

## Financial Development and Domestic Investment Nexus: An Empirical Study of Bangladesh

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### Abstract

*This study empirically evaluates financial depth and stability to identify the cointegration between financial development and investment in Bangladesh. The Auto Regressive Distributed Lag (ARDL) model is applied by the study with bound testing procedures. The model is selected on the basis of mixed stationarity of the variables. The sample selection is from yearly time-series from 1974 to 2019. The result confirms the existence of long run nexus between domestic investment and financial development in the context of Bangladesh. Particularly the study finds that domestic credit to the private sector as a source of financial stability is strongly negatively related to domestic investment in the long run. Additionally, broad money as a source of financial depth is found to be linked with domestic investment negatively but insignificantly in the long run. In contrast, the long run relation between trade openness and domestic investment is found to be strongly positive by the study. The dynamics of the short run represents that financial depth is negatively impacting domestic investment. Accordingly, as a key driver financial development has not been proved to be effective for domestic investment neither in the long run nor in the short run. In contrast trade openness found to be influencing domestic investment positively in the short run by the study. The study suggests the policy makers to be eclectic and circumspect in the strategy formulation and implementation of domestic investment policies for Bangladesh provided the existing condition of the financial development.*

**Keywords:** ARDL Model, Investment, Financial Development, Bangladesh

### 1. Introduction

The nexus between financial development and investment is highly absent in economics literature. Most studies indirectly evaluate this link with a focus on finance-growth relation while considering investment mainly as a positive channel to either economic growth or financial development, or both (Muyambiri & Odhiambo, 2018).

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Though over the past few decades the ratio of investment-GDP has shown a rising trend, in recent years, a fall in the contribution of private investment in total investment has been witnessed. In contrast, the public investment share in total investment has been found to be increased in Bangladesh. Private investment-GDP ratio altered and rarely increased by 1.2 percentage points between 2009 and 2017, despite private investment-GDP ratio showed a persistent rise in between 1995 and 2008, (Raihan, 2018). Though public investment is increasing and may crowd out private investment, Bangladesh can get benefit from public investment by removing the impediments to trade openness and financial deregulation (Saidjada & Jahan, 2018).

But in recent years, financial sector became unable to work for economic liberalization in the country. The confidence and trust of the people of the country are hit hard by the loan scandals of many financial institutions and others. Among them, Sonali Bank Limited, private commercial banks and hallmark groups were involved in the loan scam (Afroze, Zohra & Akter, 2019).

In this vein corporate governance may influence productivity of financial intermediaries but in the context of Bangladesh it is subject to several constraints (Rashid, Zobair, Chowdhury & Islam, 2020). Lack of discipline in the financial sector in Bangladesh may be due to excessive government interference and political ties, corruption in economic and political arena, organizational and managerial inefficiency that stymie not only economic growth and industrialization but also cause adverse social change in developing countries (Nguyen, Islam & Ali, 2011).

This study is performed to bridge the gap in the contemporary research on the nexus between investment and financial development in Bangladesh. The study findings will accordingly portray the long run affiliation between investment and financial development in Bangladesh. Additionally, it will also find the variables' dynamics in the short run (SR) to establish their long run (LR) positions strongly. This study relies on the two distinct indicators which examine how financial development alters domestic investment. They are (1) domestic credit to the private sector (DCPS) as an indicator of financial stability (Guru & Yadav, 2019) and (2) broad money supply (BM) as the depth of financial system (Levine, 1997; Adusei, 2013). Accordingly, this research adds to the body of scientific evidence by addressing the following general and specific objectives respectively:

- to identify the cointegration between financial development and domestic investment in Bangladesh;

- to identify the relationship between financial system stability and depth to domestic investment in Bangladesh.

The paper is organized consecutively with financial sector and Bangladesh investment profile, theoretical construction and literature survey, methodology and model specification, empirical results and discussion and finally, conclusions with relevant policy forwarding.

## **2. Status of Financial Development and Investment in Bangladesh**

The consequences of financial liberalization in Bangladesh like many other underdeveloped countries are undecided though it started since 1980s. Empirical evidence found that despite significant development, financial as well as monetary variables do not fully contribute to Bangladesh's growth in the post-reform era (Kabir & Hoque, 2007).

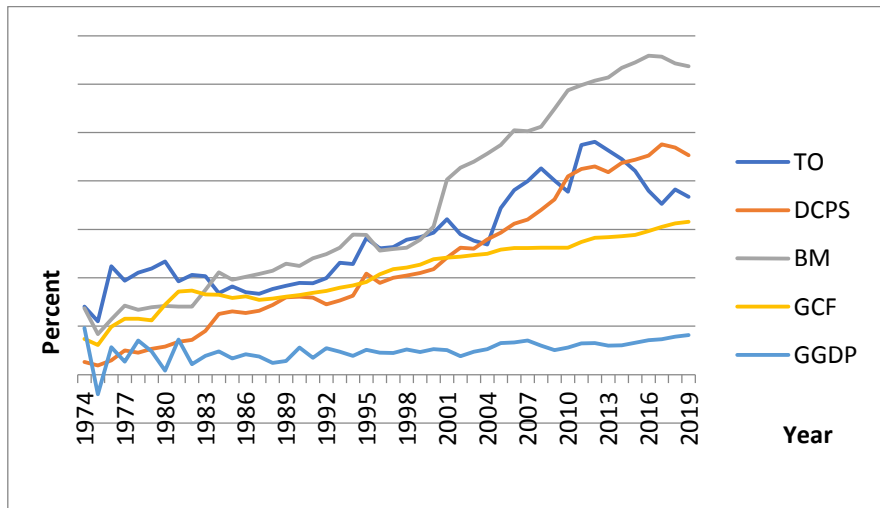
In the following decade, macro level empirics also validated the previously found role of financial development. The factors of private investment in Bangladesh found to be partially supportive to the flexible accelerator hypothesis. As a consequence, it was not the real interest rate but national output which was found to be emphatic in determining LR private investment. On top of that, government expenditure is found to be a substantial determinant for both the LR and SR in this vein. Since investment is found to be no interest sensitive the crowding out of private investment is found to be minimal by the government expenditure. The study accordingly found that it is government expenditure not monetary policy that may boost an economy out of recession (Hasan & Selim, 2011).

A study performed by USAID further explored how financial factors may deter investment in Bangladesh. It identified Infrastructure bottlenecks, the cost of doing business, unjustified taxation, exorbitant interest rates, and lack of access to finance as major challenges of investment from the side of the entrepreneurs (USAID, 2019).

A recent study explored how financial development (FD), capital formation, foreign direct investment (FDI) and labor forces may influence Bangladesh economy in both SR and LR for the duration of 1990–2018. The findings implied a lack of efficiency is persisting in capital management since, in the LR, capital formation has a positive impact whereas in the SR, it has a negative impact on GDP. The banking sector’s vulnerability was also vivid by the fact that, FDI’s impact on GDP is slightly positive in the SR but it was largely negative in the LR. These findings also supported fraud and wasteful usage of DCPS (Siddike & Rahman, 2020).

Accordingly, the trend of domestic investment and its potential indicators namely FD, GDP and TO are presented in figure 1.

**Figure 1:** Trade Openness (% of GDP), Domestic credit to private sector (% of GDP), Broad money (% of GDP), Gross capital formation (% of GDP) and Growth rate of GDP



Source: World Bank, World Development Indicators, 2021.

Notes: Variable Definitions: TO = Trade Openness, DCPS = Domestic Credit to Private Sector, BM = Broad Money, GCF = Gross Capital Formation, GGDP = Growth Rate of GDP.

Figure 1 illustrates that the DCPS, BM and TO are showing an upward trend in Bangladesh whereas the domestic investment is showing a slighter growth in its trend. GDP is found to be showing the lowest and more stable growth pattern among other variables.

### 3. Theoretical Construction and Literature Survey

#### Theoretical Construction

FD by Levine (1997) involves advances in producing information about potential investments and assigning capital; applying corporate governance and monitoring firms; easing of trading, diversification and reducing management risk, pooling and mobilizing savings and enabling the exchange of goods and services.

The actual contribution of a potential financial system is highlighted in the theory in many ways. The logic of sequence from savings to investment and technological progress and thereby to financial development and investment was confirmed not only by traditional Solow model but also by the endogenous growth models. Endogenous growth models emphasize the dominance of financial development in mobilization and allocation of resources to gain rapid growth via increased savings and investment (Bencivenga & Smith, 1991).

It is also observable that the notable frameworks for financial liberalization as a path for financial development are developed by McKinnon-Shaw group and by the models of Kapur, Mathieson and Galbis (Jouan, 2005). Blaming the 1960s's government for financial suppression McKinnon (1973) and Shaw (1973) argued that, financial liberalization can be ensured by the removal of obvious price controls and by the proper credit allocations. Financial suppression lowers the market rate of interest which tend to curb savings and investment (Muyambiri & Odhiambo, 2017). Digging deep into the McKinnon-Shaw group, Kapur and Mathieson's focus was mainly on the role of financial liberalization on investment quantity while Galbis focus was on the investment quality mostly (Gibson & Tsakalotos, 1994).

Modern growth theories signifies the role of finance on savings and capital accumulation. For the creation of new investment as well financial sector development is a prerequisite as per Tobin Q theory and the Duesenberry (1958) financial theory (Muyambiri & Odhiambo, 2018).

Summing up the theoretical construction it is obvious that financial development may ensure investment and savings by ensuring effective resource mobilization and allocation. Relaxing the investment modeling with context specific assumptions this study will unfold some empirics in the following section.

#### Literature Survey

A dynamic financial sector is inevitable for the economic progress of a country. The benefits of a developed financial sector, according to Jalilian Kirkpatrick & Parker (2007) and Odhiambo (2010), include insurance to domestic enterprises of local funds to purchase new equipment, implement advanced technology and attract skilled labor. It can further ease credit constraints of the foreign companies and thus

enable them to involve in backward linkages. Additionally, it is found to be essential for generating income for the poor by empowering them to invest in physical and human capital (Tchamyou, 2019).

Various time series and panel data empirics are worthy to investigate for this study. Analyzing for the duration between 1960 to 2008, in Turkey a research paper found that in a competitive model of firms with financial frictions, financial growth influences investment decisions. Financial growth, budget balance, and private sector financing all have a substantial footprint on investment, according to the findings (Balcilar, Çiftçioğlu & Güngör, 2016).

Another study by Hasan (2015) found money supply and the exchange rate to be influential to elicit private investment which in turn promoted sustainable economic growth. The domestic credit availed by the private sector from the financial institutions has played a key role in this regard. In contrast it was found from a study in Ghana using simple econometric model for the period of 1980 to 2007 that, private investment does not respond significantly to the liberalization policies of financial instruments (Asare, 2013).

In this vein a study further explored how external factors along with FD impact on domestic private investment. It found that, though financial development facilitates domestic investment the terms of trade is found to be negatively and highly significant on domestic investment in Pakistan – depicting Pakistan's investment is vastly sensitive to external shock (Liaqat, Firoz, Panhawar & Rizwana, 2013).

A more inclusive study by Onodugo, Kalu & Anowor (2013) regressed private investment with respect to financial savings, deposit money bank's credit to private sector, prime lending rate and real GDP as regressors. The results showed that the coefficients of credit to the private sectors and prime lending rate conformed the expected signs theoretically only, while that of others and dummy variable did not.

A bank-based FD revealed that though FD has caused the growth of domestic capital stock it insignificantly impacted on economic growth. It also identifies that foreign investment which contributes to domestic capital and economic growth is only significantly affected by openness and real exchange rate of the economy (Anwar & Sun, 2011).

To reach a firm conclusion Ucan & Ozturk (2011) propose that future domestic investment can be interpreted by a level of FD. The rising trends of FD in the 1980s are found to be linked to rising levels of investment in the 1990s and 2000s. Among other stylized facts, inflation and real interest rate negatively influence domestic investment. Real per capita GDP is also found to be reflecting in the same manner on domestic investment (accelerator effect) as well by the study.

Involving a new set of variables, a cointegration test of a study indicates that, investment is positively and significantly related to the TO, GDP and population. The Granger causality test of the study reflects that TO, GDP, population, and investment have bidirectional SR causal relationships. The study further confirmed the existence of bidirectional LR causal relationships between GDP, population, and investment and a unidirectional LR causal relationship from TO to investment (Mohsen, 2015).

A paper using cross-sectional data for the period of 2000-2011 in the EU countries found that countries with higher GDP per capita are carrying better financial system. Interestingly, the study further explored that the volume and growth of private investment are higher but less stable in countries with underdeveloped financial system (Sinevičienė & Deltuvaitė, 2014).

Finally, in any nation or country, a strengthened financial sector may confirm that limited financial resources are channeled to the prioritized economic alternatives, outcomes, and investments, according to the literature review.

The impression of FD, financial liberalization on investment is empirically researched to a limited extent. In this context this nexus is not explored for Bangladesh with the contemporary data while the focus is mostly on FDI for the existing literature. Considering the insignificant role of FDI, unsatisfactory domestic investment level and shaky financial sector of the country this study is a very timely effort for the economy of Bangladesh.

#### **4. Methodology and Model Specification**

##### **Data Sources**

Annual time-series data from 1974 to 2019 are used in this study. The World Bank's World Development Indicators data (2021) are used to compile the data. This research uses ARDL analysis to assess the effect of BM, DCPS, TO and growth rate of GDP on domestic investment in Bangladesh between 1974 and 2019.

For econometric analysis, to check the stationarity of the data series this study has done the unit root tests. Then to see the existence of the long run and short run relationship among the variables this study applies the ARDL modelling approach. Finally, to check the robustness of the study several diagnostic tests have been done. Econometric analysis of this study is done by using EViews 10 software.

##### **Model Specification**

###### **Test of Unit Root**

A variety of powerful tools can be used in time series data to test the existence of stationarity. In this regard this research applies Augmented Dickey-Fuller (ADF) and Phillips–Perron (PP) test. Tests are administered for both level and differenced data.

###### **Selection of Time Lag**

Before the formation of the time series model, an essential initial step is the selection of the lag order of the series. The optimum lag order selection can be done by using the minimum information criterion, such as sequential modified LR test statistic, Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SCC), Hannan-Quinn information criterion (HQC).

###### **Cointegration Test/ Bound Testing**

Co-integration test is used to detect the presence of long run relationship between variables. Different co-integration techniques can be used to determine the long run relationship between time series data. There are different co-integration methods are available such as Engle and Granger (1987) test which is based on residual, Johansen (1991), the Johansen (1995) and Johansen and Juselius (1990) tests which are based

on the maximum likelihood methods. Having limits with those models, nowadays, the ordinary least square (OLS) based ARDL model turned into the most popular approach among investigators (Qamruzzaman & Wei, 2018). Another benefit of ARDL model is that it can be used even when the variables are integrated in I(0) or I(1) (Pesaran, Shin & Smith, 2001). Additionally, in ARDL approach a dynamic error correction model (ECM) can be found by using linear transformation (Banerjee, Dolado, Galbraith, & Hendry, 1993).

### The Estimation of the Model Using ARDL Approach

This research uses the ARDL model because it has the following advantages over other co-integration models. Firstly, the ARDL model outperforms other models in terms of sample size, which can be as small as 30 to 80 observations (Ghatak & Siddiki, 2001). Secondly, it does not matter whether the basic variable is integrated in a different order or a mixture of both, the ARDL method can be used. Thirdly, when the lags are appropriate for the ARDL model then the model is correct for serial correlation. Finally, by using the ARDL model, the long run and short run co-integration relationship can be estimated with unbiased result (Pesaran et al, 2001).

Investors' liquidity constraints are expected to be reduced by financial progress, resulting in an increase in capital stock by the investors who respond to increase in aggregate demand (Aggregate demand is proxied by the growth rate of the real GDP). As a result, domestic investment should be linked to stronger effects of BM and DCPS though TO and GDP growth rate may also supplement domestic investment for this model. The general model can be written as follows:

$$GCF_t = \beta_0 + \beta_1 BM_t + \beta_2 DCPS_t + \beta_3 TO_t + \beta_4 GGDP_t + \beta_5 GCF_{t-1} + \varepsilon_t \quad (1)$$

Where GCF is the gross capital formation which is a proxy for the domestic investment, BM is the broad money, DCPS is the domestic credit to private sector, TO is the trade openness and GGDP is the growth rate of real GDP which is a proxy of real output growth, and  $\varepsilon_t$  is the error term.

The following equation is the ARDL representation of equation (1):

$$\Delta GCF_t = \alpha_0 + \sum_{i=0}^n \alpha_{1i} \Delta BM_{t-i} + \sum_{i=0}^n \alpha_{2i} \Delta DCPS_{t-i} + \sum_{i=0}^n \alpha_{3i} \Delta TO_{t-i} + \sum_{i=0}^n \alpha_{4i} \Delta GGDP_{t-i} + \sum_{i=1}^n \alpha_{5i} \Delta GCF_{t-i} + \sigma_1 BM_{t-1} + \sigma_2 DCPS_{t-1} + \sigma_3 TO_{t-1} + \sigma_4 GGDP_{t-1} + \sigma_5 GCF_{t-1} + e_{1t} \quad (2)$$

Here  $\Delta$  represents difference operator,  $\alpha_0$  is a constant,  $\alpha_{1i} - \alpha_{5i}$  and  $\sigma_{1i} - \sigma_{5i}$ , are coefficients and  $e_{1t}$  is error term.

The null hypothesis that there is no co-integration (equation (3)) against the alternative hypothesis that there is co-integration among the variables (equation (4)) in the model of equation (2) can be tested by using following equations:

$$H_0 = \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = 0 \quad (3)$$

$$H_0 \neq \sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_4 \neq \sigma_5 \neq 0 \quad (4)$$

Here the null hypothesis in equation (3) indicates that there are no long run relationships among the variables. The calculated value of F statistics will be compared with the upper and lower bound critical values. Here the decision rule is i) if this calculated value of F statistics is greater than the upper bound value, the null hypothesis is rejected; ii) if this calculated value of F statistics is less than the lower bound value, the null hypothesis cannot be rejected; and iii) if this calculated value

of F statistics is in between the upper bound and the lower bound value, the test result would be inconclusive (Pesaran et al, 2001).

If the variables in equation (2) are co-integrated, then the following ECM can be estimated by using equation (2):

$$\Delta GCF_t = \alpha_0 + \sum_{i=0}^n \alpha_{1i} \Delta BM_{t-i} + \sum_{i=0}^n \alpha_{2i} \Delta DCPS_{t-i} + \sum_{i=0}^n \alpha_{3i} \Delta TO_{t-i} + \sum_{i=0}^n \alpha_{4i} \Delta GGDP_{t-i} + \sum_{i=1}^n \alpha_{5i} \Delta GCF_{t-i} + \xi_1 ECM_{t-1} + e_t \quad (5)$$

In equation (5),  $ECM_{t-1}$  is one period lag error correction term. The coefficient of the  $ECM_{t-1}$  is represented by  $\xi$  which is known as the speed of adjustment parameter. This parameter measures the speed of adjustment each period toward equilibrium after a shock. If the sign of this parameter is negative and statistically significant, then this result will again confirm the presence of a co-integration relationship. The short-run dynamics of the estimated relationship can be found from equation (5).

### The Diagnostic Tests

Several econometric tests such as heteroscedasticity, serial correlation, normality and stability should be done for the application of the estimates of a model for economic analysis (Greene, 2008; Gujarati & Sangeetha, 2007). All those econometrics tests are done in this research to test the desired econometric properties of the model as well as the structural stability of the model.

## 5. Empirical Results and Discussion

### Unit Root Test

To estimate the time series models, the first step is to test the stationarity of the variables. If the variables are not stationary at levels, then it is necessary to make the series stationary by taking appropriate differences of the series (Gujarati, 2003). To test the unit root of data this research uses the ADF and PP unit root tests. For both of those tests, the null hypothesis is that the series has unit root, where the alternative hypothesis is that the series has no unit root.

**Table 1: Result of Unit Root Tests**

Variable	ADF		PP	
	Levels	1 <sup>st</sup> differences	Levels	1 <sup>st</sup> differences
<b>GCF</b>	-0.3856***	-	-0.2493	-0.8895***
<b>BM</b>	-0.1198	-0.8349***	-0.1636	-0.8349***
<b>DCPS</b>	-0.1654	-0.9912***	-0.1654	-0.9912***
<b>GGDP</b>	-1.4811***	-	-1.4812***	-
<b>TO</b>	-0.2390	-1.1716***	-0.2391	-1.1716***

Note: \*\*\* represents significant at 1% level.

The results of table 1 show that the variables are integrated of both I (0) and I (1) and no variables are integrated in I (2). The subsequent step of this study is to perform ARDL bound test approach to investigate the existence of co-integrating relationship among the variables.



### The Bounds Test

The ARDL bounds test approach examines the long-run co-integrating relationship among GCF, BM, DCPS, TO and growth rate of GDP of Bangladesh by using equation (2). Here the null hypothesis that is tested is there is no co-integration (equation (3)) against the alternative hypothesis is there is co-integration (equation (4)) among the variables. Table 2 shows the co-integration results of ARDL bounds tests.

**Table 2: Bound Test**

Lag length		F-statistic	
ARDL (3, 1, 1, 0, 4)		6.901714	
Level of Significance		Critical Values	
	Number of variable (k) and sample size (n)	Lower bound	Upper bound
	k = 4, n = 1000		
10%		3.03	4.06
5%		3.47	4.57
	k = 4, n = 45		
10%		3.298	4.378
5%		3.89	5.104
	k = 4, n = 40		
10%		3.334	4.438
5%		3.958	5.226

Note: k is the number of independent variable number in equation (1). Actual sample size is 42.

Results in table 2 shows that the calculated F-statistic is greater than the upper bound value at the 5% and 10% level of significance for both asymptotic (n=1000) and finite Sample (n=45 or n=40). The results reject the null hypothesis and indicate that there is a significant cointegrating relationship among the variables. Specifically, the results confirm that over the study period the GCF, BM, DCPS, TO and growth rate of GDP have long run relationship.

### Long Run Estimation

The LR relationship among the variables is analyzed by applying the ARDL model stated in equation (2). Here, the lag structure of the ARDL model is selected by the AIC. The ARDL (3, 1, 1, 0, 4) model shows the optimal number of lags of each variable. The LR results of the model are represented in table 3. The estimated value of R-square is 0.99 which indicates that 99 % variation in GCF has been explained by BM, DCPS, GGDP and TO. The value of F-statistics (361.7) with zero probability strongly supports the statistical significance of the model. The estimated LR coefficients of the ARDL model are reported in Table 3.

**Table 3: ARDL Estimations for Long-Run Coefficient for the Period 1974 – 2019**

Dependent variable: GCF					
Constant	Trend	BM	DCPS	GGDP	TO
1.857591 (2.087713)**	0.274153 (4.390778)***	-0.016059 (-0.157026)	-0.660269 (-2.920757)***	-0.035796 (-0.159464)	0.538966 (3.515353)***
$R^2 = 0.994697$					
Adjusted $R^2 = 0.991947$					
F-stat. = 361.7329***					

Note: The number inside the parenthesis is the value of the t-ratio

\*\*\*, \*\* and \* represent significant at 1%, 5%, and 10% level respectively.

The results of table 3 indicate that DCPS and TO are statistically significant in influencing GCF at the 1% level of significance. The estimated coefficient of DCPS shows that 10% increase of DCPS will lead to 6.60% decrease in GCF in the LR ceteris paribus. This implies that for Bangladesh there is a negative relationship between DCPS and investment in the LR. On the other hand, GCF is influenced by trade openness strongly. The estimated coefficient of TO shows that 10% increase of TO will lead to 5.39% increase in GCF in the LR ceteris paribus. This implies that for Bangladesh there is a positive relationship between TO and investment in the LR. Moreover, both the constant and trend are statistically significant in LR.

#### Analysis of Short-Run Dynamics

Equation (5) helps to estimate the SR coefficients. Moreover, equation (5) also provides the estimated value of ECT which indicates the speed of adjustment by which in this model the SR dynamics converge to the equilibrium path in LR.

The estimated ECM is represented in table 4. In table 4 most of the coefficients are significant. In SR, BM has negative significant effect on GCF. The magnitude of the impacts of DCPS and TO variables in the LR are much higher than those of the SR impacts, indicating that the impacts of change in DCPS and TO are much stronger in LR than in SR. Moreover, the impact of DCPS on GCF is insignificant in the SR.

A stable LR relationship could also be proved further by a highly significant ECT (Banerjee, Dolado & Mestre, 1998). In this study, the estimated value of the coefficient of error correction term is - 0.346161. This ECT is highly statistically significant with appropriate sign which indicates a 0.35% speed of convergence to the equilibrium after shock. More specifically, the ECT suggests that the deviation from the LR GCF path is corrected by 0.35% over the following year after shock. The ARDL model of error correction regression fits well because here the value of  $R^2$  is 0.69 which indicates that the explanatory variables of the model can explain 69% variation of GCF.

**Table 4: Error Correction Regression**

Dependent variable: D(GCF)	
Regressors	ARDL(3, 1, 1, 0, 4)
C	1.857591 <sup>***</sup> (6.668183)
TREND	0.274153 <sup>***</sup> (6.143453)
D(GCF(-1))	0.373685 <sup>***</sup> (3.441632)
D(GCF(-2))	-0.295875 <sup>***</sup> (-3.097456)
D(BM)	-0.109674 <sup>**</sup> (-2.374887)
D(DCPS)	-0.103822 (-1.518799)
D(TO)	0.059279 <sup>**</sup> (2.198268)
D(TO(-1))	-0.120843 <sup>***</sup> (-3.446637)
D(TO(-2))	-0.146099 <sup>***</sup> (-4.486002)
D(TO(-3))	-0.132281 <sup>***</sup> (-4.503904)
ECT(-1)	-0.346161 <sup>***</sup> (-6.294518)
R <sup>2</sup>	0.688536
Adjusted R <sup>2</sup>	0.588064
F-stat.	6.853007 <sup>***</sup>

Note: The number inside the parenthesis is the value of the t-ratio

<sup>\*\*\*</sup>, <sup>\*\*</sup> and <sup>\*</sup> represent significant at 1%, 5%, and 10% level respectively.

### Diagnostic Testing

Various diagnostic tests results are represented in table 5. To check the heteroscedasticity and serial correlation of the residuals, this study uses Breusch-Pagan-Godfrey test and Breusch-Godfrey Serial Correlation LM Test respectively. The P-value of these tests is greater than 5% which indicate that the model has no heteroscedasticity and serial correlation problem. To test normality this study uses the Jarque-Bera test. The P-value of the Jarque-Bera tests is also greater than 5 percent which indicates the normal distribution of the residual. Additionally, the Ramsey RESET test is used in this study to test the appropriate functional form of the study. The P- value is 0.7669 which indicates that the models are well specified.

**Table: 5 Diagnostic Testing**

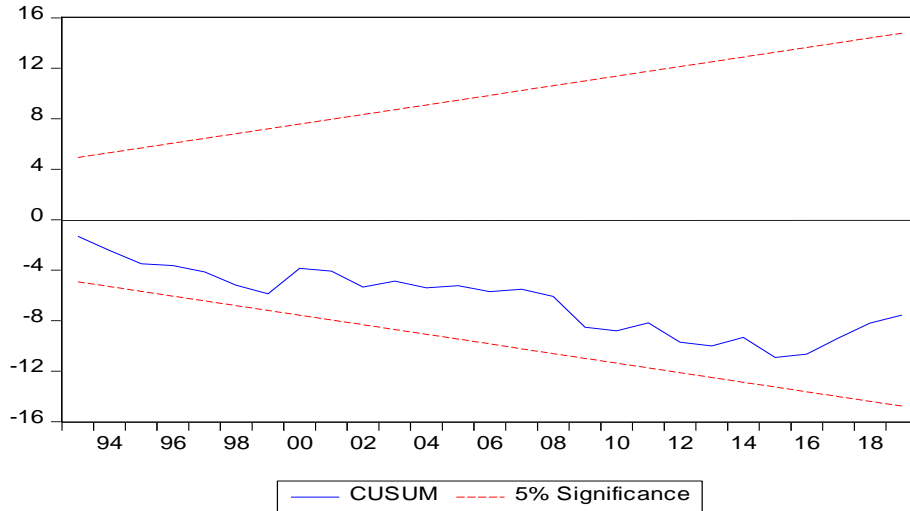
Test	F-Statistics /Jarque-bera	Obs*R <sup>2</sup>	Probabiity
Heteroskedasticity Test	1.3951	17.6292	0.2242
Serial Correlation	1.8188	2.7460	0.0975
Normality	2.4930	-	0.2875
Ramsey RESET	0.0898	-	0.7669

Source: Author's calculations.

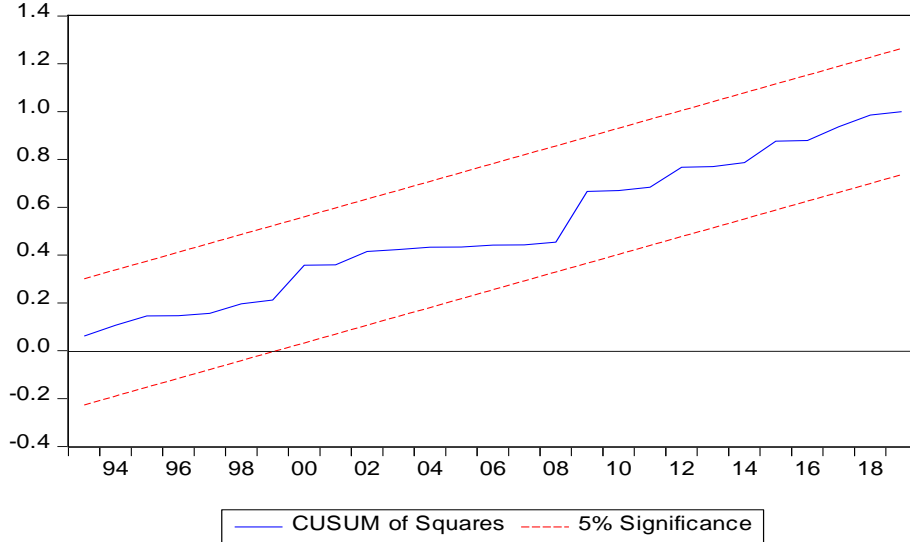
**Stability Test**

To test the stability of the model this study uses the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ). The test results of the CUSUM and CUSUMQ are shown in figure 2 and figure 3 respectively.

**Figure 2 Cumulative Sum of Recursive Residuals (GCF)**



**Figure 3 : Cumulative Sum of Squares of Recursive Residuals (GCF)**



The null hypothesis of the stability of the parameters cannot be rejected if both the plot of CUSUM and CUSUM of squares stay within the 5% critical bounds. Figures 2 and 3 show that both lines are in between 5% critical bounds which indicate the

absence of any instability of the coefficients during the study period. From the above tests it can be said that the models have desired econometric properties and the models are structurally stable.

Finally, the overall findings of the study are analyzed with the SR and LR dynamics of the interest variables. It implies that the financial stability (DCPS) is statistically significant in the LR whereas financial depth (BM) is found to be significant in the SR. The study further concentrated on the direction of effects of the variables and found that they are impacting negatively on the domestic investment of the economy for both terms. This study justifies the result of the findings of Iheonu, Asongu, Odo & Ojiem (2020) which shows that the ability of the banks to transform deposits into credit and BM supply negatively and significantly affect domestic investment. This study validates another study which has operationalized bank-based FD by liquid liabilities as a ratio of GDP (M3), DCPS as a ratio of GDP, and claims on the central government as a ratio of GDP and found that they only had a negative direct effect on investment in the LR (Muyambiri & Odhiambo, 2017). The study findings may also explain the effects of FD on economic growth in Bangladesh. It is consistent with the findings that, in five emerging South Asian countries (including Bangladesh) BM, trade balance and domestic credit have little impact on economic growth which is generally unexpected (Rana & Barua, 2015). This may imply that the DCPS and BM may not be sufficient to be able to attract private investment in Bangladesh. Moreover, since the changes in credit have positive and significant SR effects on changes in monetary policy by Emenike (2017), this may be a reason behind the collaborative effects of DCPS and BM on gross fixed capital formation in Bangladesh.

It is essential to investigate the controlled variables at this stage to highlight the study validity. During the study time, only one of the two control variables was found to be statistically significant in influencing private investment in Bangladesh. TO is consistently recorded to have significant positive effects on domestic investment. The availability of high quality and sophisticated capital inputs may result this outcome of trade. It is very usual that during this time the private investors get access to sophisticated machines and capital equipment. International market exposures may also be the leeway for domestic investors. The result of this study justifies the findings of a study by Bakari & Tiba, (2019). The study showed that the Asian economies' remarkable pace of economic progress may be due to the positive externalities of TO and FDI inflow which results technology transfer, financial capacity, human expertise, large-sized market and finally spillover effect to the national investment. On the contrary the impact of GDP as another control variable was found to be negative but insignificant on GCF in the LR by the study. It can be explained that in our context it is not GDP growth but the quality of growth should be focused on. Since our GDP does not capture the inequality and inclusivity of economic growth, its quality may be an issue for the country (Khatun, 2020). Accordingly, it may be a reason why GDP growth of the country is impacting GCF negatively.

## **6. Conclusion and Way Forward**

The study examines the impact of FD on domestic investment in Bangladesh using the ARDL bounds testing procedure over the period of 1974 to 2019. The study

summarizes that the role of FD namely DCPS on domestic investment is statistically significant in the LR whereas that of BM is significant in the SR. It implies that financial stability is significant in the LR whereas financial depth is significant in the SR. The direction of effects of the variables illustrates that in both SR and LR they are affecting negatively the domestic investment of the economy of Bangladesh. The findings may converge to the point of bank management in Bangladesh. Even though the domestic credit is disbursed to the investors and broad money is increasing in the economy as a source of financial liquidity, the domestic investment is not responding. Private sector assurance may be established by reducing irregularities in the banking sector. Banks' irregularities can be addressed by controlling major borrowers, avoiding forgeries and self-evaluation of anti-fraud internal controls. The present trend of nonperforming loans of the banking sector should be curbed to reduce credit risk and eventually ensure financial stability.

In contrast among the controlled variables in the study TO consistently recorded to have significant positive effects on domestic investment. Accordingly, this study can suggest that Bangladesh can be more competitive in the world market by rationalizing its tariff structure. Tariff reforms including simplified rate, lesser nominal protection and revenue neutrality is a demand of the time. Adverse revenue impact could be addressed by consolidating large taxpayer units, expanding the tax base and by plummeting the frequent releases in value-added tax (VAT).

The paper suggests that the existing investment environment in Bangladesh may be a key factor to direct FD to investment. As this study focused on mainly bank based FD indicators, additional variables may also be responsible for the stagnant domestic investment in Bangladesh. Accordingly, the scope of further study may address a number of supply-side constraints to increase domestic investments. The policy makers can be sincere in dealing the issues like weak infrastructure, high cost of doing business and inefficient human capital to boost domestic investment in Bangladesh.

Finally, quality implementation of investment policies is required to cut down cost overrun, and sub-standard long-standing projects which may encourage domestic investment in Bangladesh.

## References

- Adusei, M. (2013). Finance-growth nexus in Africa: a panel generalized method of moments (GMM) analysis. *Asian Economic and Financial Review*, 3(10), 1314-1324.
- Afroze, S., Zohra, F. T., & Akter, S. (2019). Financial crisis in the banking sector of Bangladesh and auditors' silence. *The Cost and Management*, 4(6), 4-11.
- Anwar, S. & Sun, S. (2011). Financial development, foreign investment and economic growth in Malaysia. *Journal of Asian Economics*, 22(4), 335-342.
- Asare, E. (2013). The impact of financial liberalization on private investment in Ghana. *The International Journal of Business and Finance Research*, 7(4), 77-90.
- Asongu, S. A., & Odhiambo, M. N. (2019). Challenges to doing business in Africa: A systematic review. *Journal of African Business*, 20(2), 259-268.
- Ay, A., Kurşunel, F., & Baoua, M. M. A. (2017). Relationship between trade openness, capital formation and economic growth: A panel data analysis for African countries. Paper presented at *the International Conference on Eurasian Economies*. Retrieved from <https://www.avekon.org/papers/2013.pdf>

- Bakari, S., & Tiba, S. (2019). The impact of trade openness, foreign direct investment and domestic investment on economic growth: New evidence from Asian developing countries. *Economic Research Guardian*, 9(1), 46-54.
- Balcilar, M., Çiftçiöğlü, S., & Güngör, H. (2016). The effects of financial development on investment in Turkey. *The Singapore Economic Review*, 61(4), 1-36.
- Banerjee, A., Dolado, J. J., Galbraith, J. W., & Hendry, D. (1993). *Co-integration, error correction, and the econometric analysis of non-stationary data*. Oxford: Oxford University Press, OUP Catalogue.
- Banerjee, A., Dolado, J. J., & Mestre, R. (1998). Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of Time Series Analysis*, 19(3), 267-285.
- Bencivenga, V. R., & Smith, B. D. (1991). Financial intermediation and endogenous growth. *The Review of Economic Studies*, 58, 195-209.
- Ghatak, S., & Siddiki, J. (2001). The use of the ARDL approach in estimating virtual exchange rates in India. *Journal of Applied Statistics*, 28(5), 573-83.
- Gibson, H. D., & Tsakalotos, E. (1994). The scope and limits of financial liberalisation in developing countries: A critical survey. *The Journal of Development Studies*, 30(3), 578-628.
- Greene, W. H. (2000). *Econometric analysis*. Upper Saddle River, New York University Press: Prentice Hall.
- Gujarati, D. & Sangeetha, (2007). *Basic econometrics: Cointegration and error correction model*. New Delhi: Tata McGraw-Hill Publishing Company Limited.
- Gujarati, D.N. (2009). *Basic econometrics*. New York, USA: McGraw-Hill Education.
- Guru, B.K., & Yadav, I. S. (2019). Financial development and economic growth: panel evidence from BRICS. *Journal of Economics, Finance and Administrative Science*, 24(47), 113-126.
- Hassan, K., & Salim, R. (2011). Determinants of private investment: Time series evidence from Bangladesh. *The Journal of Developing Areas*, 45, 229-249.
- Hassan, O. M. (2015). The impact of monetary policy on private capital formation in Nigeria. *Journal of Empirical Economics*, 4(3), 138-153.
- Iheonu, C. O., Asongu, S. A., Odo, K.O., & Ojiem, P. K. (2020). Financial sector development and investment in selected countries of the economic community of West African states: Empirical evidence using heterogenous panel data method. *Financial Innovation*, 6(29), 1-15.
- Jalilian, H., Kirkpatrick, C., & Parker, D. (2007). The impact of regulation on economic growth in developing countries: A cross-country analysis. *World development*, 35(1), 87-103.
- Jouan, J. K. (2005). *Financial liberalisation in mauritius and the finance-growth nexus* (Doctoral thesis, Edinburgh Napier University, United Kingdom). Retrieved from <https://catalog.ihsn.org/index.php/citations/54449>
- Kabir, S., & Hoque, H. (2007). Financial liberalization, financial development and economic growth: Evidence from Bangladesh. *Savings and Development*, 31(4), 431-448.
- Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature*, 35(2), 688-726.
- Liaquat, A., Firoz, S., M., Panhawar, I. A., & Rizwana, B. (2013). An empirical investigation of relationship between financial sector development and domestic private investment in Pakistan. *Global Management Journal for Academic & Corporate Studies*, 3(1), 176-185.

- Mohsen, A. S. (2015). The relationship between trade openness and investment in Syria. *Journal of Life Economics*, 2(2), 19-28.
- Muyambiri, B., & Odhiambo, N. M. (2017). *Investment dynamics in mauritius: Does financial development matter?* UNISA Economic Research Working Papers constitute work in progress. Retrieved from <https://ideas.repec.org/p/uza/wpaper/22077.html>
- Muyambiri, B., & Odhiambo, N. M. (2018). The impact of financial development on investment: a review of international literature. *Organizations and Markets in Emerging Economies*, 9(18), 167-192.
- Nguyen, C.V., Islam, A. M., & Ali, M. M. (2011). The current state of the financial Sector of Bangladesh: An analysis (AIUB Business and Economics Working Paper Series, No 2011-03), Retrieved from <http://orp.aiub.edu/WorkingPaper/WorkingPaper.aspx?year=2011>.
- Odhiambo, N. M. (2010). Finance-investment-growth nexus in South Africa: an ARDL bounds testing procedure. *Economic Change and Restructuring*, 43(3), 205-219.
- Onodugo, V. A., Kalu, I. E., & Anowor, O. (2013). Financial intermediation and private sector investment in Nigeria. *Research Journal of Finance and Accounting*, 4(12), 47-54.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.
- Qamruzzaman, M., & Wei, J. (2018). Financial innovation, stock market development, and economic growth: An application of ARDL model. *International Journal of Financial Studies*, 6(3), 1-30.
- Raihan, S. (2018, November 08). Why isn't private investment growing faster? *The Daily Star*.
- Rana, R.H., & Barua, S. (2015) Financial development and economic growth: Evidence from a panel study on South Asian countries. *Asian Economic and Financial Review*, 5(10), 1159-1173.
- Rashid, M. H. U., Zobair, S. A. M., Chowdhury, M. A. I., & Islam, A. (2020). Corporate governance and banks' productivity: evidence from the banking industry in Bangladesh. *Business Research* 13, 615-637.
- Saidjada, K.M., & Jahan, S. I. (2018). Public and private investment nexus in Bangladesh: Crowding-in or out? *The Journal of Developing Areas*, 52(4), 115-127.
- Siddiquee, M. N., & Rahman, M. M. (2020). Foreign direct investment, financial development, and economic growth nexus in Bangladesh. *The American Economist*. <https://doi.org/10.1177/0569434520938673>.
- Sinevičienė, L., & Deltuvaitė, V. (2014). Testing relationship between private investment and financial system's development: The case of the EU countries. *Procedia Economics and Finance* 14, 377 – 386.
- Tchamyou, V. S. (2019). The role of information sharing in modulating the effect of financial access on inequality. *Journal of African Business*, 20(3), 317-338.
- Tchamyou, V. S. (2020). Education, lifelong learning, inequality and financial access: Evidence from African countries. *Contemporary Social Science*, 15(1), 7-25.
- Ucan, O., & Öztürk, O. (2011). Financial determinants of investment for Turkey. *Journal of Economic and Social Studies* 1(1), 83-110.
- USAID (2019). *Bangladesh Comprehensive Private Sector Assessment*. Retrieved from [http://pdf.usaid.gov/pdf\\_docs/PA00TWMH.pdf](http://pdf.usaid.gov/pdf_docs/PA00TWMH.pdf)