

Unveiling the powerhouse: Exploring the dynamic relationship between globalization, urbanization, and economic growth in Bangladesh through an innovative ARDL approach

Mohammad Ridwan*

Department of Economics, Noakhali Science and Technology University

ABSTRACT

Significant changes in the economic landscape of Bangladesh have occurred in recent decades due to variables such as globalization, urbanization, FDI, trade, population dynamics, and their interplay. Effective policies and strategies must be developed with a thorough comprehension of the interconnected dynamics of these factors and their influence on economic expansion. This study investigates the dynamic linkages between globalization, urbanization, foreign direct investment (FDI), trade, population, and economic growth in Bangladesh. The study employs sophisticated econometric techniques to analyze the impact of these variables on the nation's economic landscape from 1991 to 2021. The stability of the dataset is evaluated using stationarity tests including ADF, DF-GLS, and P-P unit root tests. The results indicate a varied order of integration estimation for the investigated variables, necessitating additional investigation. The Autoregressive Distributed Lag (ARDL) estimation technique is utilized to investigate the long-term relationship between the variables. The results demonstrate a positive and statistically significant relationship between globalization, urbanization, trade, FDI, and economic growth. The significance of external factors and urbanization in propelling Bangladesh's economic growth is highlighted by these findings. Surprisingly, during the examined period, population dynamics had no significant impact on economic growth. This emphasizes the need for policymakers to investigate the intricate relationship between population trends and sustainable economic growth. Using the Ramsey Reset test, Jarque-Bera test, Breusch Godfrey LM test, and CUSUM & CUSUM square test, the model's dependability is rigorously evaluated. The results demonstrate the model's robustness and validity, bolstering the veracity of the study's findings. On the basis of the research findings, a number of policy recommendations emerge. To promote economic growth, it is recommended that Bangladesh continue to embrace globalization, encourage FDI, and strengthen international trade relations. In addition, policymakers should prioritize urban development to capitalize on the economic benefits of urbanization. To address population dynamics, a balanced approach is required. To maximize the potential of the young workforce, population control measures should be considered alongside investments in education, skills training, and healthcare.

KEYWORDS

ARDL; Bangladesh; Economic Growth; Globalization; Urbanization

Received: 6 June 2023

Accepted: 20 June 2023

Published: 21 June 2023

Introduction

Bangladesh, a South Asian nation situated on the Bay of Bengal, has experienced substantial economic progress and development over the past several decades. Bangladesh has maintained a constant development trajectory despite numerous obstacles, transforming from a low-income to a lower-middle-income country (Hussain and Haque, 2016). This study seeks to analyze Bangladesh's economic development conditions and cast light on the factors that have contributed to its success. Macroeconomic stability is one of the fundamental pillars of Bangladesh's economic growth. To maintain price stability, control inflation, and manage the budget deficit, the government has implemented prudent fiscal and monetary policies. Bangladesh has, through effective macroeconomic management, created a favorable environment for both domestic and foreign investment, which has contributed to economic growth. Bangladesh's economy is predominantly export-driven, with textiles and apparel constituting the dominant industries. The nation has taken advantage of its abundant labor force and competitive edge in the global textile market. Government policies aimed at attracting foreign direct investment (FDI) in the export sector have resulted in the establishment of numerous export-oriented industries and the creation of employment opportunities. Consistent export growth has substantially contributed to the country's economic expansion. Infrastructure development investments have been crucial to Bangladesh's economic growth (Hasan et al., 2022). The government has undertaken significant efforts to improve transportation networks, energy generation, and telecommunications infrastructure. Infrastructure projects, including the Padma Bridge, deep-sea terminals, and power facilities, have increased connectivity, decreased transportation costs, and attracted investment (Rahaman et al., 2022). These developments have paved the way for additional economic growth and generated opportunities in sectors such as manufacturing

and services. Despite its remarkable progress, Bangladesh confronts a number of obstacles to sustaining its economic development, including poverty, income inequality, infrastructure deficits in rural areas, political instability, and dangers associated with climate change (Hasan et al., 2022). Efforts from the government and collaboration between the public and private sectors are required to effectively address these challenges. Sustaining economic progress requires policies that promote inclusive growth, enhance infrastructure in rural areas, attract investment in diverse sectors, and mitigate the effects of climate change. The world press has always been quite complimentary of Bangladesh's economic success. Bangladesh's per capita income climbed by 8% over the prior year to \$2,227, which is \$280 higher than India's per capita income in the fiscal year 2020–21 (Golder et al., 2023). After this incident, there was a great deal of discussion on Bangladesh's economic development in the Indian and international media, including the Wall Street Journal and Bloomberg. The development of Bangladesh's economy has sometimes been mentioned in Pakistani media as well. Despite Bangladesh having a 45% wealth advantage over Pakistan on the 50th anniversary of its independence, a Bloomberg study claims that Pakistan was almost 70% wealthier than Bangladesh in 1971 (Golder et al., 2023). From 2000, Bangladesh's GDP has grown at a pace of 5%. Several measures of the nation's economic growth also showed a discernible increase. 49% of the population of Bangladesh lived below the poverty level in 2000, according to the Bangladesh Bureau of Statistics. By 2010, just 31.5% of those people remained (Golder et al., 2023).

The effect of urbanization on Bangladesh's economic development has been the subject of considerable interest and research. Bangladesh has experienced accelerated urbanization over the past several decades, with a substantial increase in urban population (Liu et al., 2023). This phenomenon has both positive and negative effects on the economic growth of the country. The potential for increased productivity and efficacy is one of the most significant advantages of urbanization. Urban regions function as economic hubs, enticing businesses, industries, and investments. The concentration of people in urban areas creates a larger labor pool, which facilitates economies of scale and encourages specialization (Raza et al., 2023). This results in increased economic output and productivity. Urbanization also facilitates the growth of diverse industries, such as manufacturing, services, and commerce, which contributes further to economic expansion. In addition, urbanization in Bangladesh has spurred infrastructure growth. The expansion of the urban population necessitates the improvement of transportation networks, lodging facilities, healthcare services, and educational institutions. The construction and maintenance of such infrastructure creates jobs and stimulates economic activity. In addition, urban areas are frequently centers of technological innovation and knowledge exchange, which fosters entrepreneurship and attracts foreign direct investment. However, urbanization also poses challenges that, if not properly addressed, can hinder economic growth (Huq and Shafique, 2023). Excessive urban population development can place a strain on existing resources and infrastructure, leading to problems such as overpopulation, inadequate housing, traffic congestion, and environmental degradation. These obstacles can impede productivity, raise costs, and diminish quality of life, thereby impeding economic development.

Globalization has had a major and broad influence on Bangladesh's economic development. Globalization is the process through which nations become more integrated and dependent on one another as a result of trade in products, services, money, technology, and ideas. The globalization of the economy has had both beneficial and bad effects on Bangladesh, a developing nation in South Asia. The increase of international commerce has been one of the main effects of globalization on Bangladesh's economic development. Bangladesh can now sell its products and services to new markets because to globalization (Sun et al., 2023). Globalization has helped the nation's ready-to-wear sector in particular, since its clothing is exported to other nations. As a result, there have been more foreign currency revenues, jobs being created, and industrial growth. Globalization has also been essential in drawing FDI (foreign direct investment) to Bangladesh. Many economic sectors, including manufacturing, telecommunications, energy, and infrastructure, have seen investments from foreign firms. Together with finance, FDI has also contributed technology, managerial know-how, and access to global markets. As a result, Bangladesh's economy has grown, its productivity has increased, and its competitiveness has increased. Bangladesh today has easier access to information and technology thanks to globalization. The nation has access to cutting-edge discoveries and technologies thanks to international ties in research and technology transfer. This has aided in modernizing sectors, raising productivity, and broadening the economy (Sadiq et al., 2023). For instance, Bangladesh's information technology industry has expanded significantly as a result of improvements in worldwide communication networks and the outsourcing of IT services. Additionally, globalization has contributed to Bangladesh's development of a competent labor force. Increased exposure to global markets and international standards has increased the demand for advanced degrees and technical expertise. As a result, the number of educational institutions and vocational training centers has increased, producing a reservoir of competent labor that is essential for economic development and global market competitiveness (Adeleye et al., 2023). Despite this, there are lack of studies relative to globalization, urbanization, and economic growth in Bangladesh. Thus, it is important to explore those relationship. The primary aim of this research includes (a) to find out the impact of urbanization on economic growth in Bangladesh; (b) to examine the effect of globalization on economic growth in Bangladesh; (c) to observe the effect of FDI on economic growth (d) to formulate the effective policy. The following sections describes literature review, methodology, and empirical findings.

Literature review

Productivity may grow by 3.4% in Japan if the urban population is doubled, as shown by Nakamura (1985), and by 6% in the United States, as shown by Ciccone and Hall (1993). Ciccone (2002) contends that a doubling of the population may increase aggregate output by 4.5 percent in France, Germany, Italy, Spain, and England. Using data for Indonesia from 1960–2009, Lewis (2014) finds that urbanization is associated with economic growth but that the rate of urbanization change is negatively correlated with economic output. He attributes this to a lack of investment in local public infrastructure. Li (2017) used a VAR model to analyze time series data for China from 1982 to 2014 and discovered that urbanization of land leads to GDP growth in the long term (also see Cheng, 2013). The correlation between urbanization and economic development is further supported by the research of Song et al. (2018). Based on

an input-output study of data from 2005-2010 for China, they conclude that urbanization was responsible for 16.40% of the entire growth in Chinese production during that time. According to Gross and Ouyang's (2021) study, which utilized cross-sectional data from 91 countries, urbanization resulting from in-migration has a favorable effect on economic growth. Conversely, the natural increase of the urban population, which is attributed to urban births and deaths, does not appear to have any significant impact. Bloom et al. (2008) and Jedwab et al. (2014) contend that comprehending the influence of urbanization on economic growth necessitates an examination of discrete forms of urbanization. Nevertheless, certain studies have reported contradictory findings, indicating a unidirectional causal relationship from economic growth to urbanization or the absence of any causal linkages. Moomaw and Shatter (1996) conducted a study utilizing panel data spanning over a period of three years (1960, 1970, and 1980) across 90 countries. The study revealed a positive correlation between the urbanization rate of countries and their respective GDP per capita and share of sectoral incomes. Additionally, the study identified the presence of reverse causation. Pradhan et al. (2014) discovered unidirectional causality from per capita GDP to urbanization in G20 countries, based on data spanning from 1961 to 2012.

According to Zhao and Wang's (2015) study, which analyzed data from 1980 to 2012 in China, there was a unidirectional causal relationship from economic growth to urbanization. Similarly, Arvin et al. (2015) found evidence of reverse causation from per capita GDP to urbanization in the G20 countries, based on their analysis of data from 1961 to 2012. The correlation between urbanization and economic growth may exhibit a non-linear pattern. The phenomenon of urbanization has the potential to yield favorable outcomes for economic growth during its initial phases. However, once it surpasses a particular threshold, its impact may experience a decline. This phenomenon could potentially be attributed to the comparatively advantageous progress of infrastructure in rural regions and the relocation of industries towards the outskirts. Nguyen and Nguyen (2018) conducted a study utilizing data from ASEAN countries spanning from 1993 to 2014. The researchers employed both static and dynamic panel models and determined that urbanization has a positive impact on economic growth, albeit in a non-linear fashion. Nevertheless, when urbanization attains a static model threshold of 69.99% or a dynamic model threshold of 67.94%, it hinders economic progress. Numerous studies have presented divergent findings from the conventional agreement regarding the advantageous effects of urbanization on the advancement of the economy. According to Henderson's (2023) study, which utilized panel data spanning from 1960 to 1995 for 70 countries, there is no discernible economic support for the notion that urbanization leads to productivity growth. According to Bloom et al. (2008), there is no indication that urbanization leads to economic growth. As a result, the authors suggest that urbanization serves more as a measure of economic development rather than a means to achieve it. The study conducted by Chen et al. (2014) analyzed data from 226 countries spanning from 1980 to 2011. Through the use of cross-sectional and panel estimates, the researchers discovered a strong correlation between urbanization and GDP per capita. However, they did not find any evidence of causality between urbanization and economic growth rates on a global scale. Salim and Shafiei (2014) conducted a study utilizing data from OECD countries, while Solarin and Shahbaz (2013) analyzed data specific to Angola. Both studies concluded that there is no causal relationship between urbanization and economic growth.

Research on the connection between globalization and rising prosperity has sparked heated debate for decades. In this area, leading academics share their research in the hopes of tracing the development of this topic across time and around the globe. From 1980 to 2016, Parisa and Hashem (2014) used the Generalized Method of Moments (GMM) to analyze the connection between globalization and economic development in OIC member states. The authors argue that globalization's effect on economic development in the studied nations may be measured scientifically. In a more direct form, economies with highly educated employees and a sophisticated financial system benefited significantly from globalization. Similarly, high- and middle-income nations gained from globalization while low-income countries experienced the reverse. Twenty-one African nations' rates of growth from 1970 to 2005 as a result of globalization were studied by Rao & Vadlamannati (2011) using the KOF globalisation index. According to the results, globalization had a more significant impact on economic development in the study's sample nations than did investment. The impact of financial globalization on economic growth, according to Gu and Dong (2011), may be positive or negative depending on the maturity of individual countries' financial systems. If nations' financial openness isn't accompanied by improvements to their financial system, they say, instability will replace growth. The relationship between globalization and economic growth in a sample of 101 economies from 1970 to 2005 was investigated by Villaverde and Maza (2011) using Ordinary Least Square and Generalized Method of Moments. The research concluded that globalization and economic development in the sample nations converged over the long term. In other words, those nations' economies flourished as a direct consequence of globalization. Similarly, Awuah & Amal (2011) used a theoretical approach to examining how globalization has influenced corporate performance in emerging markets. The authors said that although the advantages of globalization have been widely heralded, the lingering impacts it has had on the productivity of small and medium-sized enterprises (SMEs) have been mired in controversy.

Although previous research has investigated the individual effects of globalization, urbanization, and economic growth on Bangladesh, there is a dearth of research examining their interdependent nature. Existing research may have neglected the interdependencies and feedback mechanisms between these factors, focusing instead on isolated effects. Analyzing the relationship between globalization, urbanization, and economic growth in Bangladesh, previous research may have relied on conventional econometric techniques or simple causal models. There is a deficiency in the literature regarding the implementation of sophisticated econometric techniques, such as the Autoregressive Distributed Lag (ARDL) approach, which enables dynamic analysis and the capture of long-run relationships. Although a number of studies have examined the relationship between globalization, urbanization, and economic development in a variety of contexts, Bangladesh-specific research may be scarce. Exploring these dynamics in the context of Bangladesh would contribute to the existing literature and provide insights pertinent to economies with comparable characteristics, given the unique challenges and opportunities encountered by developing nations. By addressing these gaps in the literature, your research article can make a significant contribution to the field by

providing a more thorough and nuanced understanding of the dynamic relationship between globalization, urbanization, and economic growth in Bangladesh using an innovative ARDL approach.

Data

This study examines the impact of globalization and urbanization on economic growth in Bangladesh over the period 1990 to 2021. The study also considers FDI, Trade, and population to observe the driving factors of economic growth in Bangladesh. The study employed GDP per capita as dependent variable and independent variables include globalization, urbanization, FDI, population, and Trade. World Bank is the main source of data. The variables description is showed in table 1.

Table 1. Variable Description

Variables	Description	Logarithmic forms	Units	Sources
GDP	GDP	lnGDP	Constant US dollar	WDI
FDI	FDI	lnFDI	Net inflows (US\$)	WDI
Urbanization	URBA	lnURBA	Urban Population	WDI
Population	POP	lnPOP	Total population	WDI
Trade	TO	lnTO	Trade Openness (% of GDP)	WDI
Globalization	GL	lnGL	Globalization	KOF

Model specification

The empirical specification of this article follows previous research in that it is derived from a generic production function:

$$Y = f(K, T, L) \quad (1)$$

In equation (1), Y stands for income, T indicates technological variables, and L represents labor.

Now, substitute study variables in equation (1) we found equation (2):

$$Y = f(FDI, Urbanization, Globalization, Population, Trade) \quad (2)$$

From equation (2), we can find the following empirical model:

$$GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 URBA_t + \beta_3 GL_t + \beta_4 POP_t + \beta_5 TO_t + \varepsilon_t \quad (3)$$

In equation 3, ε indicated error term.

Now, we can write the econometric function by using logarithm as follows:

$$LGDP_t = \beta_0 + \beta_1 LFDI_t + \beta_2 LURBA_t + \beta_3 LGL_t + \beta_4 LPOP_t + \beta_5 LTO_t + \varepsilon_t \quad (4)$$

In equation (3), β indicated coefficient for study variables.

Econometric framework

This study employed several sophisticated econometric tests to conduct estimation procedure more accurately.

Stationary test

Time series data frequently exhibit patterns, trends, and interdependencies. The statistical properties of a stationary time series, such as the mean, variance, and autocovariance, remain constant over time. By conducting stationary tests, we can determine whether or not the time series data satisfy the stationarity assumptions. If the data are non-stationary, it indicates that the statistical properties of the series change over time, making it difficult to precisely model and interpret the data. This study employed ADF, DF-GLS, and P-P unit root test to check stationarity.

ARDL estimation method

The ARDL (Autoregressive Distributed Lag) estimation method is an essential and extensively employed econometric technique, particularly in the fields of time series analysis and macroeconomics. The ARDL technique permits the modeling of dynamic relationships between variables within a time series context. By incorporating lagged values of the dependent variable and independent variables, it captures both short- and long-term dynamics. This is especially useful when analyzing economic phenomena in which the effects of disruptions or variable changes may persist over time. The ARDL method is versatile and applicable to a variety of time series data classes, including stationary, integrated, and mixed order of integration series. It can manage I(0) and I(1) variables in the same model, making it appropriate for analyzing relationships between variables with varying order of integration. This adaptability enables researchers to apply the ARDL methodology to a vast array of economic and social phenomena.

In econometric analysis, endogeneity and reverse causality are typical concerns. The ARDL method addresses these issues by incorporating lagged values of both the dependent and independent variables. Incorporating these lagging values mitigates potential endogeneity issues and yields more accurate estimates of the relationship between variables.

The ARDL estimation equation for long-run is as follows:

$$\ln GDP = \omega_{0i} + \sum_{i=1}^p \alpha_i \ln GDP_{t-i} + \sum_{i=0}^q \beta_i \ln FDI_{t-i} + \sum_{i=0}^q \gamma_i \ln POP_{t-i} + \sum_{i=0}^q \delta_i \ln URBA_{t-i} + \sum_{i=0}^q \varphi_i \ln GL_{t-i} + \sum_{i=0}^q \tau_i \ln TO_{t-i} + \sum_{i=0}^q \theta_i p_{t-i} + \epsilon_t \dots \dots \dots (5)$$

The optimal lag order is q, and the dependent and independent variables are allowed to be co-integrated or purely I (1).

The ARDL short-run equation is as follows:

$$\Delta \ln GDP = \mu_{01} + \lambda(w_1 \ln GDP_{t-i} + w_2 \ln POP_{t-i} + w_3 \ln FDI_{t-i} + w_4 \ln GL_{t-i} + w_5 \ln URBA_{t-i} + w_5 \ln TO_{t-i}) + \sum_{i=1}^p w_i \ln GDP_{t-i} + \sum_{i=0}^q \beta_i \ln POP_{t-i} + \sum_{i=0}^q \gamma_i \ln FDI_{t-i} + \sum_{i=0}^q \delta_i \ln GL_{t-i} + \sum_{i=0}^q \alpha_i \ln TO_{t-i} \epsilon_{1t} \dots \dots \dots (6)$$

Diagnostic test

This research employed several diagnostic tests to verify the estimation method. This research employed Ramsey-Reset test, ARCH test, Jarque-Bera normality test, B-G serial correlation test, and Durbin Watson test. The study also employed CUSUM and CUSUM square test to check stability of the model.

Results and Discussion

Stationarity test results

Table 2. Stationarity test

Variables	ADF		DF-GLS		P-P	
	At levels	1 st difference	At levels	1 st difference	At levels	1 st difference
LGDP	-0.7630	-2.8175***	-0.6432	-3.6543***	-1.7654	-3.5342***
LFDI	1.6543	-4.3687***	0.7643	-2.6543***	1.8765	-2.8542***
LPOP	-2.7523***	-3.3912***	-1.6543***	-4.5432***	-2.2345**	-5.8726***
LURBA	0.9763	-3.7951***	0.7654	-8.7653***	-2.6739	-9.4537***
LGL	-0.9876***	-2.8026**	0.2134***	-3.1234***	-0.6522**	-3.9837**
LTO	-1.2435	-4.2579***	-1.9843	-4.7643***	-1.8763	-6.9837***

Table 2 presents the empirical findings of unit root test. The study employed ADF, DF-GLS, and P-P unit root test to observe stationarity. The findings showed that LPOP and LGL are stationary at level and significant at 1% significance level. That means LPOP and LGL are integrated at order 0 or I(0). On the other hand, rest of the variables (LGDP, LFDI, LURBA, and LTO) are not stationary at level but stationary at first difference. As a result, those variables showed integrated at order 1 or I(1). Thus, the study variables showed mixed order of integration and confirm the validity of ARDL estimation method.

ARDL bound test

Table 3. ARDL bound test

F-bounds test		Null hypothesis: No degrees of relationship		
Test statistic	Estimate	Significance	I(0)	I(1)
F-statistic	6.65437	At 10%	2.328	3.947
K	5	At 5%	2.974	4.985
		At 1%	4.382	5.994

The results of the ARDL bound test indicate that the null hypothesis of no co-integration is rejected at the 1% significance level. The F test statistic value exceeds the critical value. Consequently, it can be stated that the model's variables have distinctive co-integrating relationships. In this study, the long-term driving factors are FDI, Globalization, Urbanization, Trade, and population, and when a typical stochastic disturbance hits the system, they move first. The following conclusion suggests that variations in these variables affect GDP.

ARDL short run and long-run estimation**Table 4.** ARDL long-run and short-run results

Variables	Long-run			Short-run		
	Coefficient	t-Statistic	p-value	Coefficient	t-Statistic	p-value
LGL	0.674***	1.764	0.008	0.165***	0.789	0.003
LFDI	0.045**	1.167	0.034	0.043*	1.145	0.065
LPOP	-0.056	-1.324	0.249	-0.087	-0.624	0.342
LURBA	0.567***	4.874	0.001	1.876***	4.543	0.005
LTO	0.072**	1.543	0.067	0.087**	1.543	0.068
C	21.434	2.454	0.154	-	-	-
ECM (-1)	-	-	-	-0.742***	-3.876	0.000
R ²	0.9678					
Adjusted R ²	0.9554					

Table 4 displays the ARDL short-run and long-run estimation results. The findings indicated that LGL has a significant positive relationship with LGDP in both the short- and long-term. According to the findings, a 1% increase in LGL will increase LGDP by 0.674% over the long term and 0.165% over the short term. The correlation between LGL and LGDP is significant at the 1% level of significance. As a result of globalization, Bangladesh is now engaged in more international trade. Having access to global markets has allowed the nation to diversify its exports and grow its export market. Because of this, exports have grown, which in turn has boosted GDP. The research result is in line with Bechtel (2022), Stiglitz (2017), Figge et al. (2017), Gurgul and Lach (2014), and Latif et al. (2018). In addition, the results demonstrated that a 1% increase in LFDI will result in a 0.045% increase in LGDP in the long-run. Foreign direct investment (FDI) transfers funds from outside into Bangladesh, funding a wide range of economic and social endeavors. Investment in infrastructure, growth in productive capacity, and an improved environment for business are all made possible by this influx of funds. The consequence is a rise in GDP as a result of the increased economic activity and higher productivity. The result is in line with Agrawal and Khan (2011), Iqbal et al. (2014), Sengupta and Puri (2020), Kosztowniak (2016), and Ali et al. (2022). Moreover, at a significance level of 1%, this study estimated that LURBA has a positive relationship with LGDP in both the short- and long-term. A one percent increase in LURBA will increase LGDP by 0.567% over the long term and 1.876% over the short term. Concentrations of industries, enterprises, and services can be found in urban regions, making them vital nodes in the global economic system. As cities expand, new jobs and businesses open up, luring investors and inspiring innovators. Increases in output, employment, and tax income all result from this clustering of businesses and industries. The result is supported by Ahmed et al. (2020), Anwar et al. (2020), Anser et al. (2020), and Jing et al. (2020). ARDL estimation also demonstrated a positive relationship between LTO and LGDP. As a 1% increase in LTO raises LGDP by 0.072% over the long term and 0.087% over the short term. According to the results, there is no correlation between LPOP and LGDP.

Diagnostic test

The findings of diagnostic test are showed in table 05. The result showed that all diagnostic tests have insignificant value and we cannot reject the null hypothesis. Thus, the empirical model is free from serial correlation, heteroscedasticity, and specification error issue. The figure 1 showed that the parameter of econometric model are stable at 5% significance level.

Table 5. Diagnostic Inspection

Diagnostic tests	Coefficient	p-value
Breusch-Godfrey LM test	1.673422	0.3452
Breusch-Pagan-Godfrey test	1.345673	0.2876
Jarque-Bera test	1.653276	0.3432
Ramsey RESET test	2.893672	0.2453

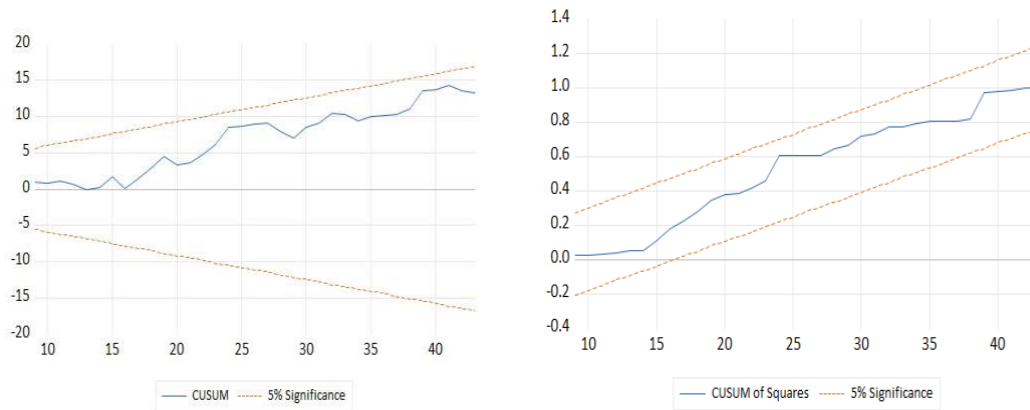


Figure 1. CUSUM and CUSUM square test

Conclusion

Bangladesh has emerged as a noteworthy case study in the pursuit of economic progress amidst increasing urbanization and globalization. Over the past three decades, this South Asian country has experienced a transformative shift propelled by foreign direct investment (FDI), trade, urbanization, and globalization. This study aimed to comprehend the intricate interactions among these factors and their impact on Bangladesh's economic development from 1991 to 2021. Rigorous statistical analysis and cutting-edge econometric methods were employed to examine the dynamics of Bangladesh's economic environment. To ensure the stability of the dataset, stationarity tests such as the ADF, DF-GLS, and P-P unit root tests were conducted. The findings revealed mixed orders of integration estimates for the variables under investigation, indicating the need for comprehensive research. The Autoregressive Distributed Lag (ARDL) estimation technique was employed to analyze the long-term relationship between the variables. Surprisingly, the results indicated that trade, FDI, urbanization, and globalization exhibited positive and statistically significant links with economic growth. These findings underscore the significant roles played by external factors and the urbanization process in driving Bangladesh's economic development. Intriguingly, the study discovered that population dynamics had no impact on economic development throughout the examined period. This highlights the necessity for further investigation into the intricate relationship between population dynamics and sustainable economic growth, urging policymakers to formulate strategies that leverage the demographic dividend for long-term prosperity. To ensure the reliability of the model, several tests were conducted to assess its resilience against heteroscedasticity, serial correlation, and specification errors. The Ramsey Reset test, Jarque-Bera test, Breusch Godfrey LM test, and CUSUM & CUSUM square test were utilized, with results indicating the model's accuracy and dependability, thereby supporting the validity of the study's conclusions.

Based on the research findings, several policy recommendations are proposed. Bangladesh should continue to embrace globalization and actively participate in the global economy. This entails fostering a favorable environment for FDI and strengthening international trade relations, as both have been identified as growth-stimulating factors. Additionally, policymakers should prioritize urban development, investing in infrastructure, housing, and urban services. This not only stimulates economic activity but also improves the quality of life for citizens. Regarding population dynamics, policymakers need to strike a delicate balance between population control measures and maximizing the potential of the country's young workforce. Investments in education, skills training, and healthcare are essential to enable the growing population to contribute meaningfully to economic growth and development. By implementing these recommendations, Bangladesh can further enhance its economic landscape and sustain long-term progress.

While the aforementioned studies provide insight on the interconnections between urbanization, foreign direct investment (FDI), trade, population growth, and GDP expansion in Bangladesh, there are many more ways to investigate these issues. The following are some promising areas for further study: Evaluation of change: Existing studies looked at data from 1991 to 2021. More current data or a longer time period for study might help shed light on the dynamic nature of the link between these factors and their effect on Bangladesh's economic development. Additionally, Analyses of certain industries: Globalization, urbanization, FDI, trade, and population increase were all factors studied to determine their combined effect on economic expansion. Consequences for certain industries may be investigated in further studies. Sector-level dynamics and their contribution to economic development may be better understood, for example, by examining the impact of foreign direct investment and trade on industries like textiles, manufacturing, and services.

Acknowledgements

We would like to thank all the parties involved in this research.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

- Adeleye, B. N., Akam, D., Inuwa, N., James, H. T., & Basila, D. (2023). Does globalization and energy usage influence carbon emissions in South Asia? An empirical revisit of the debate. *Environmental Science and Pollution Research*, 30(13), 36190-36207.
- Agrawal, G., & Khan, M. A. (2011). Impact of FDI on GDP: A comparative study of China and India. *International Journal of Business and Management*, 6(10), 71.
- Ahmed, Z., Zafar, M. W., & Ali, S. (2020). Linking urbanization, human capital, and the ecological footprint in G7 countries: an empirical analysis. *Sustainable Cities and Society*, 55, 102064.
- Ali, N., Phoungthong, K., Techato, K., Ali, W., Abbas, S., Dhanraj, J. A., & Khan, A. (2022). FDI, Green innovation and environmental quality nexus: New insights from BRICS economies. *Sustainability*, 14(4), 2181.
- Anser, M. K., Alharthi, M., Aziz, B., & Wasim, S. (2020). Impact of urbanization, economic growth, and population size on residential carbon emissions in the SAARC countries. *Clean Technologies and Environmental Policy*, 22, 923-936.
- Anwar, A., Younis, M., & Ullah, I. (2020). Impact of urbanization and economic growth on CO2 emission: a case of far east Asian countries. *International Journal of Environmental Research and Public Health*, 17(7), 2531.
- Arvin, M. B., Pradhan, R. P., & Norman, N. R. (2015). Transportation intensity, urbanization, economic growth, and CO2 emissions in the G-20 countries. *Utilities Policy*, 35, 50-66.
- Awuah, G. B., & Amal, M. (2011). Impact of globalization: The ability of less developed countries'(LDCs') firms to cope with opportunities and challenges. *European Business Review*.
- Bechtel, G. G. (2022). Globalization and GDP. *Open Journal of Social Sciences*, 10(2), 72-81.
- Bloom, D. E., Canning, D., & Fink, G. (2008). Urbanization and the wealth of nations. *Science*, 319(5864), 772-775.
- Chen, M., Zhang, H., Liu, W., & Zhang, W. (2014). The global pattern of urbanization and economic growth: evidence from the last three decades. *PLoS one*, 9(8), e103799.
- Cheng, C. (2013). Dynamic quantitative analysis on Chinese urbanization and growth of service sector. In *LISS 2012: proceedings of 2nd international conference on logistics, informatics and service science* (pp. 663-670). Springer Berlin Heidelberg.
- Ciccone, A. (2002). Agglomeration effects in Europe. *European economic review*, 46(2), 213-227.
- Ciccone, A., & Hall, R. E. (1993). Productivity and the density of economic activity.
- Figge, L., Oebels, K., & Offermans, A. (2017). The effects of globalization on Ecological Footprints: an empirical analysis. *Environment, Development and Sustainability*, 19, 863-876.
- Golder, U., Rumaly, N., Hossain, M. K., & Nigar, M. (2023). Financial progress, inward remittances, and economic growth in Bangladesh: Is the nexus asymmetric?. *Heliyon*, 9(3).
- Gross, J., & Ouyang, Y. (2021). Types of urbanization and economic growth. *International Journal of Urban Sciences*, 25(1), 71-85.
- Gu, X., & Dong, B. (2011). A theory of financial liberalisation: Why are developing countries so reluctant?. *The World Economy*, 34(7), 1106-1123.
- Gurgul, H., & Lach, L. (2013). Political instability and economic growth: Evidence from two decades of transition in CEE. *Communist and Post-Communist Studies*, 46(2), 189-202.
- Hasan, M. A., Nahiduzzaman, K. M., Aldosary, A. S., Hewage, K., & Sadiq, R. (2022). Nexus of economic growth, energy consumption, FDI and emissions: A tale of Bangladesh. *Environment, Development and Sustainability*, 1-22.
- Henderson, V. (2003). The urbanization process and economic growth: The so-what question. *Journal of Economic growth*, 8, 47-71.
- Hossain, A., & Hossain, M. K. (2012). Empirical relationship between foreign direct investment and economic output in South Asian countries: A study on Bangladesh, Pakistan and India. *International Business Research*, 5(1), 9-21.
- Huq, E., & Shafique, T. (2023). People move, policies don't: discursive partition against climate-impacted dwellers in urbanizing Bangladesh. *Environment and Urbanization*, 35(1), 91-100.
- Iqbal, N., Ahmad, N., Haider, Z., & Anwar, S. (2014). Impact of foreign direct investment (FDI) on GDP: A Case study from Pakistan. *International Letters of Social and Humanistic Sciences*, 16(5), 73-80.
- Jedwab, R., Christiaensen, L., & Gindelsky, M. (2014). Rural push, urban pull and... urban push? New historical evidence from developing countries. *Institute for International Economic Policy: Washington, DC, USA*.
- Kosztowniak, A. (2016). Verification of the relationship between FDI and GDP in Poland. *Acta Oeconomica*, 66(2), 307-332.
- Latif, Z., Latif, S., Ximei, L., Pathan, Z. H., Salam, S., & Jianqiu, Z. (2018). The dynamics of ICT, foreign direct investment, globalization and economic growth: Panel estimation robust to heterogeneity and cross-sectional dependence. *Telematics and Informatics*, 35(2), 318-328.
- Lewis, B. D. (2014). Urbanization and economic growth in Indonesia: good news, bad news and (possible) local government mitigation. *Regional Studies*, 48(1), 192-207.
- Li, Y. Z. (2017). Urbanization and economic growth in China—an empirical research based on VAR model. *International Journal of Economics and Finance*, 9(3), 210-219.
- Moomaw, R. L., & Shatter, A. M. (1996). Urbanization and economic development: a bias toward large cities?. *Journal of Urban Economics*, 40(1), 13-37.
- Nakamura, R. (1985). Agglomeration economies in urban manufacturing industries: a case of Japanese cities. *Journal of Urban Economics*, 17(1), 108-124.
- Nguyen, H. M. (2018). The relationship between urbanization and economic growth: An empirical study on ASEAN countries. *International Journal of Social Economics*, 45(2), 316-339.
- Pradhan, R. P., Arvin, M. B., Norman, N. R., & Bele, S. K. (2014). Economic growth and the development of telecommunications infrastructure in the G-20 countries: A panel-VAR approach. *Telecommunications Policy*, 38(7), 634-649.
- Rahaman, M. A., Hossain, M. A., & Chen, S. (2022). The impact of foreign direct investment, tourism, electricity consumption, and economic development on CO2 emissions in Bangladesh. *Environmental Science and Pollution Research*, 29(25), 37344-37358.
- Rao, B. B., Tamazian, A., & Vadlamannati, K. C. (2011). Growth effects of a comprehensive measure of globalization with country-specific time series data. *Applied Economics*, 43(5), 551-568.
- Raza, M. Y., Hasan, M. M., & Chen, Y. (2023). Role of economic growth, urbanization and energy consumption on climate change in Bangladesh. *Energy Strategy Reviews*, 47, 101088.

- Sadiq, M., Kannaiah, D., Yahya Khan, G., Shabbir, M. S., Bilal, K., & Zamir, A. (2023). Does sustainable environmental agenda matter? The role of globalization toward energy consumption, economic growth, and carbon dioxide emissions in South Asian countries. *Environment, Development and Sustainability*, 25(1), 76-95.
- Salim, R. A., & Shafiei, S. (2014). Urbanization and renewable and non-renewable energy consumption in OECD countries: An empirical analysis. *Economic Modelling*, 38, 581-591.
- Samimi, P., & Jenatabadi, H. S. (2014). Globalization and economic growth: Empirical evidence on the role of complementarities. *PloS one*, 9(4), e87824.
- Sengupta, P., & Puri, R. (2020). Exploration of relationship between FDI and GDP: A comparison between India and its neighbouring countries. *Global Business Review*, 21(2), 473-489.
- Solarin, S. A., & Shahbaz, M. (2013). Trivariate causality between economic growth, urbanisation and electricity consumption in Angola: Cointegration and causality analysis. *Energy policy*, 60, 876-884.
- Song, C., Liu, Q., Gu, S., & Wang, Q. (2018). The impact of China's urbanization on economic growth and pollutant emissions: an empirical study based on input-output analysis. *Journal of cleaner production*, 198, 1289-1301.
- Stiglitz, J. E. (2017). The overselling of globalization. *Business Economics*, 52, 129-137.
- Sun, C., Abbas, H. S. M., Xu, X., Gillani, S., Ullah, S., & Raza, M. A. A. (2023). Role of capital investment, investment risks, and globalization in economic growth. *International Journal of Finance & Economics*, 28(2), 1883-1898.
- Thébault, E., Purucker, M., Whaler, K. A., Langlais, B., & Sabaka, T. J. (2010). The magnetic field of the Earth's lithosphere. *Space Science Reviews*, 155, 95-127.
- Villaverde, J., & Maza, A. (2011). Globalisation, growth and convergence. *The World Economy*, 34(6), 952-971.
- Zhao, Y., & Wang, S. (2015). The relationship between urbanization, economic growth and energy consumption in China: an econometric perspective analysis. *Sustainability*, 7(5), 5609-5627.
- Zhong, Z., & Carr, T. R. (2016). Application of mixed kernels function (MKF) based support vector regression model (SVR) for CO₂-Reservoir oil minimum miscibility pressure prediction. *Fuel*, 184, 590-603.