International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2023, 13(6), 168-176.

Rethinking FDI Policy in Bangladesh: An Asymmetric Approach to Globalization, Population, and Trade

Al Amin Biswas[1], A. H. M. Shahriar[1], Mohammad Jahangir Alam[2], Ruhul Kuddus[1], Uttam Golder[1]*, Mita Rani Paul[3]

[1]Department of Finance and Banking, Jashore University of Science and Technology, Bangladesh, [2]Department of Accounting and Information Systems, Jashore University of Science and Technology, Bangladesh, [3]Department of BBA, National Institute of Science and Technology, Bangladesh. *Email: uttamgolder@gmail.com

Received: 13 September 2023 **Accepted:** 06 November 2023 **DOI:** https://doi.org/10.32479/ijefi.15391

ABSTRACT

Prior studies in Bangladesh were conducted to examine either the impact of globalization on the foreign direct investments (FDI), population growth on the FDI, or trade openness on the FDI. No studies were conducted to examine the combined effects of those variables on the FDI. Besides, most of the studies conducted used linear models and almost no studies were done to see the non-linear effects. This study thereby attempts to check the asymmetric effects of globalization, population growth, and trade openness on the FDI of Bangladesh taking time series from 1990 to 2020. The study used the NARDL model to see the long run effects of the explanatory variables on the responding variable. The asymmetric association is confirmed by study results. The results show that rising globalization is not good for growth of the FDI rather the opposite is better. The uniqueness of the study is that both increase or decrease in population boosted the FDI of the country. However, decrease in trade openness brought the FDI down. So, the government should take necessary steps to boost the imports and exports of the country, and to tackle ripple effects of global crisis causing due to globalization.

Keywords: NARDL Model, Asymmetric or Non-Linear Relation, Globalization, Population Growth, Trade Openness, Foreign Direct Investments, Bangladesh
JEL Classifications: E7, G2, M2

1. INTRODUCTION

Foreign Direct Investment (FDI) heads economic growth in the economy ensuring upgrading of technological supports and the movement of resources that lead to productivity (Kim, 2014; Moralles and Moreno, 2020). Based on the enhancement of efficiency in domestic companies, Moralles and Moreno (2020) ensured that due to inflows of foreign direct investment, governments from different countries articulate guidelines to attract foreign investors. To revive the thinking of investing funds as FDI ensuring different infrastructure expansion and corporate governance, it is necessary to give focus on the enhancement of FDI arrival. (Groh and Wich, 2012; Moralles and Moreno, 2020; Kayalvizhi and Thenmozhi, 2018).

The economy of Bangladesh has touched a milestone after its independence creating congenial investment environment (Hussain and Haque, 2016) by formulating and ensuring economic policies, motivating investors and augmenting resource mobilization securing growth rate of more than 6% over the past eras (Islam et al., 2018). Bangladesh has also been keeping its position in the case of economic development (Wang and Wang, 2017; Guris and Gozgor, 2015) due to globalization, privatization, flows of foreign direct investment, and innovation (Islam et al., 2021). To facilitate the inflows of foreign direct investment, trade openness (Aziz and Makkawi, 2012) creates the scope of borderless market. Managing population growth (Aziz and Makkawi, 2012) aids economic evolution though negatively affects growth (Hussain and Haque,

2016) in some cases. Though there are some mixed findings, trade fortifications are prospective to surge foreign flows of funds (Aziz and Makkawi, 2012; Blonigen, 2005; and Kogut and Chang, 1991). The trade openness not only governs the foreign direct investment but also changes the global economic situation. The expedient dimension of Trade openness is defined by the imports and exports of goods and services compared to gross domestic products (Adow and Tahmad, 2018; Ho et al., 2013; Zaman et al., 2018). Globalization moves the level of output transferred from one country to another which charms the investors in improving foreign direct investment (Mudiyanselage et al., 2021). Aziz and Makkawi (2012) expressed that population growth is not normally taken into consideration while examining the effects of it on the FDI which motivated them to do a study on this topic and the authors found a result that supported their hypothesis of positive relation. Better population health is found to be positively correlated to the FDI of countries (Alsan et al., 2006).

Consequently, this study intends to inspect the asymmetric influences of globalization index, population growth, and trade openness on foreign direct investment in Bangladesh. There is long-run asymmetric impact previously expected in this study of predictors on foreign direct investment. Initially, Nonlinear Autoregressive Distributed Lag (NARDL) model is occupied to discern the asymmetric relationship between predictors and predicted variable. When the globalization fails, the foreign direct investment increases and vice versa. Surprisingly, when population growth increases or declines, the foreign direct investment positively rises. Besides, there is long-run positive association between trade openness and foreign direct investment in Bangladesh.

Undoubtedly the world economy has become more imperative in terms of investment in the era of globalization. Due to changes in market access and trade liberalization, it has become important to investigate how globalization impacts FDI in Bangladesh. On the other hand, Bangladesh has high population growth as it is one of the world's most densely populated countries. Thus because of high population growth, labor force, market size and consumption patterns essentially influence FDI decision in terms of Bangladesh. Hence, scrutinizing the relationship is essential for finding how demographic factors affect FDI trends. Furthermore, as trade and FDI are closely linked, changes in trade policies, export-import dynamics and regional trade contracts can affect FDI flows. Thus, investigating how trade patterns interact with FDI flows in the context of Bangladesh is important for shaping trade policies that promote FDI attraction. Thus, our study investigates the impact of Globalization, Population Growth, and Trade on FDI in the context of Bangladesh using the NARDL model to scrutinize the asymmetric impact.

The residual part of this study is organized as follows: Section 2 describes a detailed literature review, and Section 3 discusses methodology. The empirical results are discussed in Section 4 and Section 5 confers the conclusion and policy implications.

2. LITERATURE REVIEW

Macroeconomic factors that influence foreign direct investment (FDI) must be investigated since FDI inflows support the growth of manufacturing and the introduction of innovative projects in the nation. FDI can be seen as a different kind of economic strategy that companies utilize when they want to buy assets from a foreign company or invest in building a new office or facility. FDI now has a big impact on an economy's ability to grow. Foreign direct investments are vital sources of capital for economies such as Bangladesh, where financial resources are limited. FDI can influence the equilibrium real exchange rate, the local currency's appreciation or depreciation, both positively and negatively (Rehman et al., 2022). In recent decades, multinational enterprises (MNEs) have been venturing into new markets for their goods and services, and both developed and developing nations have been striving to draw in foreign investment. The entire globe's population, including its gender and age distribution, length and standard of living, labor force participation rate, population migration, and social and economic impacts, all have an impact on the patterns of foreign direct investment development in the contemporary world and its economy. Realizing the importance of FDI, authors from different countries tried to scrutinize the impact of different factors on FDI and the importance of FDI on the growth of the economy (Aziz and Makkawi, 2012; Doytch and Uctum, 2016; Essandoh et al., 2020; Rehman et al., 2022; Sabir and Gorus, 2019).

Sadikova et al. (2017) carefully examined how FDI affects the unemployment issue. He discovered that while industrialized and developing nations have been trying to draw in foreign investment, multinational corporations have been looking into new markets for their goods and services in recent decades. The authors went on to say that the global population's trends in foreign direct investment development of the modern world are influenced by factors such as gender and age distribution, length and quality of life, labor force participation, population migration, and economic and social effects. As a result, this scenario lessens the issue of unemployment. Large populations provide a large market for MNE products and services, as well as a large labor force and various skill bases. Given the benefits of a large population, it was assumed that MNEs would invest more in countries with larger populations which will contribute to the welfare of the economy.

Alsan et al. (2006) examined how population affects FDI attraction and proposed that population is a key element of human capital, raising worker productivity and stimulating economic growth. High levels of human capital in the workforce, all other things being equal, are likely to increase a nation's attractiveness to international investors. However, the authors also stated that high rates of absenteeism or labor turnover brought on by illness and death could increase production costs and discourage foreign direct investment. Moreover, Bloom and Canning (2004) conducted a panel data analysis of 74 industrialized and developing countries from 1980 to 2000 to examine the impact of population on FDI inflows. Their main conclusion was that, within the sample of low-and middle-income nations, population has a significant and positive impact on foreign direct investment inflows. Their findings show that a 1-year increase in life expectancy boosts foreign direct investment inflows into these countries by 9%, even after controlling for other pertinent variables. These results lend credence to the idea that, in developing nations, population is a crucial component of human capital.

Furthermore, trade and foreign direct investment (FDI) are significant avenues for advancing a nation's growth that seem to enhance one another rather than replace one another, thus it is critical to accurately assess their economic impacts. Trade and FDI are major pathways for technology diffusion among countries (Bitzenis, 2012). Economic growth is increasingly dependent on a country's portfolio of trade and investment partners. According to Kim and Park (2017) trade has a greater impact than FDI for both developing and developed countries. The author also noted that Foreign Research and Development (RandD) contributions are correlated with FDI flows more than host country size. According to Devereux and Devereux and Lapham (1994), trade benefits economic growth even in the absence of knowledge transfers. On a different note, FDI has long been considered a major means of promoting economic diffusion due to the fact that multinational firms share technology across their subsidiaries. In addition to the well-known advantages of foreign direct investment (FDI) such as increased employment and income, the potential for technological impacts provides additional motivation to attract FDI and gives this problem a significant policy component (Görg and Greenaway, 2003; Aitken and Harrison, 1999). FDI typically moves into an economy's more productive sectors. Ciruelos and Wang (2005) examined a sample of 47 developing and OECD countries between 1988 and 2001 and show how, in less developed countries with substantial human capital, both trade and foreign direct investment serve as conduits for economic diffusion. According to the authors' findings, most FDI is still concentrated in certain areas.

The term 'globalization' refers to the tendency of the world economy to integrate in a variety of ways, not only with regard to finance, technology, and international commerce but also in labor markets (Doytch and Uctum, 2016; Khan, 2019; Mehmet, 2006). According to Lee and Vivarelli (2006), the essence of the globalization concept is that the world has a strong tendency to coalesce into a single entity. To be more explicit, the word globalization refers to the expansion in international trade and financial flows that has occurred since 1960, but especially since 1980. FDI happens when MNCs seek access to specific resources, such as raw materials, labor, or technological capabilities that are rare or expensive in their home countries. According to resource-seeking theory, globalization facilitates the movement of resources across borders, making FDI an appealing approach for MNCs to efficiently secure these resources. Many studies have established a link between globalization and FDI inflows (Mah, 2002; Doytch and Uctum, 2016; Islam et al., 2021). For example, studies have shown that nations with more open economies and trade policies tend to attract higher amounts of FDI. Pradhan et al. (2017) specified that FDI has also been linked to greater job creation, knowledge transfer, and general economic growth in host countries. Some academics contend that globalization and FDI can have negative repercussions (Mathur, 2005).

Foreign direct investment (FDI) currently accounts for the majority of net resource flows to developing countries, exceeding official development assistance (ODA), portfolio investments, and bank loans (Miyamoto, 2003). The author also included that FDI now accounts for the majority of net resource flows to developing countries, exceeding official development assistance (ODA), portfolio investments, and bank loans. Countries like Malaysia, Singapore, and Korea have held the leading position among the developing countries to get foreign direct investment since 1995. On the other hand, the most developed countries have had the upper hand in increasing imports in terms of exports (Neumayer and Soysa, 2005). Islam et al. (2021) employed non-spatial models and discovered that trade had no influence on FDI in Africa as a whole. Trade and FDI may have a positive impact on developing countries' economic progress. In the long run, a combination of opening the Eurozone countries to trade and promoting their financial and economic development has increased inflows of foreign direct investment into the region. Simultaneously, increased inflows of foreign direct investment have spurred economic growth in the short run, which in turn has strengthened the importance of financial development and international commerce in sustaining economic growth in the region via feedback effects. The empirical findings have substantial policy implications for Eurozone countries, particularly those facing issues due to a loss of confidence in their financial system or a sovereign debt crisis (Neumayer and Soysa, 2005).

Economic growth has often been found to be significantly influenced by trade openness and foreign direct investment inflows (Belloumi, 2014; Currie and Tekin, 2012). Trade openness can have a positive and significant impact on economic growth since it facilitates the transfer of technology and the accumulation of physical capital. Conversely, the positive effect of FDI inflows on economic growth can be associated with increasing and enhancing the available capital for domestic investment (Cipollina et al., 2012). According to Lean and Tang (2009), trade openness and foreign direct investment both contribute to economic growth. According to Liargovas and Skandalis (2012), trade openness and foreign direct investment (FDI) inflows can both boost the availability of foreign funding while reducing the capacity of established industrial and financial players to stifle competition by preventing new businesses from.

In summary, several studies in Bangladesh have attempted to find either the impact of globalization on foreign direct investment, the impact of population growth on FDI, or the impact of trade on FDI, but no studies have found an asymmetric impact of globalization, population growth, or trade openness on foreign direct investment. So, this study aims to find out the asymmetric impact of globalization, population growth, and trade openness on foreign direct investment.

3. METHODOLOGY

In this study, time series data have been used for the variables of Foreign Direct Investment, Population Growth, and Trade Openness for the period of 1990-2020 collected from World Bank and the values of Globalization Index have been collected from KOF Globalization Index. This study follows quantitative method to determine any significant connection between endogenous variable and exogenous variables (Table 1).

Here, Foreign Direct Investment (FDI) is considered as dependent variables where Globalization Index (GI), Population Growth (PW), and Trade Openness (TRD) are taken as independent variables over

Table 1: Summary of studied variables

Used variables	Symbols	Measurement scale	Explanation
Foreign direct investment	FDI	Foreign direct investment, net inflows indicated as % of GDP	Net inflows of foreign direct investment as % of GDP measured over specified period
Globalization index	GI	Measured as the ratio between de facto and de jure indices	Globalization Index indicates the economic, social, and political dimension
Population growth	PG	Annual rate of change of population growth indicated as annual %	The annual rate of change of population growth over specified period
Trade openness	TRD	Total import and total export divided by GDP indicated as % of GDP	The portion of GDP from total import and export is considered

FDI: Foreign direct investment, GI: Globalization index, PG: Population growth, TRD: Trade openness

dependent variable. The statistical model (Odugbesan et al., 2021) among the variables is indicated below:

$$FDI_t = \beta_0 + \beta_1 (GI_t) + \beta_2 (PG_t) + \beta_3 (TRD_t) + \epsilon_t \quad (1)$$

The dependent variable FDI_t indicates Foreign Direct Investment in a given time t. In addition, independent variables *GI, PG*, and *TRD* indicates Globalization Index, Population Growth, and Trade Openness respectively over time t. B_i indicates the long run parameters where ε_t *denotes* the error term. Equation (1) signifies that variations among independent variables lead same influences and predict incorrect solutions when linear estimation models are improperly used (Enders, 2014; Galadima and Aminu, 2019; Meo et al., 2018). Contrary, when short-term and long-term non-linearity is taken, NARDL model predicts the influences of the exogenous variables on endogenous variable by fractional sum breakdown of the exogenous variables both positively and negatively (Golder et al., 2023; Rumaly et al., 2023; Shin et al., 2014). So, functional variation of the model would be prescribed here to identify the connection among globalization index, population growth, trade openness, and economic growth.

$$FDI = (GI^+, GI^-, PG^+, PG^-, TRD^+, TRD^-) \quad (2)$$

To observe the asymmetric long-run relationship among predictors and predicted one, the following equation would be developed in accordance with the Ref. (Galadima and Aminu, 2019; Bahmani-Oskooee and Fariditavana, 2015; Katrakilidis and Trachanas, 2012; Meo et al., 2021).

$$FDI_t = \phi_0 + \phi_1(GI_t^+) + \phi_2(GI_t^-) + \phi_3(PG_t^+) + \phi_4(PG_t^-) + \phi_5(TRD_t^+) + \phi_6(TRD_t^-) + \mu_t \quad (3)$$

Here the coefficients of the long-run parameter are represented by $\emptyset_i$ where $GI_t^+, GI_t^-, PG_t^+, PG_t^-, TRD_t^+$, *and* TRD_t^- are positive and negative fractional sum breakdowns respectively. As equation (1) focuses long-run effects of predictors, it is inadequate to use in short-run effects. So, error-correction model has been used to modify equation (1) and get the following equation.

$$\Delta FDI_t = \vartheta_0 + \sum_{j=1}^{p} \vartheta_{1j} \Delta FDI_{t-j} + \sum_{j=1}^{p} \vartheta_{2j} \Delta GI_{t-j} + \sum_{j=1}^{p} \vartheta_{3j} \Delta PG_{t-j} + \sum_{j=1}^{p} \vartheta_{4j} \Delta TRD_{t-j} + {}_1 FDI_{t-1} + {}_2 GI_{t-1} + {}_3 PG_{t-1} + {}_4 TRD_{t-1} + \pi_t \quad (4)$$

Here, the difference operator in time *t indicates the sign* Δ with lag order *p*. The symbol ω_i signifies the long-term rise and fall of the independent variables on the dependent variable in where $\sum_{j=1}^{p} \vartheta_{ij}$ determines the short-run results of determiner variables on foreign direct investment. Here, equation (4) estimates the symmetrical connection among the estimated variables. Disintegrate regression is characterized by $z_t = \varnothing^+ f_t^+ + \varnothing^- f_t^- + \pi_t$, and $\emptyset^+$ and $\emptyset^-$ are related to long-run parameters and in equation (5), f_t is a regressor vector broken down into by way of:

$$f_t = f_t^+ + f_t^- \quad (5)$$

The predictor variables are *f*+ and *f*- disintegrating into the sectional sum of normal and inverse movement. Predicted variables of $GI_t^+, GI_t^-, PG_t^+, PG_t^-, TRD_t^+$ and TRD_t^- can be prescribed through equations (6), (7), (8), (9), (10), and (11) (Shin et al., 2014).

$$GI^+ = \sum_{r=1}^{t} \Delta GI_r^+ = \sum_{r=1}^{t} max(\Delta GI_r, 0) \quad (6)$$

$$GI^- = \sum_{r=1}^{t} \Delta GI_r^- = \sum_{r=1}^{t} min(\Delta GI_r, 0) \quad (7)$$

$$PG^+ = \sum_{r=1}^{t} \Delta PG_r^+ = \sum_{r=1}^{t} max(\Delta PG_r, 0) \quad (8)$$

$$PG^- = \sum_{r=1}^{t} \Delta PG_r^- = \sum_{r=1}^{t} min(\Delta PG_r, 0) \quad (9)$$

$$TRD^+ = \sum_{r=1}^{t} \Delta TRD_r^+ = \sum_{r=1}^{t} max(\Delta TRD_r, 0) \quad (10)$$

$$TRD^- = \sum_{r=1}^{t} \Delta TRD_r^- = \sum_{r=1}^{t} min(\Delta TRD_r, 0) \quad (11)$$

This paper integrates equation (1) with equation (3) for prevailing the NARDL model with salient features expressing short-run and long-run asymmetric relationship estimated in equation (12) (Shin et al., 2014).

$$\Delta FDI_t = \varnothing + \sum_{j=1}^{p} \varnothing_j \Delta FDI_{t-j} + \sum_{j=1}^{p} \varnothing_j \Delta GI_{t-j}^+ + \sum_{j=1}^{p} \varnothing_j \Delta GI_{t-j}^- + \sum_{j=1}^{p} \varnothing_j \Delta PG_{t-j}^+ + \sum_{j=1}^{p} \varnothing_j \Delta PG_{t-j}^- + \sum_{j=1}^{p} \varnothing_j \Delta TRD_{t-j}^- + \sum_{j=1}^{p} \varnothing_j \Delta TRD_{t-j}^- + {}_1 FDI_{t-1} + \omega_2 GI_{t-1}^+ + \omega_3 GI_{t-1}^- + \omega_4 PG_{t-1}^+ + \omega_5 PG_{t-1}^- + \omega_6 TRD_{t-1}^+ + \omega_7 TRD_{t-1}^- + \pi_t \quad (12)$$

Here the parameters of the short-run and long-run movement of globalization index, population growth, and trade openness on the FDI are denoted by ω_i, and $\sum_{j=1}^{p} \varnothing_j$. However, foreign direct investment having long-run influences with positive and negative movement will be anticipated by $\xi_1 = {-\omega_2}/{1}$, $\xi_2 = {-\omega_3}/{1}$, $\xi_3 = {-\omega_4}/{1}$, $\xi_4 = {-\omega_5}/{1}$, $\xi_5 = {-\omega_6}/{1}$, and $\xi_6 = {-\omega_7}/{1}$.

To find any asymmetric relations between globalization index, population growth, trade openness, and foreign direct investment, this study uses time series data estimations applying NARDL model (Golder et al., 2023). The NARDL model exceeds ARDL model with several advantages like examination of asymmetries, that violet the linearity assumption. Traditional cointegration methods such as the Engle-Granger (Engle and Granger, 1987) and the classic Johansen cointegration (Johansen, 1991) infer relentless modification over time carrying infeasibility in practice where linear estimation will not be apposite, driving to incorrect policy formulation (Enders, 2014; Galadima and Aminu, 2019). The NARDL model studies the potential for an asymmetric connection between the properties of the dependent variable and independent variables. Unit root test supported in NARDL model orders to clarify that no variables are I (2). To check the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests are used to safeguard the stationary nature of all variables.

4. RESULTS AND DISCUSSIONS

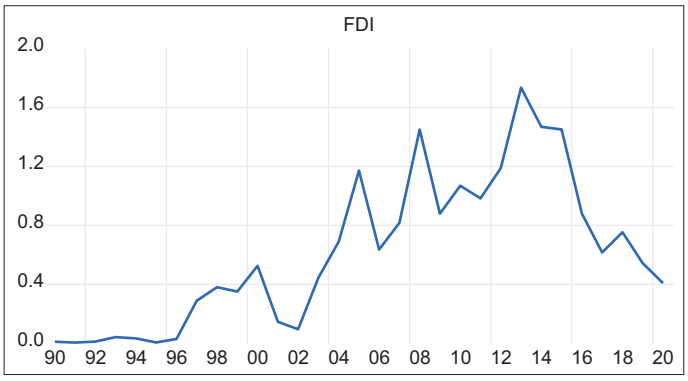
Observed data of both predictor (globalization index, population growth, trade openness) and predicted (foreign direct investments) variables are graphed in Figures 1-4. Overall, all the values of the variables increased from 1990 to 2020, except population growth.

Population growth got down significantly, while globalization showed the opposite during the data period. The FDI and trade openness showed a significant increase from 1990 with some fluctuations in the middle periods until recently, when those showed a decrease in value, mainly for the COVID situation throughout the world and effects of Russia-Ukraine war.

Table 2 briefs the descriptive statistics of the studied variables. Here all the variables express normal skewness as the values are between + 0.5 and − 0.5. Besides, kurtosis of the variables is below 3 which indicates negative, less peaky, or platykurtic distribution. Moreover, the probabilities of Jarque-Bera test shows values > 5% level, that ensures the normality of the studied variables.

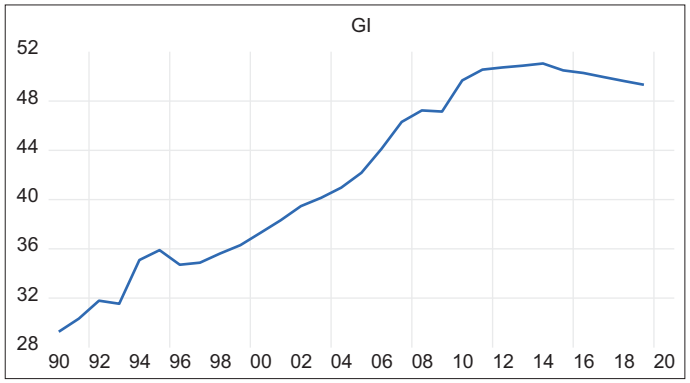
The unit root tests shown in Table 3 confirm that the NARDL model can be used in the study as there is no second order unit root in the studied variables. In ADF unit root test, all the variables other than population growth are found integrated into the first order. The population growth variable is integrated at the level in the test. In PP unit root test, all the variables including population growth are integrated into the first order. So, the NARDL model can be used in the study.

Figure 1: Trend of foreign direct investments



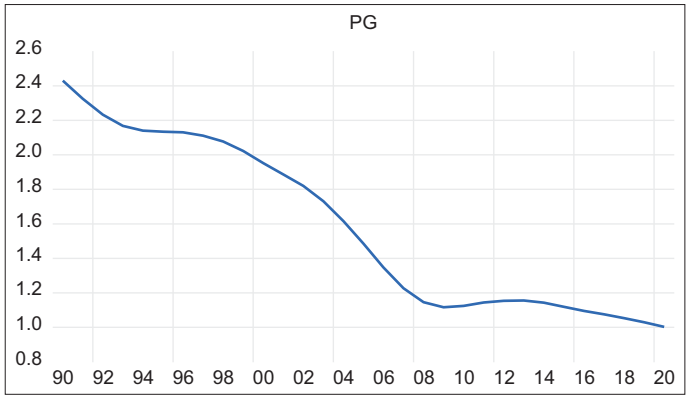
Source: Author's computations

Figure 2: Trend of globalization index



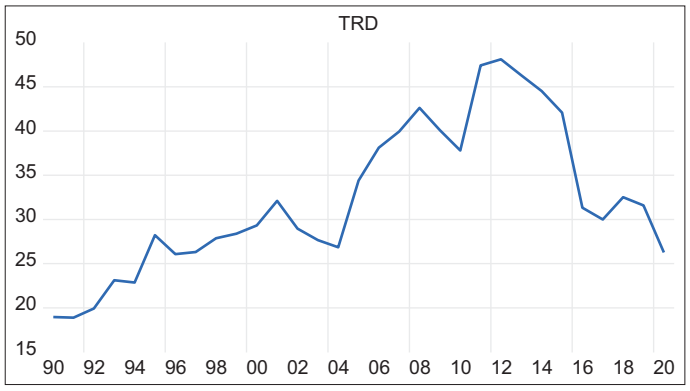
Source: Author's computations

Figure 3: Trend of population growth



Source: Author's computations

Figure 4: Trend of trade openness



Source: Author's computations

Table 2: Descriptive statistics

Particulars	FDI	GI	PG	TRD
Mean	0.6233	42.0403	1.6065	32.4128
Median	0.5798	41.5723	1.5500	30.6669
Maximum	1.7354	51.0533	2.4296	48.1109
Minimum	0.0045	29.2642	1.0292	18.8898
SD	0.5190	7.3921	0.4848	8.5116
Skewness	0.4404	−0.1655	0.1946	0.3014
Kurtosis	2.1246	1.5570	1.3860	2.1079
Jarque-Bera	1.9279	2.7397	3.4454	1.4490
Probability	0.3814	0.2542	0.1786	0.4846

Source: Authors' computations. FDI: Foreign direct investment, GI: Globalization index, PG: Population growth, TRD: Trade openness, SD: Standard deviation

Table 3: Unit root tests

Tests	FDI	GI	PG	TRD
ADF				
I (0)	−0.9452	1.8540	−3.5768***	−0.0634
I (1)	−6.3630***	−3.2582***	−1.0568	−4.4536***
PP				
I (0)	−0.8666	2.5303	−3.6885***	−0.0966
I (1)	−6.3767***	−3.2277***	−1.7508*	−4.4536***

***P<0.01, *P<0.10. Source: Author's computations. FDI: Foreign direct investment, GI: Globalization index, PG: Population growth, TRD: Trade openness, ADF: Augmented Dickey-Fuller, PP: Phillips Perron

Bound test results are used to examine the asymmetric relation of the variables in the long run. Table 4 shows the calculated F-statistic with upper and lower bound critical values. The model's F-statistic value 6.27 is greater than upper bound's critical values of 3.99 and 2.94 computed at 1% and 10% significance level respectively. This ensures long term asymmetric relation of the variables in the study and using NARDL model without hesitation.

The long-run connection between globalization, population growth, trade openness, and foreign direct investments are reported in Table 5. The table has been computed based on the values obtained in Table 6. It is indicated in the results that a 1% expand in globalization parameter shrinks the foreign direct investments in Bangladesh by 0.165%. Possible explanations for this could be that increased globalization leads to more idea sharing and expertise of local companies where foreign investors fear to compete against them, expose of country's regulatory and political risks to outsiders, supply chain disrupts due to global health crisis like COVID-19, exchange rate volatilities due to multiple currency handling, and ripple effects of economic uncertainties in another part of the world, that ultimately reduces foreign direct investments. Besides, in ease of doing business index, Bangladesh ranked 168th place out of 190 countries in 2020 which negatively affected the foreign direct investments (World Bank, 2023). The opposite reaction happened when reduced globalization increased foreign direct investments of the country. The result reports that a 1% drop in globalization index leads to 0.509% growth in FDI of Bangladesh.

The long-run asymmetric connection was also found between the population growth and foreign direct investments of the country. The result shows that a 1% growth in population growth leads to the rise of the foreign direct investments by 33.2368%. It indicates that a rise in population growth increases the number of working

Table 4: Results of bounds test

Model	F-statistic	Upper bound	Lower bound
FDI/(GI^+, GI^-, PG^+, PG^-, TRD^+, TRD^-)	6.27		
Critical values (%)			
10		2.94	1.99
5		3.28	2.27
2.5		3.61	2.55
1		3.99	2.88

Source: Author's computations. FDI: Foreign direct investment, GI: Globalization index, PG: Population growth, TRD: Trade openness

Table 5: Results of long-run asymmetric association

Variable	Coefficient	SE	t-statistic	Probability
GI^+	−0.1650	0.0767	−2.1501	0.0546
GI^-	−0.5090	0.2466	−2.0640	0.0634
PG^+	33.2368	13.5631	2.4505	0.0322
PG^-	−5.6188	1.3214	−4.2523	0.0014
TRD^+	−0.0529	0.0484	−1.0939	0.2974
TRD^-	0.1181	0.0238	4.9536	0.0004
C	−0.3238	0.2477	−1.3070	0.2179

Source: Author's computations. GI: Globalization index, PG: Population growth, TRD: Trade openness, SE: Standard error

Table 6: Results of dynamic assessment of nonlinear autoregressive distributed lag

Variable	Coefficient	SE	t-statistic	Probability
C	−0.3773	0.2843	−1.3272	0.2113
FDI (−1)	−1.1654	0.1906	−6.1155	0.0001
GI^+ (−1)	−0.1923	0.0946	−2.0329	0.0669
GI^-	−0.5932	0.2722	−2.1792	0.0519
PG^+ (−1)	38.7325	15.8418	2.4450	0.0325
PG^- (−1)	−6.5479	1.5732	−4.1623	0.0016
TRD^+ (−1)	−0.0617	0.0539	−1.1444	0.2767
TRD^- (−1)	0.1376	0.0314	4.3780	0.0011
dGI^+	−0.0139	0.0613	−0.2255	0.8257
dPG^+	−50.8994	21.9664	−2.3172	0.0408
dPG^+ (−1)	39.3110	20.2185	1.9443	0.0779
dPG^-	−8.8734	3.3245	−2.6691	0.0218
dPG^- (−1)	11.3469	4.4315	2.5605	0.0265
$dTRD^+$	0.0235	0.0311	0.7536	0.4669
$dTRD^+$ (−1)	−0.0486	0.0219	−2.2217	0.0482
$dTRD^-$	0.0675	0.0204	3.3183	0.0069
$dTRD^-$ (−1)	−0.0300	0.0222	−1.3511	0.2038

Source: Author's computations. FDI: Foreign direct investment, GI: Globalization index, PG: Population growth, TRD: Trade openness, SE: Standard error

people in Bangladesh leading to availability of manpower for production which ultimately accelerates the scope of foreign companies to use them by directly investing in the country. Surprisingly the same effect was found on the FDI when there was a shock in population growth. The test result shows that a 1% cut in population growth also shoots the FDI up by 5.6188%. The possible explanation might be that increased labor productivity of the existing working-class people, more stable market, attractive policies of the government, and higher standard of living of people rose the foreign direct investments of the country though the population growth got down.

Trade openness and the foreign direct investments also showed the asymmetric association in the long-run. A 1% fall in trade openness

Table 7: Wald test results

Variable	χ^2 (probability)	Asymmetric association results
GI	2.9246 (0.0872)	Asymmetric association exists between GI and FDI
PG	11.3841 (0.0007)	Asymmetric association exists between PG and FDI
TRD	13.6478 (0.0002)	Asymmetric association exists between TRD and FDI

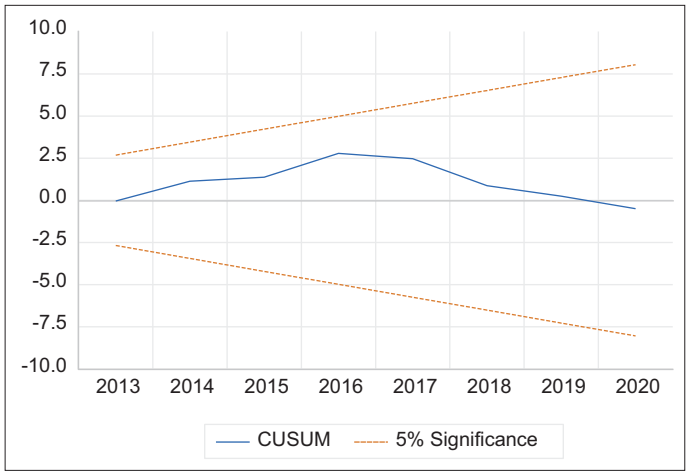
Source: Author's computations. FDI: Foreign direct investment, GI: Globalization index, PG: Population growth, TRD: Trade openness

Table 8: Diagnostic examination

Test	χ^2 (P)/stability	Result
LM (Breusch-Godfrey)	0.2522	No serial correlation found
Breusch-Pagan-Godfrey	0.1557	No heteroscedasticity found
Jarque-Bera (normality)	0.1324	Normally distributed residuals
Ramsey RESET	0.4189 (F-statistic)	Zero mis-functionality found
CUSUM	Stable	Confirms stability
CUSUM-SQ	Stable	Confirms stability

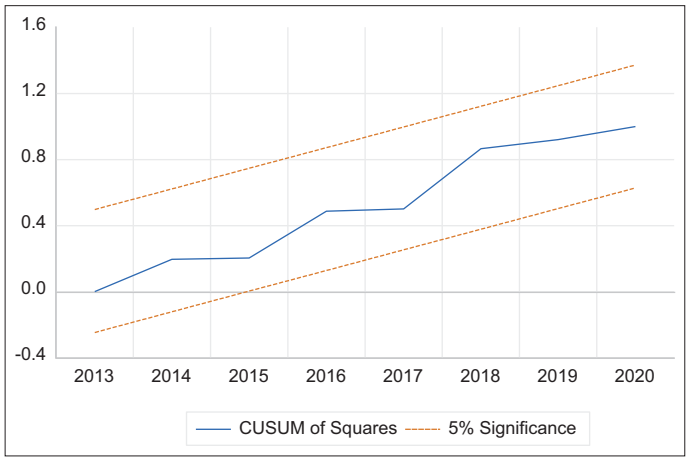
Source: Author's computations

Figure 5: CUSUM test



Source: Author's computations

Figure 6: CUSUM-SQ tests



Source: Author's computations

value directs the value of the FDI to fall by 0.1128%. This occurred for the possible reason that as the volume of total exports and imports diminishes, the economic and business activities within the country are not up to the mark to attract the FDI in Bangladesh. Reduced trade might have increased production costs, lowered profitability for the companies, revealed trade barriers within the country that in fact reduced the FDI.

Though Table 5 shows asymmetric association between the predicted and predictor variables (as the effects of positive and negative changes of predictor variables are not same on predicted variable), Wald test has also been conducted in the study to further confirm the asymmetric association. The test summarizes the association in Table 7 where it is reported that the effects of globalization, population growth, trade openness on the FDI of Bangladesh are not symmetrical.

Some diagnostic examinations have been conducted in the study and summarized in Table 8 to find out if various problems such as serial correlation, heteroscedasticity, mis-functionality, non-normality, and instability of the model exist.

As the *P* value of LM, Breusch-Pagan-Godfrey, Jarque-Bera, and Ramsey RESET tests are > 5%, it is confirmed that there is no serial correlation, heteroscedasticity, non-normality, and mis-functionality in the study. Besides, the model has shown stability over time through CUSUM and CUSUM-SQ tests that has been shown in graphs in (Figures 5 and 6) as the blue lines in both graphs are between the two red lines in each graph.

5. CONCLUSION AND POLICY IMPLICATION

Very few studies have been conducted in Bangladesh to examine the asymmetric or non-linear effects between variables. Most of the studies have been done to see the linear relationship between exogenous and endogenous variables. This study is attempted to examine the asymmetric effects of globalization, population growth, and trade openness on the foreign direct investments taking data from 1990 to 2020 using the NARDL model. The computed study confirmed the asymmetric association and the results showed positive impact on the FDI for decreased globalization and both increase and decrease of population growth, and negative impact on the FDI when globalization rose up, and trade openness shrunk.

Based on the analysis, to increase the FDI in the country, the study suggests to develop skills of the working-class people, ensure stable business conditions, ensure political stability, take measurement to increase import and export activities, take necessary steps for combating future global health crisis that could hamper the supply chain system in the country, and ensure stable exchange rates in the market.

There are some limitations in the study that are needed to be mentioned. The research has not considered other variables like tariffs and tax regime, ease of remitting funds, exchange

rate volatilities, structural development, inflation, investment opportunities, savings behavior etc., that can have direct or indirect impact on the FDI. Besides, the study is solely based on Bangladesh or an Asian country. More researches could be taken in hand taking the mentioned variables in other parts of the world.

REFERENCES

Adow, A.H., Tahmad, A.M.I. (2018), The impact of trade openness on foreign direct investment in Sudan by sector in the 1990-2017 period: An empirical analysis. Economic Annals, 172 (7-8), 14-21.

Aitken, B.J., Harrison, A.E. (1999), Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. American Economic Review, 89 (3), 605-618.

Alsan, M., Bloom, D.E., Canning, D. (2006), The effect of population health on foreign direct investment inflows to low-and middle-income countries. World Development, 34 (4), 613-630.

Aziz, A., Makkawi, B. (2012), Relationship between foreign direct investment and country population. International Journal of Business and Management, 7 (8), 63-70.

Bahmani-Oskooee, M., Fariditavana, H. (2015), Nonlinear ARDL approach, asymmetric effects and the J-curve. Journal of Economic Studies, 42 (3), 519-530.

Belloumi, M. (2014), The relationship between trade, FDI and economic growth in Tunisia: An application of the autoregressive distributed lag model. Economic Systems, 38 (2), 269-287.

Bitzenis, A. (2012), Globalization and foreign direct investment. In: Mergers and Acquisitions as the Pillar of Foreign Direct Investment. Germany: Springer. p9-24.

Blonigen, B.A. (2005), A review of the empirical literature on FDI determinants. Atlantic Economic Journal, 33, 383-403.

Bloom, D.E., Canning, D. (2004), Global Demographic Change: Dimensions and Economic Significance (Working Paper 10817). Massachusetts: National Bureau of Economic Research.

Cipollina, M., Giovannetti, G., Pietrovito, F., Pozzolo, A.F. (2012), FDI and growth: What cross-country industry data say. The World Economy, 35 (11), 1599-1629.

Ciruelos, A., Wang, M. (2005), International technology diffusion: Effects of trade and FDI. Atlantic Economic Journal, 33 (4), 437-449.

Currie, J., Tekin, E. (2012), Understanding the Cycle: Childhood Maltreatment and Future Crime. Journal of Human Resources, 47 (2), 509-549.

Devereux, M.B., Lapham, B.J. (1994), The stability of economic integration and endogenous growth. The Quarterly Journal of Economics, 109 (1), 299-305.

Doytch, N., Uctum, M. (2016), Globalization and the environmental impact of sectoral FDI. Economic Systems, 40 (4), 582-594.

Enders, W. (2014), Applied Econometric Time Series. Available from: https://www.wiley.com/en-us/applied+econometric+time+series%2C+4th+edition-p-9781118808566 [Last accessed on 2022 Jun 02].

Engle, R.F., Granger, C.W.J. (1987), Co-integration and error correction: Representation, estimation, and testing. Econometrica: Journal of the Econometric Society, 55, 251-276.

Essandoh, O.K., Islam, M., Kakinaka, M. (2020), Linking international trade and foreign direct investment to CO2 emissions: Any differences between developed and developing countries? Science of the Total Environment, 712, 136437.

Galadima, M.D., Aminu, A.W. (2019), Positive and negative impacts of natural gas consumption on economic growth in Nigeria: A nonlinear ARDL approach. African Journal of Economic and Sustainable Development, 7 (2), 138-160.

Golder, U., Rumaly, N., Hossain, M. K., and Nigar, M. (2023). Financial progress, inward remittances, and economic growth in Bangladesh: Is the nexus asymmetric? Heliyon, 9(3), 14454.

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), e14454.

Görg, H., Greenaway, D. (2003), Much Ado about Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment? (SSRN Scholarly Paper 475044).

Groh, A.P., Wich, M. (2012), Emerging economies' attraction of foreign direct investment. Emerging Markets Review, 13, 210-229.

Guris, S., Gozgor, K. (2015), Trade openness and FDI inflows in Turkey. Applied Econometrics and International Development, 15 (2), 53-62.

Ho, C.S.F., Amir, K., Nasaruddin, L.S., Abidin, N.F.Z. (2013), Openness, market size and foreign direct investments. In Emerging Markets and Financial Resilience: Decoupling Growth from Turbulence. Germany: Springer, p129-146

Hussain, M.E., Haque, M. (2016), Foreign direct investment, trade, and economic growth: An empirical analysis of bangladesh. Economies, 4 (4), 7.

Islam, M., Hossain, A., Tareque, M. (2018), Impact of public and private investment on GDP growth in Bangladesh: crowding-in or out. Global Journal of Human-Social Science: E Economics, 18 (6), 1-8

Islam, M.M., Khan, M.I., Tareque, M., Jehan, N., Dagar, V. (2021), Impact of globalization, foreign direct investment, and energy consumption on CO2 emissions in Bangladesh: Does institutional quality matter? Environmental Science and Pollution Research, 28 (35), 48851-48871.

Johansen, S. (1991), Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica: Journal of the Econometric Society, 59, 1551-1580.

Katrakilidis, C., Trachanas E. (2012), What drives housing price dynamics in Greece: New evidence from asymmetric ARDL cointegration. Economic Modelling, 29 (4), 1064-1069.

Kayalvizhi, P.N., Thenmozhi, M.J.E.M.R. (2018), Does quality of innovation, culture and governance drive FDI?: Evidence from emerging markets. Emerging Markets Review, 34, 175-191.

Khan, M.K., Teng, J.Z., Khan, M.I., Khan, M.O. (2019), Impact of globalization, economic factors and energy consumption on CO_2 emissions in Pakistan. Science of the total environment, 688, 424-436.

Kim, M. (2014), Productivity spillovers from FDI and the role of domestic firm's absorptive capacity in South Korean manufacturing industries. Empirical Economics, 48 (2), 807-827.

Kim, S., Park, J. (2017), Foreign direct investment and international randd spillovers in oecd countries revisited. Journal of Institutional and Theoretical Economics (JITE), 173 (3), 431-453.

Kogut, B., Chang, S.J. (1991), Technological capabilities and Japanese foreign direct investment in the United States. Review of Economics and Statistics, 73, 401-413.

Lean, H.H., Tang, C.F. (2009), Is the tourism-led growth hypothesis stable for Malaysia? A note. International Journal of Tourism Research, 12, 375-378.

Lee, E., Vivarelli, M. (2006), The social impact of globalization in the developing countries. International Labour Review, 145, 167-184.

Liargovas, P.G., Skandalis, K.S. (2012), Foreign direct investment and trade openness: The case of developing economies. Social Indicators Research, 106 (2), 323-331.

Mah, J.S. (2002), The impact of globalization on income distribution: The Korean experience. Applied Economics Letters, 9 (15), 1007-1009.

Mathur, O.P. (2005), Impact of globalization on cities and city-related policies in India. In: Globalization and Urban Development. Germany: Springer. p43-58.

Mehmet, O. (2006), Race to the bottom: The impact of globalization

on labor markets-a review of empirical and theoretical evidence. In: Globalization and the Third World: A study of Negative Consequences. Germany: Springer. p148-161.

Meo, M., Nathaniel, S., Shaikh, G., Kumar, A. (2021), Energy consumption, institutional quality and tourist arrival in Pakistan: Is the nexus (a) symmetric amidst structural breaks? Journal of Public Affairs, 21 (2), e2213.

Meo, M.S., Chowdhury, M.A.F., Shaikh, G.M., Ali, M., Masood Sheikh, S. (2018), Asymmetric impact of oil prices, exchange rate, and inflation on tourism demand in Pakistan: New evidence from nonlinear ARDL. Asia Pacific Journal of Tourism Research, 23 (4), 408-422.

Miyamoto, K. (2003), Human Capital Formation and Foreign Direct Investment in Developing Countries (SSRN Scholarly Paper 668505).

Moralles, H.F., Moreno, R. (2020), FDI productivity spillovers and absorptive capacity in Brazilian firms: A threshold regression analysis. International Review of Economics and Finance, 70, 257-272.

Mudiyanselage, M.M.R., Epuran, G., Tescaşiu, B. (2021), Causal links between trade openness and foreign direct investment in Romania. Journal of Risk and Financial Management, 14 (3), 90.

Neumayer, E., De Soysa, I. (2005), Trade openness, foreign direct investment and child labor. World Development, 33 (1), 43-63.

Odugbesan, J.A., Sunday, T.A., Olowu, G. (2021), Asymmetric effect of financial development and remittance on economic growth in MINT economies: An application of panel NARDL. Future Business Journal, 7 (1), 39.

Pradhan, R.P., Arvin, M.B., Hall, J.H., Nair, M. (2017), Trade openness, foreign direct investment, and finance-growth nexus in the Eurozone countries. The Journal of International Trade and Economic Development, 26 (3), 336-360.

Rehman, A., Radulescu, M., Ahmad, F., Kamran Khan, M., Iacob, S.E. and Cismas, L.M. (2022), Investigating the asymmetrical influence of foreign direct investment, remittances, reserves, and information and communication technology on Pakistan's economic development. Economic Research-Ekonomska Istraživanja, 36, 1-21.

Rumaly, N., Golder, U., Rahman, M. S., Sheikh, M. I., and Alam, M. J. (2023). How Do Macroeconomic Stability and Environmental Concerns Affect International Tourism Demand in Bangladesh? Insights from Linear and Nonlinear Approach. Jurnal Ekonomi Malaysia, 57(3).

Sabir, S., Gorus, M.S. (2019), The impact of globalization on ecological footprint: Empirical evidence from the South Asian countries. Environmental Science and Pollution Research, 26, 33387-33398.

Sadikova, M., Faisal, F., Resatoglu, N.G. (2017), Influence of energy use, foreign direct investment and population growth on unemployment for Russian Federation. Procedia Computer Science, 120, 706-711.

Shin, Y., Yu, B., Greenwood-Nimmo, M. (2014), Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In: Festschrift in Honor of PETER Schmidt: Econometric Methods and Applications. Germany: Springer. p281-314.

Wang, B., Wang, Z. (2017), Imported technology and CO_2 emission in China: Collecting evidence through bound testing and VECM approach. Renewable and Sustainable Energy Reviews, 2018, 4204-4214.

World Bank. (2023), Ease of Doing Business Rank (1=Most Business-friendly Regulations). Available from: https://data.worldbank.org/indicator/ic.bus.ease.xq

Zaman, Q.U., Zang, D., Gulam, Y., Shah, Z., Muhamad, I. (2018), Trade openness and FDI inflows: A comparative study of Asian Countries. European Online Journal of Natural and Social Sciences, 7, 386-396.