased. Meraj (2013) utilized time series data ranging from 1971 to 2005 to examine the impacts of globalization and trade openness on Bangladesh's economic expansion. The Johansen cointegration test found that Bangladesh's GDP, exports, and imports all have a connection with

each other over the long term. The Granger causality test showed a linkage in both directions between GDP and exports, but there is no connection between imports and GDP or vice versa. According to Akhter's (2015) research of annual data from 1982 to 2012, exports had a beneficial influence on the growth of the economy, whereas imports had the reverse effect. This was the case during the whole period. A more in-depth investigation of the effect that international trade has had on Bangladesh's economic growth was carried out by Ahamad (2018). He demonstrated a significant positive association between international commerce and economic development by utilizing multiple regression Pearson correlation analysis. This was achieved by employing a causal research technique using secondary data from a range of sources. Numerous pieces of empirical research have borne the conclusion that more commercial openness is associated with wider-ranging economic growth (Ulasan, 2012).

Several gaps in the literature were identified after evaluating the relevant literature. First, there have been very few studies conducted on the relationship between trade openness and economic growth, and most of them lack sophisticated and advanced methodology. Second, the majority of work relevant to trade and economic growth in Bangladesh is conducted before the 2016's industrial policy. Thus, the contribution of industrial policy in 2016 and 2019 was omitted from these studies. Third, there is no relevant research on the trade-economic growth nexus that simultaneously considers the effects of inflation, exchange rate, and population in Bangladesh. Fourthly, the structural break analysis has not been implemented in any study. This study identified those gaps and produced precise estimations using contemporary econometric techniques and data.

3. DATA AND METHODOLOGY

3.1. Data

Table 1 shows the summary statistics of all variables. The paper applied a log of all variables to minimize the bulky sizes of GDP and population. Also, a log of variables helps to discover elasticities.

Table 2 shows the summary statistics of the variables. In this table, we find the variables list, several observations, mean, standard deviation, minimum, and maximum values. LnGDP is the highest mean, and LnINF is the lowest mean.

3.2. Theoretical Framework and Cobb-Douglas Model

The study used the Cobb-Douglas production function and the AK endogenous growth model, which is shown in Equation (1), to examine how trade openness impacts economic development.

$$Y = Ak^{\beta}L^{1-\beta} \quad (1)$$

Where Y stands for economic production (or, in this instance, economic growth), A for technical development, K for capital stock, L for the labor force, and β and 1-β are, respectively, the elasticities of the capital stock and labor force.

Divide both sides of Equation (1) by the labor force to get the per capita output shown in Equation (2).

$$y = Ak^{\beta} \quad (2)$$

Table 1: Summary of data

Log of variables	Variables details	Sources
lnGDP	Gross domestic product (Current US$)	WDI
lnTOP	Trade (% of GDP)	
lnEXR	Official exchange rate (LCU per US$, period average)	
lnINF	Inflation, consumer prices (annual %)	
lnPOP	Population, total	

Table 2: Summary statistics

Variables	n	Mean	SD	Min	Max
lnGDP	41	25.16	0.781	24.16	26.65
lnTOP	41	3.439	0.265	2.939	3.874
lnINF	41	1.732	0.428	0.697	2.433
lnEXR	41	4.080	0.290	3.543	4.441
lnPOP	41	18.72	0.141	18.45	18.92

Where y and k respectively represent economic output per capita and capital stock per capita.

The log form of Equation (2) was produced by further applying the natural logarithm to Equation (2).

$$Lny = lnA + \beta lnK \quad (3)$$

Where β represents the economic output's capital stock elasticity. "A" quantifies the rise in economic production that is not attributable to a rise in the labor force or capital accumulation. The analysis relies on the assumption that economic factors like trade openness, population, and inflation have an impact on Bangladesh's technological advancement. [i.e. A=f(TOP,INF,POP)]. According to Oreiro (2015), the accumulation of capital is a function of the real exchange rate [i.e., k=f(EXR)]. In this study, we utilized GDP per capita as economic output per capita. Thus, Equation (3) can be specified as

$$lnGDP = \beta lnTOP + lnINF + lnEXR + lnPOP \quad (4)$$

Where GDP denotes gross domestic product, TOP is trade openness, INF indicates Inflation, EXR is the exchange rate, and finally, POP shows population.

Now, the econometric model for estimation can be written as follows:

$$lnGDP_t = \beta_0 + \beta_1 lnTOP_t + \beta_2 lnINF_t + \beta_3 lnEXR_t + \beta_4 lnPOP_t + \epsilon_t \quad (5)$$

Where β_1-β_4 are used as coefficients of explanatory variables.

3.3. Empirical Model and Method of Analysis

3.3.1. Unit root test

The usage of a unit root test is required to avoid spurious regression. By comparing the variables in the regression and utilizing stationary procedures to predict the relevant equation, it verifies that the variables are stationary. The existing studies acknowledge the importance of establishing the integration order before examining the cointegration of variables. This study

employed Augmented Dickey Fuller (ADF), Philips-Perron (P-P), and IPS unit root test.

3.3.2. ARDL bound test

To ascertain the cointegration, the ARDL bounds test was utilized. Compared to other one-time integer cointegration evaluation methods, the ARDL bounds test provides several benefits. When a series has a mixed order of integration, the ARDL bounds test could be employed since it does not need any necessary assumptions or that all variables be incorporated into the analysis in the same order. Additionally, it has far higher reliability, especially for limited sample sizes. The sample size is considered small if there are fewer than 40 observations (Poole et al., 2002). Furthermore, it offers an accurate assessment of the long-term model. Thus, if the data are non-stationary and do not exceed I (2) after differentiating, the ARDL bounds testing method can be used for stationary and non-stationary variables.

The following equation (6) is used for the bound testing approach:

w, ∀

$$\Delta lnGDP_t = w_0 + w_1 lnGDP_{t-1} + w_2 lnTOP_{t-1} + w_3 lnINF_{t-1} + w_4 lnEXR_{t-1} + w_5 lnPOP_{t-1} + \sum_{i=1}^{p} \forall_1 \Delta lnGDP_{t-i} + \sum_{i=1}^{p} \forall_2 \Delta lnTOP_{t-i} + \sum_{i=1}^{p} \forall_3 \Delta lnINF_{t-i} + \sum_{i=1}^{p} \forall_4 \Delta lnEXR_{t-1} + \sum_{i=1}^{p} \forall_5 \Delta lnPOP_{t-1} + ¥_t \quad (6)$$

Pesaran (2001) proposed some critical values for F distribution and ARDL bound test based on its evaluation. To determine the significance of the combined coefficients of the lagged variables, the F-test was utilized, and the estimating process began with Eq (6). By using this method, we may test the hypothesis of a long-term relationship between the variables across time. There are no cointegrating interactions between the regressors, as shown by the null hypothesis (H_0). The null hypothesis can be rejected if the projected F value surpasses the upper bound critical value and implies the existence of long-run cointegration. In contrast, the null hypothesis would be accepted if the F value falls below the lower critical bound and exhibits there is no cointegration. Finally, the decision would be inconclusive if the F value falls between the upper and lower limit critical value.

3.3.3. DOLS cointegration regression, FMOLS, and CCR for robustness

An expanded equation of OLS estimation called DOLS was utilized to examine time series data (Raihan et al., 2022). The cointegration test includes the lags and leads of the first difference terms as well as the explanatory variables. This method is efficient for integrating independent variables in a cointegrated diagram by predicting response variables on each other. Furthermore, it addresses the problems of autocorrelation, endogeneity, and limited sample bias. The long-run coefficient is estimated utilizing the DOLS method in this study using Eq (6). The robustness of the results was examined using FMOLS and CCR. The FMOLS method is a modification of least squares that takes into consideration the effects of endogeneity and serial correlation in the explanatory variables that arise from cointegrating. When the regressors have zero frequency, the CCR approach is employed to separate the error term from them. By analyzing the consequences of serial correlation, it is possible to achieve asymptotic consistency.

3.3.4. Pairwise granger causality test

The Granger causality test was utilized in this study to investigate any causal connection between Bangladesh's economic development and its level of trade openness. The concept of causality is essential in econometrics and largely pertains to the capacity of one variable to forecast the value of another. Granger (1969) devised a relatively simple test that characterized the causative relationship.

$$\Delta lnGDP_t = \sum_{k=1}^{n} \beta_{11} lnGDP_{t-1} + \sum_{l=1}^{n} \beta_{12} lnTOP_{t-l} + \epsilon_{1t} \quad (7)$$

$$\Delta \ln TOP_t = \sum_{l=1}^{n} \beta_{21} lnTOP_{t-1} + \sum_{k=1}^{n} \beta_{22} lnGDP_{t-k} + \epsilon_{2t} \quad (8)$$

$$\Delta \ln INF_t = \sum_{l=1}^{n} \beta_{31} lnINF_{t-1} + \sum_{k=1}^{n} \beta_{32} lnGDP_{t-k} + \epsilon_{3t} \quad (9)$$

$$\Delta \ln Exrate_t = \sum_{l=1}^{n} \beta_{41} lnEXrate_{t-1} + \sum_{k=1}^{n} \beta_{42} lnGDP_{t-k} + \epsilon_{4t} \quad (10)$$

$$\Delta lnPOP_t = \sum_{l=1}^{n} \beta_{51} lnPOP_{t-1} + \sum_{k=1}^{n} \beta_{52} lnGDP_{t-k} + \epsilon_{5t} \quad (11)$$

Note: (i) symbols *, ** and *** are used to indicate 10%, 5% and 1% significance level.

4. RESULTS AND FINDINGS

4.1. Unit Root Test

The findings of testing unit roots using ADF, PP, and IPS tests are presented in Table 3. The results show that in all three of the unit root tests, LnGDP, LnPOP, LnINF, and LnTOP were non-stationary at the level and had become stationary at the first difference. Additionally, PP and IPS test findings showed that LnEXR is stationary at this level. The DOLS approach is appropriate because the unit root test shows that the series is stationary at the level of integration (I (0)) or the first order (I (1)), but none of the variables is I (2).

4.2. Unit Root Test with a Structural Break

The next step was to check the structural breaks of the variables. In Table 4, the Zivot-Andrew test was applied to check the unit root test with structural breaks for a probable phase shift throughout unit root testing, as illustrated in Table 4. When the univariate ZA unit root test was run, the results reported in Table 4 indicate that all variables show I (1) patterns at a 5% level. The LnTOP, LnINF, LnEXR, and LnGDP series all have structural discontinuities in 2015, 2003, 2013, and 1999 consecutively. This research has found several important social,

Table 3: Unit root tests

Variable	ADF test		PP test		IPS test	
	Level	1st difference	Level	1st difference	Level	1st difference
lnGDP	2.3782	−3.873***	1.968	−3.522***	−1.431	−3.993***
lnTOP	−1.9109	−4.484***	2.452	−3.531***	0.939	−7.733***
lnINF	−2.1245	−4.337***	2.195	−3.380***	1.811	−7.319***
lnEXR	−2.7836**	−4.586***	−3.518***	−5.5753***	−4.491**	−5.6728***
lnPOP	−2.1701*	−2.430**	−0.052	−4.512***	−0.7121	−4.921***

Table 4: Unit root with a structural break

Zivot-Andrews test						
Variables	ZA statistic	Break	1%	5%	10%	Decision
lnGDP	−2.860**	1999	−5.34	−4.93	−4.58	Break Exist
lnTOP	−2.658**	2015	−5.34	−4.93	−4.58	
lnINF	−4.941**	2003	−5.34	−4.93	−4.58	
lnEXR	−2.781***	2013	−5.34	−4.93	−4.58	
lnPOP	−3.108	2004	−5.34	−4.93	−4.58	

economic, and political ups and downs between 1989 and 1992 that coincided with the pivotal moments of the 1990s. An additional probable reason for the structural differences between 2015, 2013, and 2003 is that in 2000, Bangladesh's trade policy witnessed a significant shift. Bangladesh's economy would be inextricably linked to the 2008 global financial crisis, as would the economies of other Asian countries. It is vital to remember that all variables may be restored to their initial values. This means that I (1) is completely included in the variable level series.

4.3. Bound Co-integration Test

The ARDL bounds test for cointegration assessment was performed once the series was shown to be stationary. Minimum values of Akaike's Information Criterion (AIC) were used to calculate the F-statistic at an appropriate lag duration. The ARDL bounds test was performed to analyze the cointegration relationship, and the findings are shown in Table 5. The presence of a long-run connection between the parameters can be verified by checking the estimated F-test result against the lower and upper limits. The findings demonstrate that the F-statistic value (5.566) is more than 10% and 5% of the necessary upper limit in the I (0) and I (1) tests, respectively, indicating a long-term relationship between the relevant variables.

4.4. Cointegration Regression

Table 6 presents the outcomes of DOLS estimation. DOLS demonstrates that assuming other factors are kept constant, the expected long-run coefficient of trade openness is negative and statistically significant at a 1% level, suggesting that a 1% increase in trade would result in a 1.79% decline in GDP. This outcome indicates that trade openness slows down economic growth over time. Additionally, the coefficient of inflation is significant and positive at a 1% level, suggesting that in Bangladesh, a 1% rise in inflation over time would increase GDP by 0.59 %. Additionally, the projected long-run population coefficient is significant and positive at a 10% level, indicating that a 1% increase in population causes a 4.68% rise in GDP. This result suggests that population growth contributes to

Table 5: Bound co-integration test

Test statistic	Value	K
F-statistic	5.566	4
Critical value bounds		
Significance level	I (0)	I (1)
10%	2.760	4.084
5%	3.406	4.938
1%	5.023	7.062

Table 6: DOLS results (dependent variable LGDP)

Dependent variable: LGDP				
Method: Dynamic least squares (DOLS)				
Variable	Coefficient	Standard error	t-statistic	Prob.
lnTOP	−1.7937***	0.228753	−7.84136	0.0000
lnINF	0.5911***	0.18177	3.252072	0.0077
lnEXR	2.8031	1.799801	1.557486	0.1476
lnPOP	4.686*	2.350864	1.993567	0.0716
C	−70.30033	38.62682	−1.81999	0.0961
R-squared	0.993274	Mean dependent variable		25.18002
Adjusted R-squared	0.98349	S.D. dependent variable		0.722621
S.E. of regression	0.092852	Sum squared residual		0.094835
Long-run variance	0.005954			

Table 7: The outcomes of FMOLS and CCR: Dependent variable LGDP

Variables	FMOLS		CCR	
	Coefficient	Standard error	Coefficient	Standard error
lnTOP	−0.97091***	0.333959	−0.997***	0.362431
lnINF	0.108229	0.126048	0.12609	0.144139
lnEXR	−1.16772	1.511547	−1.31325	1.55161
lnPOP	8.925037***	2.948577	9.2627***	3.045933
C	−134.0171	49.55495	−139.686	51.12627
R-squared	0.934		0.933	

Bangladesh's growing GDP. Furthermore, while the anticipated long-run coefficient of the exchange rate is positive, it has insignificant long-term effects on GDP.

4.5. Robustness Check

Table 7 displays the results of the reliability of the DOLS estimate using the FMOLS and CCR methods. Both the FMOLS and the CCR show that the trade openness coefficients are negative and substantial. The FMOLS and CCR tests also demonstrate that the long-run inflation coefficient is positive and statistically significant. The results provided more evidence of the robust positive correlation

Table 8: Diagnostic tests

Statistics test	Null hypothesis	Test statistic	P-value
Heteroskedasticity Test: Breusch-Pagan-Godfrey	Ho: Homoskedasticity	0.574 (F-statistic)	0.542
Normality Test: Jarque bera	Ho: Residuals are normally distributed.	0.2547	0.1654
Breusch-Godfrey serial correlation LM test	Ho: No serial correlation up to 2 lags	2.142 (F-statistic)	0.1842
R^2			0.482
Adjusted R^2			0.742
Durbin-Watson stat		1.54	
Ramsey RESET test (F)	Ho: The functional form of the model is correct	0.234 (F-statistic)	0.5346

Sources: The authors' calculation

Table 9: Pairwise Granger causality tests

Pairwise Granger causality tests			
Null hypothesis	**Obs**	**F-statistic**	**Prob.**
lnTOP⇏lnGDP	41	2.7673**	0.0423
lnGDP⇏lnTOP		0.57139	0.5722
lnINF⇏lnGDP	41	1.65361	0.2124
lnGDP⇏lnINF		0.96759	0.3943
lnEXR⇏lnGDP	41	3.79188**	0.0371
lnGDP⇏lnEXR		0.85821	0.4365
lnPOP⇏lnGDP	41	2.1592*	0.0807
lnGDP⇏lnPOP		5.02724**	0.015

between population increase and economic expansion. The long-term effects of the exchange rate on economic growth in Bangladesh are negligible, as shown by both FMOLS and CCR results. It follows that inflation and population growth promote economic growth, but trade liberalization hinders it. DOLS results are compatible with FMOLS and CCR findings. The R2 and adjusted R2 values from FMOLS and CCR estimates exhibit the model's goodness of fit, indicating that the explanatory variables can explain 93.3% of the variance in the change of the explained variable.

4.6. Diagnostics Test

To determine the model adequacy, this study utilized several diagnostic tests. The findings of the test are shown in Table 8. The P-value of BPG heteroscedasticity and the Jarque-Bera normality test is insignificant at each level of significance, and the null hypothesis cannot be rejected. The result indicates that the model is free from heteroscedasticity issues and normally distributed. Moreover, the BG-LM test for serial correlation is also utilized to find out serial correlation within the model and the results indicate that the P-value is insignificant at each level of significance. Thus, the model is free from serial correlation issues. Finally, the Durbin-Watson test was employed to detect autocorrelation problems in the model. The test statistic of the Durbin-Watson test is 1.54 and the null hypothesis cannot be rejected.Thus, no autocorrelation problem was detected within the model.

4.7. Granger Causality

Table 9 displays the results of a causality test, which reveals two separate, unidirectional chains of causation. Bangladesh's overall trade condition has altered since adopting an industrial policy (2019), and the GDP has also been greatly influenced. Consequently, trade openness continued to have a unidirectional causal relationship with GDP, and the direction of causation being trade openness to GDP. The result of the causality test also showed a unidirectional causal relationship between exchange rate to GDP. In addition, the test result revealed a bidirectional causality relationship between GDP and population.

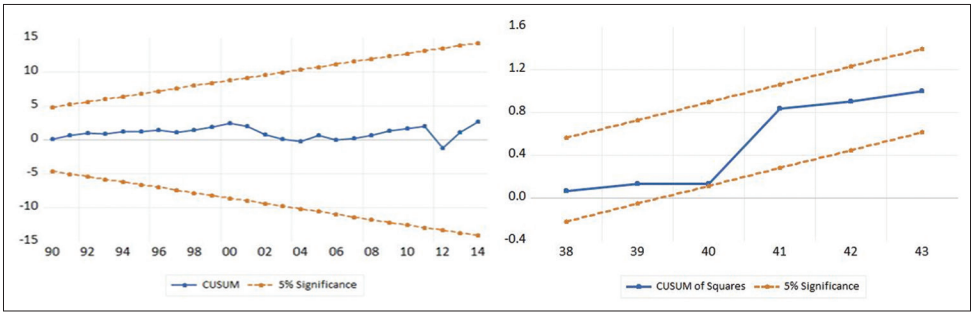
4.8. Parameter Stability Test

As shown in Figure 1, the blue line plot is inside the 5% confidence interval, indicating that all of the analysis model's parameters are stable when using CUSUM and CUSUMSQ tested their validity. The study used the CUSUM and CUSUMSQ tests to identify deviations from desired values (Figure 1). There is zero probability that any particular value will deviate from our modified objective values, as shown by the CUSUM and CUSUMSQ curves. As can be seen in both the CUSUM and

5. DISCUSSION

This paper explored the linkage between trade openness and the growth of the economy in the long term. The result demonstrated that trade liberalization has a substantial negative influence on economic expansion in Bangladesh. In industrial policy 2019, some initiatives had been taken to promote trade such as import liberalization, one-stop service, and export diversification. Both exports and imports increased but imports exceeded exports. Bangladesh has a comparative advantage in the less expensive non-technology products. Thus, Bangladesh resorted to import a huge amount of technology and other products from abroad. Imports products are dominating the domestic product in both quality and price. In 2022, the value of imports is 671.62B, while exports are just 357.51B (World Bank, 2022). Therefore, due to trade openness, imports have increased and lowered domestic production, harming the country's GDP. This finding is supported by Hye and Lau (2016), who found that trade openness has a long-run negative impact on economic growth. The results are also in line with Hye (2012), Ali and Abdullah (2015), Nayo and Khobai (2018), and Elijah and Musa (2019) but contradicted the findings of Ridzuan et al. (2017), who found a positive relationship between TO and economics growth in Singapore, and Demikha et al. (2021) for historical data based on Ottoman Empire in Turkey. Additionally, this study found a positive association between inflation and economic growth. Inflation influences economic growth in the following ways: the manufacturers often gain from inflation. They benefit financially since they can charge higher prices for their products. Additionally, investors and business owners have more motivation to invest money into productive projects when inflation is prevalent to increase their returns. Moreover, after receiving the proper capital, manufacturers generate more products and services. Thus, inflation causes a rise in

Figure 1: CUSUM and CUSUMSQ tests



the production of goods and services. Furthermore, demand for the different manufacturing factors, including labor, has increased as output has expanded; consequently, during inflation, employment and income increase. The findings that show that a rise in inflation is positively associated with economic expansion are also supported by Majumdar (2016), Sumon and Miyan (2017), and Kryeziu and Durguti (2019). Moreover, this study demonstrated that population and economic growth are positively related. The higher growth of the population will also increase economic growth in Bangladesh. The major reason behind this outcome is Bangladesh is getting benefits from the demographic dividend. The working-age share of the population is higher than the non-working-age population and has a significant positive impact on the economy (Headey and Hodge, 2009). Through the following way Bangladesh gets benefits from demographic dividend. Firstly, higher populations of working age enhance labor supply and favorably impact production. Secondly, demographic dividend lowers the dependent population. As a result, an individual can save more. Thirdly, the economy of Bangladesh is mostly dependent on remittance. Bangladesh enjoys the advantages of the demographic dividend as the number of its citizens migrating overseas for employment purposes continues to rise. The results of this study comply with Mamun et al. (2020), Garza-Rodriguez et al. (2016), and Ahmad and Luqman (2012).

6. CONCLUSION AND POLICY IMPLICATION

The current study uses time series data from 1990 to 2020 to empirically evaluate the effects of trade openness on economic growth in Bangladesh. The study also utilized the role of inflation, population, and exchange rate on economic growth. IPS, ADF, and PP unit root tests were used to determine the integration order of the series. Additionally, the ARDL bounds test demonstrated that the variables had long-term cointegration. The DOLS results show that inflation and population have a positive effect on economic progress in Bangladesh, while increasing trade liberalization has a negative influence on economic growth. The estimated outcomes comply with FMOLS and CCR estimators. Moreover, the pairwise Granger causality test determined the causal relationship between the variables. The outcomes of the causal relationship demonstrated that unidirectional causal relationships exist, from trade openness to economic growth and exchange rate to economic growth. The results also showed bidirectional causal relationship prevails between population and economic growth. These conclusions provide policy suggestions for achieving sustainable economic growth via the establishment of effective regulatory policy tools.

From the findings above, we are suggesting some policies:

- Bangladesh's government should take the necessary steps to improve the trade situation. Export diversification is one of the possible solutions to boost exports. Bangladesh's economy relies heavily on exports of RMG, leather, and frozen goods. Bangladesh is still reliant on the ready-made garment (RMG) sector, which accounts for nearly 80% of its exports, which is not a sound decision. Thus, diversification of export items and export destinations is critical for business sustainability. Moreover, the government should impose some import restrictions to protect the infant domestic industry. In addition to protective facilities, more emphasis is placed on product quality to ensure that local goods can compete in international markets. Additionally, to increase exports, new EPZs should be established.
- This study observed a positive linkage between inflation and economic progress. Inflation also has some negative effects on the economy, so it should be maintained at the standard rate. When implementing monetary policy, Bangladesh Bank should always strive to keep inflation at a moderate rate.
- Moreover, the research uncovered a favorable association between population and economic development in Bangladesh. Bangladesh has a large working-age population, which the government should utilize. Bangladesh must implement multiple strategies for all levels of education, including vocational education and training, to build a skilled labor force. This youthful population might pose a catastrophic threat to Bangladesh if Bangladesh fails to seize this opportunity immediately.
- One key indicator of a country's economic health is its exchange rate. From what we can see, there is a negative relationship between the exchange rate and GDP. From what we can see, a free and flexible exchange rate is the best option. If a country's economy improves, the currency's value could rise as well. An improvement in the currency rate is another benefit of a rise in interest rates and trade volume.

Although this study contributes significantly to the existing information body, it has certain limitations. The study focuses solely on the effects of trade, inflation, and exchange rate on economic growth, but political stability, human capital, and technical advancements may also play a significant influence in determining a country's economic growth. Thus, future studies can broaden the scope of analysis by integrating more variables and their interactions with the previously listed parameters. In addition, the study relies on secondary data sources, which may have constraints such as accuracy and reliability. In addition, the study focuses on a limited time frame. Future studies can analyze

the long-term consequences of these factors on Bangladesh's economic growth by analyzing data over a longer period. This study contributes to the current literature on the impact of trade, inflation, and exchange rate on Bangladesh's economic growth, rates on Bangladesh's economic growth despite certain limitations. Future research can overcome these constraints by broadening the area of study, examining other analytical approaches, and analyzing data over a longer period.

7. ACKNOWLEDGEMENT

The proofreading services of this paper are financed by Strategic Research Partnership Grant-100-RMC/5/3/SRPINT (010/2022), provided by Universiti Teknologi MARA, Malaysia.

8. FUNDING STATEMENT

The paper is funded by Gulf University, Sanad, Kingdom of Bahrain.

REFERENCES

Ahamad, M.H. (2018), Impact of international trade on economic growth in Bangladesh. International Journal of Science and Research, 7(11), 1624-1627.

Ahmad, N., Luqman, M. (2012), A dynamic analysis of the relationship among inflation, investment, population growth, export, and economic growth in Pakistan. Asian Journal of Research in Business Economics and Management, 2(8), 175-182.

Ahmed, R., Islam, E. (2020), COVID-19 Crisis and Fiscal Space for Bangladesh economy: A Comparative Analysis with South Asian Countries Policy note. Policy Note: PN 2002. Chief Economist's Unit Bangladesh Bank.

Ahmed, S., Sattar, Z. (2004), Impact of trade liberalization: Looking at the evidence. Economic and Political Weekly, 39(36), 4059-4067.

Akhter, M. (2015), The impact of export and import on economic growth in Bangladesh. World Vision, 9(1), 66-81.

Al Mamun, K.A., Nath, H.K. (2005), Export-led growth in Bangladesh: A time series analysis. Applied Economics Letters, 12(6), 361-364.

Ali, W., Abdullah, A. (2015), The impact of trade openness on the economic growth of Pakistan: 1980-2010. Global Business and Management Research, 7(2), 120.

Amna Intisar, R., Yaseen, M.R., Kousar, R., Usman, M., Makhdum, M.S.A. (2020), Impact of trade openness and human capital on economic growth: A comparative investigation of Asian countries. Sustainability, 12(7), 2930.

Bangladesh Bank Data. (2022). Available from: https://www.bb.org.bd/en/index.php/econdata/index [Last accessed on 2022 Apr 20].

BBS. (2021). Available from: https://www.bbs.gov.bd/site/page/29855dc1-f2b4-4dc0-907 f692361112da/statistical-yearbook [Last accessed on 2022 May 25].

Benita, F. (2019), Trade openness, economic growth and the global financial crisis of 2007-2009 in Latin America. Journal of International Development, 31(5), 411-431.

Bhagwati, J.N. (1978), Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regime. Cambridge, MA: Ballinger.

Bunje, M.Y., Abendin, S., Wang, Y. (2022), The effects of trade openness on economic growth in Africa. Open Journal of Business and Management, 10(02), 614-642.

Burange, L.G., Ranadive, R.R., Karnik, N.N. (2019), Trade openness and economic growth nexus: A case study of BRICS. Foreign Trade Review, 54(1), 1-15.

Çevik, E.I., Atukeren, E., Korkmaz, T. (2019), Trade openness and economic growth in Turkey: A rolling frequency domain analysis. Economies, 7(2), 0041.

Coe, D.T., Helpman, E. (1995), International R and D spillovers. European Economic Review, 39, 859-887.

Demikha, L., Shaharuddin, A., Ridzuan, A.R. (2021), The effects of foreign direct investment, external debts and trade openness on economic growth: Evidence from Ottoman empire 1881-1913. International Journal of Economics and Business Research, 21(3), 387-410.

Demir, F. (2010), Exchange rate volatility and employment growth in developing countries: Evidence from Turkey. World Development, 38(8), 1127-1140.

Doğanlar, M. (2002), Estimating the impact of exchange rate volatility on exports: Evidence from Asian countries. Applied Economics Letters, 9(13), 859-863.

Dowrick, S., Golley, J. (2004), Trade openness and growth: Who benefits? Oxford Review of Economic Policy, 20(1), 38-56.

Dritsaki, M., Dritsaki, C. (2020), Trade openness and economic growth: A panel data analysis of Baltic countries. Asian Economic and Financial Review, 10(3), 313-324.

Duodu, E., Baidoo, S.T. (2020), How does the quality of institutions affect the impact of trade openness on the economic growth of Ghana? Cogent Economics and Finance, 8(1), 1812258.

Elijah, Sunday & Musa, Ahmed. (2019), Dynamic impact of trade openness on the economic growth in Nigeria. International Journal of Engineering and Advanced Technology, 8, 609-616.

Garza-Rodriguez, J., Andrade-Velasco, C., Martinez-Silva, K., Renteria-Rodriguez, F., Vallejo-Castillo, P. (2016), The relationship between population growth and economic growth in Mexico. Economics Bulletin, 36(1), 97-107.

Grossman, G.M., Helpman, E. (1990), Comparative advantage and long-run growth. American Economic Review, 80, 796-815.

Guei, K.M., Le Roux, P. (2019), Trade openness and economic growth: Evidence from the economic community of Western African states region. Journal of Economic and Financial Sciences, 12(1), 1-9.

Gyamfi, B.A., Onifade, S.T., Ridzuan, A.R., Shaari M.S., Jena, P.K. (2023), An environmental assessment of the impacts of corruption, foreign investment inflow and trade liberalization in the rapidly emerging Malaysian economy. Environmental Science Pollution Research 30, 93667-93685.

Granger, C. W. J. (1969), Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. Econometrica, 37, 424-438.

Khobai, H., & Dladla, K. (2018). The impact of taxation on economic growth in South Africa, Working Papers 1818, Department of Economics, South Africa: Nelson Mandela University.

Headey, D.D., Hodge, A. (2009), The effect of population growth on economic growth: A meta-regression analysis of the macroeconomic literature. Population and Development Review, 35(2), 221-248.

Hye, Q.M.A. (2012), Long term effect of trade openness on economic growth in case of Pakistan. Quality and Quantity, 46(4), 1137-1149.

Hye, Q.M.A., Lau, W.Y. (2015), Trade openness and economic growth: Empirical evidence from India. Journal of Business Economics and Management, 16(1), 188-205.

Idris, J., Yusop, Z., Habibullah, M.S., Chin, L. (2018), Openness and economic growth in developing and OECD countries. International Journal of Economics and Management, 12(2), 693-702.

Keho, Y. (2017), The impact of trade openness on economic growth: The case of Cote d'Ivoire. Cogent Economics and Finance, 5(1), 1332820.

Khan, R.E.A., Hye, Q.M.A. (2014), Foreign direct investment and liberalization policies in Pakistan: An empirical analysis. Cogent

Economics and Finance, 2(1), 1-12.
Khanom, S. (2020), Does trade openness cause economic growth in Bangladesh? IIUC Studies, 16, 99-110.
Krueger, A.O. (1978), Foreign Trade Regimes and Economic Development: Liberalization Attempts and Consequences. Cambridge, MA: Ballinger.
Kryeziu, N., Durguti, E.A. (2019), The impact of inflation on economic growth: The case of Eurozone. International Journal of Finance and Banking Studies (2147-4486), 8(1), 1-9.
Majumdar, K. (2016). Processed food sector in India: A review. FnBnews.com. Avaliable from: http://www.fnbnews.com/Top-News/processed-food-sector-in-india-a-review-38894
Malefane, M.R., Odhiambo, N.M. (2021), Trade openness and economic growth: Empirical evidence from Lesotho. Global Business Review, 22(5), 1103-1119.
Mallik, G., Chowdhury, A. (2001), Inflation and economic growth: Evidence from South Asian Countries. Asian Pacific Development Journal, 8(1), 123-135.
Mamun, S.A.K., Rahman, M.M., Khanam, R. (2020), The relation between an ageing population and economic growth in Bangladesh: Evidence from an endogenous growth model. Economic Analysis and Policy, 66, 14-25.
Manni, U.H., Siddiqui, S.A., Afzal, M.N.I. (2012), An empirical investigation on trade openness and economic growth in Bangladesh economy. Asian Social Science, 8(11), 154-159.
Meraj, M. (2013), Impact of globalization and trade openness on economic growth in Bangladesh. Ritsumeikan Journal of Asia Pacific Studies, 32, 40-50.
Mireku, K., Animah Agyei, E., Domeher, D. (2017), Trade openness and economic growth volatility: An empirical investigation. Cogent Economics and Finance, 5(1), 1385438.
Moyo, C., Khobai, H. (2018), Trade Openness and Economic Growth in SADC Countries. MPRA Paper No. 84254.
Oreiro, J. L. (2022). Does misallocation or inefficient allocation of resources explain uneven development? Some considerations from the literature of economic growth and development. Structuralist Development Macroeconomics Research Group. Avaliable from: https://jlcoreiro.wordpress.com
Pesaran, M. H., Shin ,Y., Smith, R. J. (2001), Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics 16(3), 289-326.
Poole, M. S., McPhee, R. D., & Canary, D. J. (2002), Hypothesis testing and modeling perspectives on inquiry. In M. L. Knapp & J. A. Daly, Handbook of interpersonal communication 3rd ed pp. 23-72.
Raghutla, C. (2020), The effect of trade openness on economic growth: Some empirical evidence from emerging market economies. Journal of Public Affairs, 20(3), e2081.
Raihan, A., Muhtasim, D.A., Pavel, M.I., Faruk, O., Rahman, M. (2022), Dynamic impacts of economic growth, renewable energy use, urbanization, and tourism on carbon dioxide emissions in Argentina. Environmental Processes, 9(2), 1-29.
Raihan, S. (2008), Trade Liberalization and Poverty in Bangladesh. Macao Regional Knowledge Hub Working Papers, 15.
Rana, S.B. (2020), Trade openness and economic growth in Nepal. Butwal Campus Journal, 3(1), 1-20.
Ridzuan, A.R., Ismail, N.A., Che Hamat, A.F. (2017), Does foreign direct investment successfully lead to sustainable development in Singapore? Economies, 5(3), 1-20.
Ridzuan, A.R., Ismail, N.A., Che Hamat, A.F. (2018), Modeling macroeconomic determinants for foreign direct investment inflows in ASEAN-5 countries. International Journal of Economics and Management, 12(1), 147-165.
Rodriguez, F., Rodrik, D. (2000), Policy Skeptic's Growth. NBER Macroeconomics Annual, 15, 261-325.
Saleem, H., Shabbir, M.S., Bilal Khan, M. (2020), The short-run and long-run dynamics among FDI, trade openness and economic growth: Using a bootstrap ARDL test for co-integration in selected South Asian countries. South Asian Journal of Business Studies, 9(2), 279-295.
Shaari, M. S., Lee, W. C., Ridzuan, A. R., Lau, E., & Masnan, F. (2022), The Impacts of Energy Consumption by Sector and Foreign Direct Investment on CO2 Emissions in Malaysia. Sustainability, 14(23), 16028.
Shayanewako, V.B. (2018), The relationship between trade openness and economic growth: The case of BRICS Countries. Journal of Global Economics, 6(2), 6-10.
Sumon, K.K., Miyan, M.S. (2017), Inflation and economic growth: An empirical evidence of Bangladesh (1986-2016). International Journal of Economics and Financial Issues, 7(5), 454-464.
Tan, L., Xu, Y., Gashaw, A. (2021), Influence of exchange rate on foreign direct investment inflows: An empirical analysis based on co-integration and Granger causality test. Mathematical Problems in Engineering, 2021, 1-12.
Ulasan, B. (2012). Openness to International Trade and Economic Growth: A Cross-Country Empirical Investigation. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2087930World Bank.
World Bank. (2022), World Bank Data. Available from: https://data.worldbank.org [Last accessed on 2022 Apr 25].
Yanikkaya, H. (2003), Trade openness and economic growth: A cross-country empirical investigation. Journal of Development Economics, 72(1), 57-89.
Zahonogo, P. (2017), Trade and economic growth in developing countries: Evidence from sub-Saharan Africa. Journal of African Trade, 3, 41-56.
Zombe, C., Seshamani, V. (2014), Financial development, trade openness, and economic growth in Zambia. Journal of Modern Accounting and Auditing, 10(7), 803-815.