The Impact of Foreign Capital Inflows on Economic Growth in Bangladesh

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ABSTRACT

Bangladesh has received a huge influx of foreign capital inflows (FCIs) since its independence. This study uses the Autoregressive Distributed Lag (ARDL) bounds testing co-integration model to 1976-2019 time series data to investigate the impacts of FCI and its components (foreign direct investment, foreign aid, and remittance earnings) on economic growth in Bangladesh. The estimated results suggest that FCI and its components generally promote economic growth in the long run, but their short-run impacts on economic growth are generally negative. The study also finds that gross capital formation promotes economic growth both in the short run and long run; trade openness and population growth have mixed impacts; and natural and political instability lowers economic growth both in the short run and long run. These results provide valuable insights to policymakers regarding the long-run vs. short-run effects of FCIs on the economic growth trajectory in Bangladesh.

ملخص

تلقت بنغلاديش تدفقًا هائلاً من تدفقات رأس المال الأجنبي (FCIs) منذ استقلالها. تستخدم هذه الدراسة نموذج اختبار الانحدار الذاتي للإبطاء الموزع على بيانات سلاسل زمنية تمتد للفترة بين 1976-2019 استعراض آثار تدفقات رأس المال الأجنبي وعناصرها (الاستثمار الأجنبي المباشر والمساعدات الأجنبية وعائدات التحويلات) على النمو الاقتصادي في بنغلاديش. تشير النتائج إلى أن تدفقات رأس المال الأجنبي وعناصرها تعزز النمو الاقتصادي بشكل عام على المدى الطويل، لكن آثارها على المدى القصير على النمو الاقتصادي سلبية بشكل عام. وخلصت الدراسة إلى أن تكوين رأس المال الإجمالي يعزز النمو الاقتصادي في الأجلين القصير والطويل؛وتبين أن الانفتاح التجاري والنمو السكاني لهما آثار متباينة؛ كما أن عدم

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الاستقرار السياسي والكوارث الطبيعية يقللان من النمو الاقتصادي في الأجلين القصير والطويل. من شأن هذه النتائج أن تساعد صانعي السياسات على تشكيل تصورات قيمة فيما يتعلق بالآثار طويلة المدى مقابل الآثار قصيرة المدى لتدفقات رأس المال الأجنبي على مسار النمو الاقتصادي في بنغلاديش.

RESUME

Le Bangladesh a reçu un énorme afflux de capitaux étrangers (FCI) depuis son indépendance. Cette étude utilise le modèle de co-intégration ARDL (Autoregressive Distributed Lag) pour les séries chronologiques 1976-2019 afin d'étudier les impacts des FCI et de leurs composantes (investissement direct étranger, aide étrangère et revenus des transferts de fonds) sur la croissance économique du Bangladesh. Les résultats estimés suggèrent que l'investissement direct étranger et ses composantes favorisent généralement la croissance économique à long terme, mais que leurs impacts à court terme sur la croissance économique sont généralement négatifs. L'étude montre également que la formation brute de capital favorise la croissance économique à la fois à court et à long terme, que l'ouverture commerciale et la croissance démographique ont des effets mitigés et que l'instabilité naturelle et politique ralentit la croissance économique à la fois à court et à long terme. Ces résultats fournissent des indications précieuses aux décideurs politiques concernant les effets à long terme et à court terme des FCI sur la trajectoire de la croissance économique au Bangladesh.

1.   Introduction

Foreign capital inflows (FCIs) are among the key drivers of economic globalization. The combination of low domestic savings and chronic budget deficits in developing countries has increased the significance of FCIs to these countries. There are two opposing economic theories about the impact of FCIs on the recipient economy. The neoclassical theory emphasizes the positive impact of FCIs, asserting that foreign capital enhances efficiency, productivity, and competitiveness within the host economy, contributing to its overall development (Dunning, 1981). The neoclassical and endogenous growth theorists contend that FCIs provide funds and technology for productive sectors in capital-deficient economies, which raises the marginal productivity of capital and

contributes to economic growth. Proponents argue that FCIs contribute to economic growth in developing countries through multiple channels, such as by bridging the gap between domestic savings and capital needed for investment (Lipsey et al., 1999; Khan, 2007), transferring advanced technology from developed countries (Balasubramanyam, Salisu, & Sapsford 1996), enhancing productivity of capital and labor (Ozturk, 2007), and encouraging the development of entrepreneurship (Khan, 2007).

In contrast, the structuralist theory suggests that FCIs can exacerbate existing inequalities and dependencies in receiving economies (Stiglitz, 2002). Structuralists caution that foreign capital may reinforce structural weaknesses and resource dependency, which can potentially benefit multinational corporations more than local industries, and FCIs can eventually hinder sustainable growth in recipient nations. Persistent dependence on foreign capital in the absence of effective regulation and strategic industrial policies may adversely impact the growth process in developing countries. Furthermore, depending on government policies and economic environment, the impact of FCIs may vary from country to country or from region to region (Nwaogu & Ryan, 2015).

The impact of FCIs is not uniform across the globe and is contingent upon an array of factors in the host countries, including governmental policies and the prevailing economic environment. This dynamic interplay is exemplified by the case of FCIs in Bangladesh. From the early years of independence marked by a surge in foreign aid to subsequent shifts towards attracting FDI and remittance earnings, Bangladesh's experience mirrors the complexities of global economic integration. Government policies, e.g., investment incentives and trade liberalization initiatives, as well as external factors, e.g., exchange rate volatility and geopolitical dynamics, have played a critical role in shaping the flow and impact of FCIs in Bangladesh.

After gaining independence in 1971, Bangladesh initially received huge influx of foreign aid, which has steadily decreased over the years. Moreover, in the first three decades in the post-independence period, FDI and remittance earnings had fluctuated widely, and in the last half decade both inflows as a share of GDP have trended downward. Despite receiving huge FCIs and attaining relatively decent economic growth in the last few years, Bangladesh is still grappling with underdeveloped infrastructure,

low-capacity utilization in the industrial sector, and a range of other socio-economic challenges, including high levels of poverty, income inequality, unemployment, and inflation.

Bangladesh's experience with FCIs exemplifies the complexities inherent in managing foreign capital and their implications for economic growth. Furthermore, it shows the importance of flexible policy frameworks to navigate global finance and harness FCI's potential for sustainable growth. Against this backdrop, this study analyzes the impacts of FCIs and its components (FDI, foreign aid, and remittance earnings) on economic growth in Bangladesh. The Autoregressive Distributed Lag (ARDL) modeling technique with bounds testing cointegration approach has been applied to balanced data from 1976 to 2019. The estimated results suggest that FCI and its components generally promote economic growth in Bangladesh in the long run, but their short-run impacts on economic growth are generally negative. These finding should assist policymakers in determining the appropriate direction of government policies and initiatives aimed at achieving economic prosperity in Bangladesh.

The rest of the paper is organized as follows: Section 2 provides a brief overview of the historical trends of FCIs in Bangladesh; Section 3 presents the literature review of theoretical and empirical frameworks; Section 4 covers the data and methodology; Section 5 presents the empirical findings and discussion of results; and Section 6 provides policy implications and conclusion.

2.   Historical trends of FCIs and GDP growth in Bangladesh

Figure 1 shows the historical trends of real GDP growth, FDI, foreign aid (AID), and remittance inflows (REM) in Bangladesh. It is noteworthy that all three components of FCI have generally trended downward since the early 2010s, a period during which Bangladesh economy generally achieved high rates of growth (at least 6% real GDP growth annually) and attained the status of a lower middle-income country.

Figure 1: Historical Trend of GDP Growth and FCIs
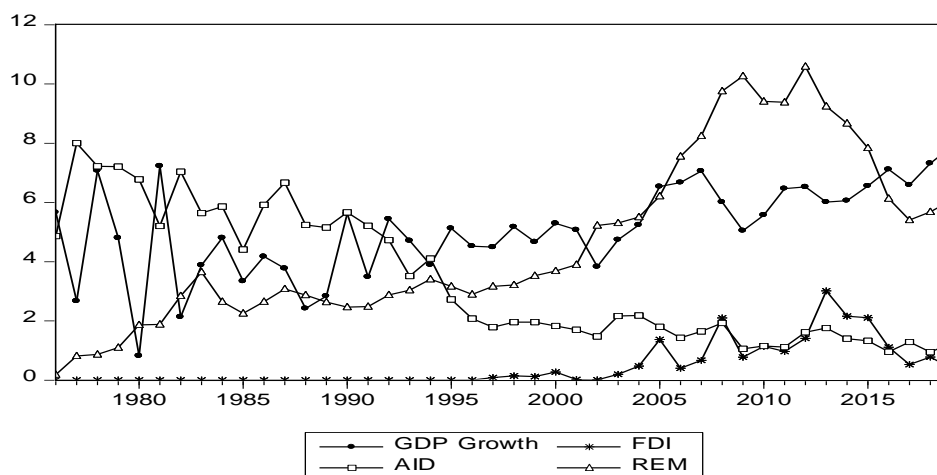
Source*: Data from World Bank (2021)*

3.   Literature Review

As briefly described in the Introduction, there are two primary economic theories (neoclassical theory and structuralist theory) that can explain the impact of FCIs on the receiving economy. According to the neoclassical theory, poor countries with limited capital but open capital accounts can attract capital from rich countries, which can contribute to the recipient countries' economic growth. This theory asserts that FCIs complement existing domestic resources, narrow the foreign exchange gap, and supplement domestic savings (Klobodu & Adams, 2016; Duodu & Baidoo, 2022). Furthermore, FCIs provide access to modern technology, management capabilities, and overseas markets (Levchenko & Mauro, 2007; Kose et al., 2009). In light of these benefits of FCIs, Fischer (2003) argues that capital account liberalization is not only inevitable, but also greatly beneficial to the receiving countries.

In contrast, the structuralists argue that FCIs can crowd out local investment, which can negatively impact economic growth in the recipient countries (Papanek, 1973; Bornschier & Chase-Dunn, 1985). Some researchers assert that FCIs encourage resource-poor countries to import inappropriate technology, nurture a dependent culture on foreign resources, worsen domestic income distribution, promote ineffective governance, and lead to corruption (Griffin & Enos, 1970; Klobodu &

Adams, 2016; Duodu & Baidoo, 2022). Consequently, countries receiving FCIs may not achieve the expected benefits.

Many studies have analyzed the effects of total FCIs as well as the disaggregated types of capital inflows on the receiving economies. The literature reveals that each type of FCI may have a distinct set of determinants and consequences on the recipient country. For example, Klobodu & Adams (2016) studied the impact of various capital inflows (FDI, foreign aid, remittances, and external debt) on economic growth in Ghana using the ARDL methodology. This study found that FDI, foreign aid, and external debt had significantly negative effects on economic growth, while remittances had a marginally significant positive effect. Similarly, Duodu & Baidoo (2022) found that remittances had a positive effect on growth in Ghana, while external debt and FDI had a negative effect in the long run, with foreign aid having an insignificant effect. Tahir et al. (2019) found that FDI and foreign aid positively affected economic growth in the SAARC countries, while external debt had a negative effect, and remittances had no impact. Rehman & Ahmad (2016) analyzed the relationship between various types of capital inflows and economic growth in 21 developing nations. This study found that foreign aid and external debt negatively impacted economic growth, while FDI and remittances positively affected it in the long run.

Among other studies, Calderón & Nguyen (2015) reported that FDI and foreign aid inflows stimulated economic growth in Sub-Saharan Africa, while sovereign borrowing inflows did not. Aizenman et al. (2013) examined the relationship between economic growth and FCIs for 100 economies during 1990-2010. This study found that FDI had positive effects, equity flows also had positive but less stable effects, while short-term borrowing had little or negative effects. These studies show that the empirical evidence regarding the link between FCI (and its components) and economic growth remains mixed.

A recent study by Adugna et al. (2023) examined the effects of foreign aid and remittances on economic growth in 31 African countries during 1980 to 2019. The study found that in the short run, foreign aid and remittances negatively impact economic growth, but that impact is statistically insignificant. However, in the long run, the effect of remittances on economic growth is positive and significant, but the effect of foreign aid on economic growth is positive and insignificant. Rao et al.

(2023) conducted a study to analyze the links between FDI, foreign aid, and economic growth in South Asia and South-East Asia during 1980 to 2016. That study found that foreign aid affects both FDI and economic growth negatively, but FDI affects economic growth positively.

A number of studies have analyzed the macroeconomic effects of foreign capital in Bangladesh. Islam (1972) concluded that foreign capital affected domestic savings in East Pakistan (which emerged as independent Bangladesh in 1971) negatively in the 1950s, but positively in the 1960s. Alamgir (1974) found that foreign capital reduced GDP growth in East Pakistan during 1960-70. Sobhan (1982) concluded that foreign aid led to substantial concentration of wealth among the urban and rural elite and helped nurture a dependent culture on foreign resources. Ahmad (1990) concluded that foreign capital raised output in the primary, manufacturing, and tertiary sectors in Bangladesh and raised GDP growth during 1961-80. Quazi (2005) found that foreign grants mostly finance non-productive civil expenditures, which do not contribute to economic growth in Bangladesh, but foreign loans generally finance public investment projects and human capital-building programs, which eventually lead to higher output growth. Using the ARDL methodology on 1973-2009 data, Quazi (2012) found that FCIs have contributed positively to GDP growth in Bangladesh both in the long and short run, and the effect of foreign aid on growth is significantly positive, but the effect of FDI on growth is weak.

This paper uses similar econometric methodology as used in Quazi (2012), but it expands on that study by analyzing the economic impact of an additional component of foreign capital - remittance earnings. More importantly, this study covers more recent data capturing the current economic and political landscape in Bangladesh. As shown in Figure 1, the ratios of FDI/GDP, aid/GDP, and remittances/GDP have decreased in Bangladesh since the early 2010s, a period of steady economic growth, which has coincided with (or arguably resulted from) a politically stable (albeit unfree) regime. In this context, this study makes a noteworthy contribution to the literature by using the ARDL methodology to 1976-2019 data to investigate the long-run and short-run impacts of the different components of FCIs on GDP growth in Bangladesh.

4.   Data and Econometric Methodology

The table below presents a summary of all variables used in this study.

Table 1: Dependent Variable, Explanatory Variables, and Control Variables

Variables	Symbols	Measurement	Data Type	Data Sources
GDP growth	GDP	Real GDP growth rate	Yearly	WDI
Foreign direct investment	FDI	Foreign direct investment, net inflows (% of GDP)	Yearly	WDI
Foreign aid	AID	Net ODA received (% of GDP)	Yearly	WDI
Remittances	REM	Personal remittances, received (% of GDP)	Yearly	WDI
Foreign capital inflows	FCI	Foreign capital inflows (% of GDP) - total of FDI, AID, and REM	Yearly	WDI
Gross fixed capital formation	GCF	Gross fixed capital formation (% of GDP)	Yearly	WDI
Population growth	POP	Population growth (annual %)	Yearly	WDI
Trade openness	TRADE	Sum of exports and imports of goods and services (% of GDP)	Yearly	WDI
Govt expenditures on education	EDU	Government expenditures on education, total (% of GDP)	Yearly	WDI
Natural & Political instability	NPI	Dummy variable (0-1)	Yearly	Authors

Following the theoretical and empirical literature discussed in the previous section, this paper analyzes the relationship between FCIs and economic growth in Bangladesh. The GDP growth rate is used as the dependent variable, and FCI, FDI, foreign aid, and remittances are used as explanatory variables (each one separately in four different model specifications), while gross capital formation, population growth, trade openness, natural & political instability, and government spending on education are used as control variables. Annual time-series data from 1976 to 2019 were collected from the World Bank's *World Development*

Indicators (WDI), while a dummy variable was used for those years that experienced either natural and/or political instability. The selection of the sample period (1976-2019) was constrained by data availability.

4.1.   Econometric Methodology

According to the empirical literature, FCIs can affect economic growth either directly (Mah, 2010) or indirectly through the spillover effects (Kotrajaras et al., 2011). This study follows the former argument (i.e., FCIs affect economic growth directly). Based on the literature, the basic regression equation can be written as:

$$GDPt = f(Xti, GCFt, POPt, TRADEt, EDUt, NPIt) \qquad (1)$$

X_ti indicates i= FCI, FDI, AID, and REM (in separate equations)

If all variables of interest happen to stationary, either Ordinary Least Square (OLS) or Vector Autoregressive (VAR) models can provide unbiased estimates; however, if the variables happen to be non-stationary, neither OLS nor VAR models may be appropriate - in that case either the Johansen or VECM model should be used. Finally, if the variables happen to be of mixed type of stationarity, i.e., some are stationary while others are non-stationary, the ARDL models should be used. Table 2 presents the results of the unit root tests for the variables used in this study. The test results show that some variables are integrated of order 0 [I(0)] while others are integrated of order 1 [I(1)]. Therefore, we proceed with the ARDL bounds testing method to determine the presence of co-integration in the long-run relationship between the variables.

The ARDL co-integration procedure was developed by Pesaran & Smith (1995), and Pesaran et al. (2001). This method has several benefits over other co-integration techniques. Firstly, unlike the other methods such as the Johansen approach, the ARDL bounds testing procedure does not require the pre-testing of variables included in the model for unit roots. Secondly, the bounds testing approach can be applied to small samples. Narayan (2005) stated that the ARDL estimation technique can be used with a small sample (i.e., 30-80 observations) to obtain robust and consistent results. According to Ghatak & Siddiki (2001), the ARDL model is statistically a more stable technique for evaluating the co-integration relationship in small samples. Moreover, the ARDL method

generally provides unbiased estimates of the long-term model, and the t-statistics derived from it are valid even when some of the regressors are endogenous (Harris & Sollis, 2003). A detailed analysis of the ARDL bounds testing approach is outside the scope of this paper; interested readers can review Pesaran (1997).

4.2.   Unit Root Test for Stationarity

In is well accepted in empirical literature that most macroeconomic time-series variables are not stationary at levels (Engle & Granger, 1987). However, non-stationary time-series variables should not be employed in regressions to avoid inconsistencies in coefficient estimation (Gujarati et al., 2012). To avoid spurious estimation, it is crucial that all variables are transformed into stationary series. Although the application of the ARDL cointegration approach does not necessarily require unit root tests, nevertheless this test should be conducted to ensure that none of the variables is integrated of order 2 [i.e., I(2)] or higher, as the ARDL technique works only with I(0) and I(1) variables.

To examine the stationarity of the variables used in this study, we used the Phillips-Perron (P-P) test, Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, and Augmented Dickey-Fuller (ADF) test proposed by Phillips & Perron (1988), Schmidt & Phillips (1992), and Dickey & Fuller (1979), respectively. The P-P test is preferred over the commonly used ADF test, as this test is robust to general forms of heteroscedasticity in the error term and does not require the user to specify a lag period for the test regression (Ojiambo & Ocharo, 2016). Table 2 presents the P-P unit root test results (and the KPSS and ADF test results are presented in Table 1-A and Table 2-A in the Appendix) -, these results generally show that all variables are either I(0) or I(1). Since no variable is found to be I(2) or higher, we can proceed with the ARDL bounds testing method to determine the presence of co-integration in the long-run relationship between the variables.

Table 2: Phillips-Perron Unit Root Tests

	Levels I(0)		First difference I(1)		
Variables	Intercept (C)	Intercept and Trend (C & T)	Intercept (C)	Intercept and Trend (C & T)	Status I(d)
GDP	-5.489***	-8.288***	-15.416***	-15.302***	I(0)
FDI	-2.320	-3.339*	-8.808***	-8.711***	I(1)
AID	-0.934	-4.117**	-14.138***	-30.328***	I(1)
REM	-1.571	-1.561	-4.661***	-4.660***	I(1)
FCI	-2.299	-2.134	-7.237***	-7.100***	I(1)
GCF	-0.924	-2.635	-5.261***	-5.099***	I(1)
POP	0.189	-4.139**	-4.660***	-4.227***	I(1)
TRADE	-0.898	-2.279	-6.453***	-6.3582***	I(1)
EDU	-1.404	-1.338	-8.093***	-8.353***	I(1)
NPI	-6.727***	-6.819***	-19.209***	-19.195***	I(0)

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

4.3. Lag Length Criteria

The next step for the ARDL technique is to determine the optimal lag order for cointegration. For the sake of brevity, the details of the estimation process of the optimal lag length have been omitted from this paper, but these are available from the authors upon request.

4.4. ARDL Bounds Test Approach

The next step is to apply the ARDL bounds test approach to determine the existence of long-run cointegration relationships between the dependent and the independent variables. Table 3 reports the critical values of F-statistics used in the ARDL bounds test and the estimated F statistics are presented in the Appendix (Table 3-A). If the estimated F statistics are found to be greater than the critical values' upper bound, the null hypothesis of no cointegration is rejected. Conversely, if the estimated F-statistics are found to be smaller than the critical values' lower bound, the null hypothesis cannot be rejected, and if the F statistics fall between the lower bound and the upper bound, the test results are non-conclusive (Narayan, 2005).

Table 3: ARDL Bounds Test

	Bound Test Critical Values	
Significant	**Lower Bounds I(0)**	**Upper Bounds I(1)**
1%	3.41	4.68
2.5%	2.96	4.18
5%	2.62	3.79
10%	2.26	3.35

The estimated F statistics for the long-run ARDL models are included in Tables 4, 5, and 6. The F statistic in each model specification is found to be greater than the upper bounds at 1%. These results reveal that a long-run cointegration relationship exists between economic growth and FCIs and the other control variables as specified in each model specification. The next step is to look for the long-run and short-run relationships in each model specification.

5.   Empirical Results

The next step is to analyze the long-run and short-run effects of the independent variables on economic growth. Tables 4, 5, and 6 present the long-run results for 12 model specifications, with each table presenting four model specifications. Table 4 includes Models 1a, 1b, 1c, and 1d, which estimate the effects of FCIs, gross fixed capital formation, population growth, and trade openness on GDP growth. The difference between them is that each model specification includes a different type of foreign capital as the explanatory variable – Model 1a includes combined FCI, Model 1b includes FDI, Model 1c includes foreign aid, and Model 1d includes remittances. Models 2a, 2b, 2c, and 2d add one more control variable (natural & political instability) to each model specification, while Models 3a, 3b, 3c, and 3d add another control variable (government expenditures on education) to each model specification. Tables 7, 8, and 9 present the short-run error correction results for the same 12 model specifications.

Table 4: Long-run ARDL models

	Model 1a	Model 1b	Model 1c	Model 1d
Foreign Capital Inflow	0.17 (177)[*]			
Foreign Direct Investment		0.63 (1.82)[*]		
Foreign AID			0.35 (2.61)[**]	
Remittances				0.40 (1.48)
Gross Fixed Capital	0.31 (2.31)[**]	0.22 (3.02)[***]	0.35 (3.84)[***]	0.34 (2.24)[**]
Population Growth	-0.33 (-0.30)	-2.19 (-2.97)[***]	-1.18 (-1.66)	-1.06 (-0.78)
Trade Openness	-0.10 (-1.47)	-0.18 (-3.41)[***]	-0.07 (-2.41)[**]	-0.24 (-2.21)[**]
Sample size	40	40	40	40
F statistic	18.44[***]	7.69[***]	14.56[***]	11.93[***]

[***] Significant at 1%; [**] Significant at 5%; [*] Significant at 10%

Table 5: Long-run ARDL models
(variables in Table 4 plus Nat. & Pol. Instability)

	Model 2a	Model 2b	Model 2c	Model 2d
Foreign Capital Inflow	0.42 (4.08)[***]			
Foreign Direct Investment		0.72 (2.07)[*]		
Foreign AID			0.32 (2.03)[**]	
Remittances				0.41 (1.48)
Gross Fixed Capital	0.67 (4.68)[***]	0.24 (3.14)[***]	0.32 (2.99)[***]	0.33 (1.99)[**]
Population Growth	2.05 (1.95)[*]	-1.49 (-2.09)[*]	-0.74 (-0.92)	-0.35 (-0.25)
Trade Openness	-0.20 (-3.02)[***]	-0.16 (-3.17)[***]	-0.03 (-1.08)	-0.21 (-1.78)[**]
Nat. & Pol. Instability	-0.91 (-3.03)[***]	-0.24 (-1.35)	-0.13 (-0.69)	-0.43 (-1.42)
Sample size	40	40	40	40
F statistic	38.72[***]	7.65[***]	11.29[***]	8.49[***]

[***] Significant at 1%; [**] Significant at 5%; [*] Significant at 10%

Table 6: Long-run ARDL models
(variables in Table 5 plus Govt. Exp. on Education)

	Model 3a	Model 3b	Model 3c	Model 3d
Foreign Capital Inflow	-0.12 (-1.07)			
Foreign Direct Investment		2.26 (3.61)[***]		
Foreign AID			0.64 (2.36)[**]	
Remittances				-0.18 (-1.55)
Gross Fixed Capital	0.21 (1.69)	0.83 (3.98)[***]	0.48 (4.01)[***]	0.16 (2.35)[**]
Population Growth	-0.98 (-0.93)	3.18 (1.85)[*]	0.18 (0.17)	-2.63 (-5.19)[***]
Trade Openness	0.03 (0.44)	-0.21 (-3.44)[***]	-0.001 (-0.11)	-0.05 (-0.96)
Nat. & Pol. Instability	-0.11 (-0.67)	0.17 (0.28)	-0.25 (-1.28)	-0.03 (-0.36)
Govt. Exp. on Education	-2.31 (-3.51)[***]	-2.49 (-3.18)[***]	0.28 (0.36)	-1.32 (-3.88)[***]
Sample size	40	40	40	40
F statistic	18.29[***]	15.05[***]	16.25[***]	8.10[***]

[***] Significant at 1%; [**] Significant at 5%; [*] Significant at 10%

Table 7: Short-run Error Correction Models

	Model 1a	Model 1b	Model 1c	Model 1d
Constant	0.24 (1.13)	23.77 (6.81)***	0.10 (4.73)***	8.91 (7.91)***
$\Delta GDPGR_{(-1)}$	0.27 (2.43)**	0.83 (3.00)***	0.55 (3.32)***	0.21 (1.77)*
$\Delta GDPGR_{(-2)}$		0.47 (2.57)**	0.33 (2.69)**	
$\Delta GDPGR_{(-3)}$		0.25 (2.46)**	0.25 (3.20)***	
ΔFCI	-0.07 (-0.77)			
$\Delta FCI_{(-1)}$	-0.38 (-3.63)***			
$\Delta FCI_{(-2)}$	-0.42 (-4.12)***			
$\Delta FCI_{(-3)}$	-0.25 (-2.88)**			
ΔFDI		0.21 (0.84)		
$\Delta FDI_{(-1)}$		-1.14 (-3.45)***		
$\Delta FDI_{(-2)}$		-0.52 (-2.03)*		
ΔAID			-0.31 (-2.15)**	
$\Delta AID_{(-1)}$			-0.89 (-4.73)***	
$\Delta AID_{(-2)}$			-1.09 (-6.04)***	
$\Delta AID_{(-3)}$			-0.66 (-4.81)***	
ΔREM				0.11 (0.39)
$\Delta REM_{(-1)}$				-0.73 (-2.92)***
$\Delta REM_{(-2)}$				-0.88 (-3.93)***
$\Delta REM_{(-3)}$				-0.41 (-2.16)**
ΔGCF	0.31 (1.37)	0.07 (0.31)	0.18 (0.94)	0.49 (2.18)**
$\Delta GCF_{(-1)}$	-0.08 (-0.40)	0.34 (1.67)	-0.17 (-0.93)	0.12 (0.55)
$\Delta GCF_{(-2)}$	-0.29 (-1.60)	-0.20 (-1.05)	-0.41 (-3.01)***	-0.15 (-0.80)
$\Delta GCF_{(-3)}$	0.34 (2.13)**	0.36 (2.04)*		0.60 (3.48)***
ΔPOP	41.95 (4.45)***	62.28 (4.29)***	30.83 (3.54)***	67.78 (5.46)***
$\Delta POP_{(-1)}$	-72.91 (-4.78)***	-89.45 (-4.15)***	-55.74 (-4.09)***	-106.60 (-5.63)***
$\Delta POP_{(-2)}$	35.50 (4.26)***	52.99 (4.20)***	34.20 (4.53)***	53.82 (5.20)***
ΔTRD	0.09 (1.90)*	-0.01 (-0.01)	0.05 (1.64)	-0.01 (-0.08)
$\Delta TRD_{(-1)}$	0.23 (4.86)***	0.37 (5.07)***	0.13 (3.70)***	0.32 (6.04)***
$\Delta TRD_{(-2)}$	0.17 (3.8)***	0.19 (2.94)***	0.08 (2.34)**	0.22 (3.50)***
$\Delta TRD_{(-3)}$	0.07 (1.85)*	0.12 (2.20)**		0.13 (2.58)**
$ECT_{(-1)}$	-1.96 (-10.61)***	-2.50 (-6.89)***	-2.03 (-9.43)***	-1.88 (-8.54)***
Adjusted R^2	0.89	0.88	0.93	0.88
F-statistic	19.79***	16.36***	29.84***	18.31***

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Table 8: Short-run Error Correction Models
(variables in Table 7 plus Nat. & Pol. Instability)

	Model 2a	Model 2b	Model 2c	Model 2d
Constant	-17.90 (-17.09)***	18.35 (7.63)***	-1.35 (-6.73)***	4.85 (7.09)***
ΔGDPGR$_{(-1)}$		0.90 (3.46)***	0.54 (3.12)***	0.19 (1.67)
ΔGDPGR$_{(-2)}$		0.44 (2.54)**	0.28 (2.20)**	
ΔGDPGR$_{(-3)}$		0.17 (1.76)*	0.19 (2.33)**	
ΔFCI	0.04 (0.48)			
ΔFCI$_{(-1)}$	-0.47 (-5.84)***			
ΔFCI$_{(-2)}$	-0.49 (-5.75)***			
ΔFDI		0.25 (1.08)		
ΔFDI$_{(-1)}$		-1.46 (-4.39)***		
ΔFDI$_{(-2)}$		-0.65 (-2.68)**		
ΔAID			-0.38 (-2.60)**	
ΔAID$_{(-1)}$			-0.96 (-5.02)***	
ΔAID$_{(-2)}$			-1.08 (-5.98)***	
ΔAID$_{(-3)}$			-0.73 (-5.23)***	
ΔREM				0.21 (0.69)
ΔREM$_{(-1)}$				-0.88 (-3.22)***
ΔREM$_{(-2)}$				-0.89 (-3.76)***
ΔREM$_{(-3)}$				-0.31 (-1.71)
ΔGCF		0.10 (0.47)	0.04 (0.22)	0.47 (2.08)*
ΔGCF$_{(-1)}$		0.22 (1.14)	-0.18 (-1.03)	0.01 (0.03)
ΔGCF$_{(-2)}$		-0.31 (-1.76)*	-0.49 (-3.58)***	-0.10 (-0.53)
ΔGCF$_{(-3)}$		0.34 (2.11)*		0.49 (2.96)***
ΔPOP	47.65 (4.90)***	63.07 (4.80)***	27.15 (3.18)***	64.49 (5.29)***
ΔPOP$_{(-1)}$	-94.23 (-4.59)***	-92.46 (-4.71)***	-54.04 (-3.99)***	-103.56 (-5.58)***
ΔPOP$_{(-2)}$	65.21 (3.55)***	52.13 (4.67)***	32.57 (4.40)***	49.02 (5.06)***
ΔPOP$_{(-3)}$	-22.33 (-3.09)***			
ΔTRD	-0.04 (-1.09)	0.03 (0.81)	0.09 (2.64)**	-0.01 (-0.20)
ΔTRD$_{(-1)}$	0.31 (8.34)***	0.40 (6.00)***	0.11 (3.21)***	0.32 (6.21)***
ΔTRD$_{(-2)}$	0.19 (5.14)***	0.23 (3.76)***	0.08 (2.38)**	0.24 (3.58)***
ΔTRD$_{(-3)}$	0.14 (4.20)***	0.17 (3.26)***		0.14 (2.81)**
ΔNPI	-0.58 (-3.55)***			-0.26 (-1.14)
ECT$_{(-1)}$	-1.54 (-16.96)***	-2.57 (-7.76)***	-2.01 (-9.36)***	-1.91 (-8.18)***
Adjusted R^2	0.91	0.89	0.93	0.89
F-statistic	31.59***	19.34***	29.59***	18.37***

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Table 9: Short-run Error Correction Models
(variables in Table 8 plus Govt. Exp. on Education)

	Model 3a	Model 3b	Model 3c	Model 3d
Constant	12.24 (12.92)***	-15.09 (-12.99)***	-12.95 (-12.81)***	33.73 (9.01)***
$\Delta GDPGR_{(-1)}$	0.22 (2.79)**	0.11 (1.37)	0.13 (1.63)	1.03 (4.23)***
$\Delta GDPGR_{(-2)}$				0.27 (2.44)**
ΔFCI	-0.18 (-2.73)**			
$\Delta FCI_{(-1)}$	-0.15 (-1.88)*			
$\Delta FCI_{(-2)}$	-0.31 (-4.55)***			
$\Delta FCI_{(-3)}$	-0.29 (-4.25)***			
ΔFDI		0.56 (3.14)***		
$\Delta FDI_{(-1)}$		-2.77 (-8.87)***		
$\Delta FDI_{(-2)}$		-1.28 (-6.04)***		
$\Delta FDI_{(-3)}$		-0.60 (-3.16)***		
ΔAID			-0.27 (-2.13)**	
$\Delta AID_{(-1)}$			-1.08 (-6.30)***	
$\Delta AID_{(-2)}$			-1.11 (-6.81)***	
$\Delta AID_{(-3)}$			-0.77 (-6.47)***	
ΔREM				0.09 (0.55)
$\Delta REM_{(-1)}$				0.41 (2.13)*
$\Delta REM_{(-2)}$				-0.65 (-4.58)***
ΔGCF	-0.05 (-0.33)	1.13 (5.99)***	0.14 ((0.85)	0.04 (0.28)
$\Delta GCF_{(-1)}$	-0.15 (-0.88)	0.08 (0.51)	-0.07 (-0.43)	-0.30 (-1.96)*
$\Delta GCF_{(-2)}$	-0.38 (-3.31)***	-0.40 (-3.78)***	-0.48 (-4.14)***	-0.35 (-2.78)**
$\Delta GCF_{(-3)}$				0.19 (1.94)*
ΔPOP	19.59 (2.48)**	25.85 (3.38)***	22.03 (2.71)**	41.87 (5.31)***
$\Delta POP_{(-1)}$	-59.19 (-3.24)***	-50.77 (-2.90)**	-62.16 (-3.36)***	-72.48 (-6.07)***
$\Delta POP_{(-2)}$	41.76 (2.33)**	40.69 (2.37)**	51.51 (2.86)**	43.43 (6.16)***
$\Delta POP_{(-3)}$	-10.58 (-1.41)	-17.20 (-2.45)**	-14.06 (-1.89)*	
ΔTRD	0.15 (4.15)***	0.17 (5.21)***	0.10 (3.47)***	0.03 (1.15)
$\Delta TRD_{(-1)}$	0.12 (3.69)***	0.47 (9.19)***	0.08 (2.83)**	0.21 (7.21)***
$\Delta TRD_{(-2)}$	0.13 (3.67)***	0.33 (6.10)***	0.06 (2.12)**	0.25 (5.99)***
$\Delta TRD_{(-3)}$	0.08 (3.00)***	0.27 (6.64)***		0.21 (5.35)***
ΔNPI		-0.99 (-5.14)***		
$\Delta NPI_{(-1)}$		-1.10 (-5.84)***		
$\Delta NPI_{(-2)}$		-0.56 (-3.25)***		
ΔEDU	0.63 (0.94)	0.40 (0.55)	2.12 (3.51)***	2.88 (4.85)***
$\Delta EDU_{(-1)}$	2.50 (3.24)***			4.55 (5.10)***
$\Delta EDU_{(-2)}$				1.23 (1.67)
$ECT_{(-1)}$	-1.93 (-13.52)***	-1.46 (-12.57)***	-1.52 (-12.51)***	-3.04 (-9.10)***
Adjusted R^2	0.95	0.95	0.94	0.96
F-statistic	37.49***	35.39***	40.47***	44.92***

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

5.1.   Long-run and Short-run Results for Total FCI

The long-run results presented in Table 4 - Model 1a show that the explanatory variable FCI has a statistically significant positive impact on economic growth in Bangladesh. For the control variables, the results indicate that economic growth is affected positively by gross fixed capital formation (statistically significant), negatively by population growth (statistically insignificant), and negatively by trade openness (statistically insignificant). When natural and political instability is added to the long-run model specification as an additional control variable, the results (presented in Table 5 - Model 2a) are found to be generally consistent with the original results. It is also found that the occurrence of natural and political instability exerts a statistically significant negative impact on economic growth. Finally, when govt expenditures on education is added as another control variable to the model specification, the results (presented in Table 6 - Model 3a) appear generally unsatisfactory, as all but one coefficient turn out statistically insignificant. It is also found that government spending on education has a negative (statistically significant) effect on economic growth, which is counterintuitive.

The short-term dynamics based on the ECM-ARDL model are discussed next. The results presented in Table 7 – Model 1a suggest that FCI generally exerts negative effects on economic growth in Bangladesh in the short run. Regarding the control variables, the results indicate that short-run economic growth is affected positively by gross fixed capital formation, population growth, and trade openness. When natural and political instability is added as an additional control variable, the results (presented in Table 8 - Model 2a) are found to be generally consistent with the original results. It is also found that natural and political instability has a statistically significant negative impact on short-run economic growth. Finally, when govt expenditures on education is added as another control variable, the results (presented in Table 9 - Model 3a) are found to be consistent with the original results for FCI and trade openness. It is also found that government spending on education affects short-run economic growth positively.

Finally, the estimated error correction terms (ECT) for all three model specifications are found to be negative and statistically significant, which indicates that all three short-run error correction models are stable

(Pahlavani et al., 2005). These error correction terms indicate the speed of adjustment towards long-run equilibrium with one period of shock.

5.2.   Long-run and Short-run Results for FDI

The long-run results presented in Table 4 - Model 1b show that FDI has a statistically significant positive impact on economic growth in Bangladesh. The results also indicate that economic growth is affected positively by gross fixed capital formation (statistically significant) and negatively by both population growth (statistically significant) and trade openness (statistically significant). When natural and political instability is added to the model specification as an additional control variable, the results (presented in Table 5 - Model 2b) are found to be remarkably consistent with the original results. It is also found that economic growth is lowered by the occurrence of natural and political instability, but the coefficient is statistically marginally insignificant. Finally, when govt expenditures on education is added as another control variable to the model specification, the results (presented in Table 6 - Model 3b) are found to be consistent with the original results for FDI, gross capital formation, and trade openness. It is also found that government spending on education has a negative (statistically significant) effect on long-run economic growth, which is counterintuitive.

The short-term results presented in Table 7 – Model 1b suggest that FDI generally exerts negative effects on economic growth in Bangladesh (which is contrary to the long-run results). The results also indicate that economic growth is affected positively by gross fixed capital formation, population growth, and trade openness. When natural and political instability is added as an additional control variable, the results (presented in Table 8 - Model 2b) are found to be consistent with the original results. Finally, when govt expenditures on education is added as another control variable, the results (presented in Table 9 - Model 3b) are also found to be generally consistent with the original results. It is also found that short-run economic growth is affected negatively (statistically significant) by natural and political instability, but positively (statistically insignificant) by government spending on education. Finally, the estimated error correction terms (ECT) are found to be negative and statistically significant for all three model specifications.

5.3. Long-run and Short-run Results for Foreign Aid

The long-run results presented in Table 4 - Model 1c show that foreign aid has a statistically significant positive impact on economic growth in Bangladesh. The results also indicate that economic growth is affected positively by gross fixed capital formation (statistically significant) and negatively by both population growth (statistically marginally insignificant) and trade openness (statistically significant). When natural and political instability is added to the model specification as an additional control variable, the results (presented in Table 5 - Model 2c) are found to be generally consistent with the original results. It is also found that the occurrence of natural and political instability has a negative (statistically insignificant) impact on economic growth. Finally, when govt expenditures on education is added as another control variable to the model specification, the results (presented in Table 6 - Model 3c) are found to be generally consistent with the original results. It is also found that government spending on education has a positive (but statistically insignificant) effect on economic growth.

The short-term results presented in Table 7 – Model 1c suggest that foreign aid generally exerts negative effects on economic growth in Bangladesh (which is contrary to the long-run results). The results also indicate that economic growth is affected negatively by gross fixed capital formation, but positively by population growth and trade openness. When natural and political instability is added as an additional control variable, the results (presented in Table 8 - Model 2c) are found to be consistent with the original results. Finally, when govt expenditures on education is added as another control variable, the results (presented in Table 9 - Model 3c) are also found to be generally consistent with the original results. It is also found that economic growth is affected positively (statistically significant) by government spending on education. Finally, the estimated error correction terms (ECT) are found to be negative and statistically significant for all three model specifications.

5.4. Long-run and Short-run Results for Remittance Earnings

The long-run results presented in Table 4 - Model 1d show that remittance earnings have a positive but statistically insignificant impact on economic growth in Bangladesh. The results also indicate that economic growth is affected positively by gross fixed capital formation (statistically

significant) and negatively by both population growth (statistically insignificant) and trade openness (statistically significant). When natural and political instability is added to the model specification as an additional control variable, the results (presented in Table 5 - Model 2d) are found to be consistent with the original results. It is also found that economic growth is reduced by natural and political instability (statistically marginally insignificant). Finally, when govt expenditures on education is added as another control variable to the model specification, the results (presented in Table 6 - Model 3d) are found to be generally unsatisfactory.

The short-term results presented in Table 7 – Model 1d suggest that remittance earnings generally exert negative effects on economic growth in Bangladesh. The results also indicate that economic growth is affected positively by gross fixed capital formation, population growth, and trade openness. When natural and political instability is added as an additional control variable, the results (presented in Table 8 - Model 2d) are found to be consistent with the original results. It is also found that short-run economic growth is reduced by natural and political instability (statistically marginally insignificant). Finally, when govt expenditures on education is added as another control variable, the results (presented in Table 9 - Model 3d) are found to be generally consistent with the original results. It is also found that economic growth is affected positively (statistically significant) by government spending on education. Finally, the estimated error correction terms (ECT) are found to be negative and statistically significant for all three model specifications.

5.5.   Diagnostic Tests

Several diagnostic tests were performed to determine the consistency of the estimated coefficients and the validity of the ARDL models. These diagnostic test results generally came out satisfactory revealing that by and large the models have acceptable statistical properties. Selected diagnostic test results are presented in the Appendix (Table 4-A).

5.6.   Discussions of Results

This study finds that foreign capital inflows affect economic growth in Bangladesh positively in the long run, but negatively in the short run. The

positive effect of FCIs on long-run economic growth is supported by the neoclassical theory, which asserts that foreign capital complements domestic resources, minimizes foreign exchange gap, supplements domestic savings, provides access to modern technology and management capabilities, and facilitates access to overseas markets. On the other hand, several factors can explain the negative effects of foreign capital on economic growth in the short run. It is also possible that the negative impact of FCIs on short-run economic growth in Bangladesh during the sample period is a reflection of the fact that since the early 2010s, the ratios of FDI/GDP, aid/GDP, and remittances/GDP have decreased in Bangladesh (as shown in Figure 1), but the country has experienced steady economic growth during this period. This dynamics may have contributed to the negative short-run relationship between FCI and growth. When FCIs are disaggregated into the three main components (i.e., FDI, foreign aid, and remittance earnings), the results are generally found to be consistent, which is discussed next.

The estimated results suggest that FDI affects economic growth in Bangladesh positively in the long run, but negatively in the short run. The positive effect of FDI on long-run economic growth is in line with the assertions of the neoclassical theory stated above. The negative impact of FDI on short-run economic growth can be attributed to several factors, such as foreign investors may return their earnings to their home countries (Herzer & Klasen, 2008). Furthermore, as FDI-financed domestic firms typically require high-tech capital equipment and intermediate goods that are normally unavailable in the host nation, FDI can raise the host nation's imports (Rahman, 2015), and rising imports may adversely affect economic growth through rising trade deficits (Fry, 1993). Also, the growth-enhancing effects of FDI may depend on country-specific factors, such as levels of human capital, macroeconomic stability, trade regime orientation (Zhang, 2001), and depth of the financial system (Hermes & Lensink, 2003). It is possible that these growth-enhancing effects of FDI are negated in Bangladesh in the short run due to underdeveloped infrastructure, lack of skilled human capital, weak financial sector, etc.

The estimated results also suggest that foreign aid contributes to economic growth in Bangladesh in the long run, but conversely in the short run. The positive effect of foreign aid on long-run economic growth is in line with the assertions of the neoclassical theory. The negative effects of foreign aid on short-run economic growth can be attributed to several factors.

First, foreign grants, which do not have to be paid back, are frequently channeled into nonproductive prestigious megaprojects that may negatively affect the growth trajectory by crowding out resources from the productive projects/sectors (Quazi, 2005; Duodu & Baidoo, 2022). Secondly, foreign aid may have negative impacts on economic growth due to poor management (Presbitero, 2012; Gebresilassie et al., 2023), bad macroeconomic policies (Durbarry et al., 1998; Brumm, 2003), and corruption (Bezabh & Kumar, 2020; Zardoub & Sboui 2021). Finally, in line with the liquidity constraint hypothesis and debt overhang theory of Krugman (1988), foreign aid may contribute to crowding out, market and policy volatility, and capital flight from the country due to concerns about currency devaluation, which may negate economic growth. The short-run negative impact of foreign aid on growth in Bangladesh found in this study is generally consistent with the results found in many studies (e.g., Quazi, 2005; Pattillo & Ricci 2011; Kharusi & Ada, 2018; Ehigiamusoe & Lean, 2019; Egyir et al., 2020; and Adugna et al., 2023).

The estimated results also suggest that the impact of remittance earnings on economic growth in Bangladesh is positive but statistically insignificant in the long run, but generally negative in the short run. The weak impact of remittances on long-run economic growth and generally negative impact on short-run economic growth can be explained by several factors. First, a significant proportion of remittances in Bangladesh is spent on consumption activities and purchase of land and other non-productive types of assets instead of productive investment projects (Ahmed, 2010; Sutradhar, 2020). Secondly, remittances provide the recipient households with easy access to money, which may have an adverse effect on their decisions to supply labor to the market (Rodriguez & Tiongson, 2001). Increased remittances can be regarded as a rise in non-labor income, which may diminish labor supply and lower economic activities (Chami et al., 2005; El Hamma, 2017). Thirdly, the steady rise in remittances can appreciate the real exchange rate and lower the external trade competitiveness, resulting in reduced exports and smaller economic growth (Rabbi et al., 2013). Several studies have also found that the impact of remittance earnings on economic growth is negative (e.g., Chami et al., 2005; Tolcha & Rao, 2016; Anetor, 2019; Bird & Choi, 2020; and Yadeta & Hunegnaw, 2022).

Regarding the effects of the control variables on economic growth in Bangladesh, this study finds that – i. gross fixed capital formation affects

economic growth positively both in the long run and short run, ii. the impact of population growth on economic growth is not robust, iii. trade openness affects economic growth positively in the short run, but negatively in the long run, and iv. natural and political instability lowers economic growth both in the short run and long run.

6.   Policy Implications and Conclusions

This study employs the ARDL bounds testing co-integration model on 1976-2019 data to examine the effects of FCIs and its components on the long-run and short-run economic growth in Bangladesh. The estimated results indicate that FCI and its components generally contribute to long-run economic growth positively, but to short-term economic growth negatively. Furthermore, the study finds that gross capital formation stimulates economic growth both in the short and long run, trade openness and population growth exhibit mixed effects on growth, and natural & political instability reduces economic growth both in the short term and the long term. These findings offer valuable insights for policymakers and shed light on the factors that moderate the effects of FCIs on economic growth.

To promote sustained long-term economic growth, policymakers should prioritize the establishment of a conducive environment for FCIs, which entails giving due consideration to the implementation of judicious policies aimed at nurturing several key factors. These factors include the growth of the financial sector, development of human capital, maintenance of macroeconomic stability, and stimulation of technological innovation. These variables are instrumental in fostering a positive and enduring relationship between FCIs and economic growth (Baharumshah et al., 2015; Bayramoglu & Abasız, 2018). Furthermore, policymakers should consider offering incentives to foreign investors, thereby attracting capital inflows while simultaneously strengthening foreign exchange reserves. Additionally, enhancing the remittance transfer system is imperative to formalize the remittance process, reducing reliance on informal channels for migrant remittances.

Modifications to the macroeconomic framework are equally critical. These adjustments should aim to stimulate domestic capital formation and optimize the efficiency of foreign capital flows. Achieving this goal requires an enhancement of institutional infrastructure and government

effectiveness, with a focus on eliminating corruption and enhancing accountability. These structural changes are indispensable for maintaining both economic and political stability, which are critical for fostering economic growth both in the short and long term (Aisen & Veiga, 2011).

While FCIs bring significant advantages to the Bangladesh economy in the long run, their short-term dynamics can present challenges, which should be addressed with due consideration. Policymakers must adopt a strategic approach to managing foreign capital to mitigate the risks associated with crowding out domestic capital. One crucial aspect of this strategy involves the thoughtful allocation of foreign capital to sectors of the economy that add substantial value. By prioritizing investment in industries and initiatives that have the potential to contribute significantly to economic growth, policymakers can maximize the positive impact of FCIs on the short-term performance of the economy.

Incentivizing households receiving remittances to make productive investments should also be given priority. Rather than directing these funds toward consumption or purchase of non-productive assets, households should be incentivized to invest these funds in productive sectors. Furthermore, it is essential that policymakers carefully monitor the exchange rate policies to prevent any undue appreciation of the real exchange rate due to the inflow of foreign capital, which can harm the competitiveness of domestic industries and hinder export growth (Combes et al., 2011; Zhu et al., 2022).

In conclusion, while FCIs hold the promise of long-term economic benefits in Bangladesh, policymakers must exercise prudent management to address the short-term challenges. This involves careful allocation of capital to value-added sectors, promoting productive use of remittances, and monitoring exchange rates to safeguard economic competitiveness. By implementing these strategies, policymakers can harness the full potential of FCIs while preserving the stability and growth prospects of Bangladesh' economy.

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Appendix

Table 1-A: Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Test Results

	Levels I(0)		First difference I(1)		
Variables	Intercept	Intercept and	Intercept	Intercept and	Status
GDP	0.707	0.160	0.195***	0.079***	I(1)
FDI	0.572	0.125**	0.065***	0.063***	I(1)
AID	0.760	0.169	0.146***	0.149**	I(1)
REM	0.661	0.079***	0.144***	0.107***	I(1)
FCI	0.248***	0.102***	0.127***	0.098***	I(0)
GCF	0.846	0.059***	0.071***	0.060***	I(1)
POP	0.782	0.137**	0.306***	0.164**	I(1)
TRADE	0.704	0.127**	0.115***	0.111***	I(1)
EDU	0.710	0.188	0.134***	0.073***	I(1)
NPI	0.259***	0.059***	0.019***	0.016***	I(0)

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 2-A: Augmented Dickey-Fuller (ADF) Test Results

	Levels I(0)		First difference I(1)		
Variables	Intercept	Intercept and	Intercept	Intercept and	Status
GDP	-4.822***	-8.375***	-13.439***	-13.294***	I(0)
FDI	-1.852	-2.413	-1.187	-0.935	
AID	-1.202	-3.842**	-6.548***	-6.664***	I(1)
REM	-1.419	-2.830	-4.639***	-4.641***	I(1)
FCI	-4.531***	-4.525***	-7.224***	-7.089***	I(0)
GCF	-0.520	-3.067	-4.809***	-4.736***	I(1)
POP	-0.964	-3.302	-1.936	-1.777	
TRADE	-0.898	-2.215	-6.453***	-6.358***	I(1)
EDU	-1.447	-1.600	-8.093***	-8.187***	I(1)
NPI	-6.731***	-6.819***	-8.793***	-8.684***	I(0)

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 3-A: ARDL Bounds Test Results

Models	Functions	F-statistics
1a	*GDP=f(FCI, GCF, POP, TRADE)*	18.440***
1b	*GDP=f(FDI, GCF, POP, TRADE)*	7.69***
1c	*GDP=f(AID, GCF, POP, TRADE)*	14.56***
1d	*GDP=f(REM, GCF, POP, TRADE)*	11.93***
2a	*GDP=f(FCI, GCF, POP, TRADE, NPI)*	38.720***
2b	*GDP=f(FDI, GCF, POP, TRADE, NPI)*	7.655***
2c	*GDP=f(AID, GCF, POP, TRADE, NPI)*	11.295***
2d	*GDP=f(REM, GCF, POP, TRADE, NPI)*	8.499***
3a	*GDP=f(FCI, GCF, POP, TRADE, NPI, EDU)*	18.288***
3b	*GDP=f(FDI, GCF, POP, TRADE, NPI, EDU)*	15.045***
3c	*GDP=f(AID, GCF, POP, TRADE, NPI, EDU)*	16.252***
3d	*GDP=f(REM, GCF, POP, TRADE, NPI, EDU)*	8.104***

Table 4-A: Diagnostic Test Results

Diagnostic tests	Model 1a	Model 1b	Model 1c	Model 1d	Model 2a	Model 2b	Model 2c	Model 2d	Model 3a	Model 3b	Model 3c	Model 3d
Normality: Jarque-Bera test	16.01 (0.000)	45.44 (0.000)	0.437 (0.804)	0.860 (0.650)	4.805 (0.090)	15.412 (0.000)	1.375 (0.503)	2.612 (0.271)	0.422 (0.810)	0.022 (0.989)	0.267 (0.875)	2.348 (0.309)
Functional Form	0.037 (0.850)	1.589 (0.225)	0.037 (0.849)	1.519 (0.230)	0.817 (0.377)	2.510 (0.134)	0.035 (0.853)	0.806 (0.383)	3.348 (0.090)	3.347 (0.094)	6.280 (0.024)	3.726 (0.077)
Serial correlation: Breusch–Godfrey Serial Correlation LM Test	1.603 (0.232)	1.649 (0.225)	2.463 (0.117)	0.945 (0.403)	0.655 (0.531)	1.286 (0.307)	3.563 (0.054)	0.827 (0.457)	5.050 (0.026)	5.958 (0.020)	7.472 (0.006)	1.478 (0.270)
Heteroscedasticity: Breusch–Pagan–Godfrey	0.644 (0.834)	0.396 (0.979)	0.693 (0.791)	0.918 (0.553)	0.512 (0.922)	0.426 (0.970)	0.748 (0.742)	0.721 (0.769)	0.631 (0.847)	0.951 (0.565)	1.047 (0.472)	0.490 (0.940)
Heteroscedasticity: Harvey	1.121 (0.407)	0.874 (0.622)	1.390 (0.242)	2.118 (0.049)	0.808 (0.674)	0.775 (0.718)	1.544 (0.182)	1.897 (0.095)	0.884 (0.620)	1.374 (0.287)	2.198 (0.054)	0.815 (0.683)
Heteroscedasticity: Glejser	1.008 (0.498)	0.704 (0.783)	0.646 (0.832)	1.392 (0.228)	0.648 (0.822)	0.645 (0.835)	0.762 (0.729)	1.255 (0.324)	0.720 (0.770)	1.118 (0.436)	1.034 (0.483)	0.779 (0.716)
CUSUM	Stable	Stable	Stable	Stable	Unstable	Stable	Stable	Stable	Stable	Stable	Stable	Stable
CUSUMSQ	Stable	Unstable	Unstable	Unstable	Stable	Stable	Unstable	Stable	Stable	Stable	Stable	Stable