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Unlocking the Economic Performance of Bangladesh: Do Financial Development, Employed Work Forces & Capital Formation Matter?

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Abstract:
Background*: More recently, the influence of financial market in accelerating economic growth has received a considerable attention. Assuring Bangladesh's stability in financial sector is seen as one of the biggest challenges. To fulfil the Bangladesh government's twin goals of poverty reduction and economic growth, financial sector development can play a significant role by resource mobilization, higher- return-oriented allocation of capital and facilitating the investment activities. The literature for Bangladesh which lacks of clear-cut or straightforward relationship between financial development and economic growth, will gain a new perspective as a result of this research. Moreover, no investigation has represented the joint association between the variables of interest in the limited period of 1980 to 2019 in Bangladesh. Therefore, this study probes whether the financial development can have a clear-cut impact on the economic growth of Bangladesh and what is the exact direction of the causality between them.*
Materials and Methods*: The study uses the Cobb-Douglas production framework by including measures for economic growth, financial depth, financial efficiency, capital and labor in the aggregate production function. The study takes annual time series data over the period of 1980 to 2019 from World Development Indicator (WDI) of World Bank. The Auto Regressive Distributed Lag (ARDL) bound testing approach of co-integration, error correction model and Granger causality tests are used to investigate the long-run equilibrium and short-run causal relationship among the five variables. Several diagnostic tests confirm the validity and reliability of the model.*
Results*: The results of the co-integration test exhibit that all of the variables in the model maintain a co-integrating relationship among them. The empirical results of the long-run model demonstrate that domestic credit to private sector as a percentage of GDP as well as broad money as percentage of GDP have significant positive influence on economic growth in the long-run. The statistically significant coefficient of Error Correction Term (ECT) holds theoretically correct sign and implies a short-run relationship that adjusts the model towards equilibrium in the long-run with the speed of 23.23%. But in the short-run, the coefficients of financial development indicators are insignificant. Granger causality test reveals the non-existence of short-run causal connection between financial development and economic growth.*
Conclusion: *It is worth mentioning that the financial sector of Bangladesh has to be reconstructed with a special attention as there exist less information access, non-performing loan, money-laundering activities, inefficient channel of funds, unskilled participants, corruption and political intervention in the financial sector of Bangladesh. The study calls for the concerned authorities to adopt effective measures for making an appropriate combination of fiscal, monetary and financial policies to maintain the current long-run positive influence of financial development on the economic growth and thereby to reach the financial sector of Bangladesh as its highest possible stage of success.*
Key Words*: Economic Growth, Financial Development, Time Series, ARDL, Granger Causality, Cobb-Douglas, Bangladesh.*

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I. INTRODUCTION

Background of the Study

Economic growth is considered as one of the crucial objectives of macroeconomic policy in any country. Poverty, unemployment, low standard of living, low level of savings and low investment are the main economic problems in the developing countries like Bangladesh. And to solve these problems, the government of Bangladesh always tries to continue their economic growth. Bangladesh is on track to rank among the top emerging market economies in the twenty-first century. Since gaining its independence in 1971, the country has seen impressive growth trends, particularly in the last few decades. As a result, the country, which was formerly described as a "bottomless basket," has disproved this concept and become an "economic role model." The

Bangladesh government's key development objective is to sustain such impressive economic growth rates in the future. Financial market is a vital part of Bangladesh economy. It is associated with buying and selling of financial instruments. It makes an easy channel between borrower and lender of capital and thereby facilitates the investment activity to boost economic growth of a country. It also provides advantages to various participants of the market as they can shift their risk and thereby promote commercial activities. Financial system of Bangladesh includes formal sector, semi- formal sector and informal sector. The formal sector of financial system contains various financial institutions such as insurance companies, non- bank financial institutions, banks, merchant banks, micro-credit institutions, etc. The semi-formal sector is not directly regulated by main regulators of financial system such as Bangladesh bank, authority of insurance, Bangladesh Securities and Exchange Commission, etc. It is comprised with Samabay Bank, Grameen bank, Palli Karma Sahayak Foundation, House Building Finance Corporation and various NGOs. But, the informal sector's institutions are totally unregulated by any financial authority. According to Hossain et al.(2017), in case of developing countries like Bangladesh, financial sector includes both banking sector as well as stock market sector. In this case, the stock market development has lower degree of influence on economic growth of Bangladesh where banking sector development has higher impact to enhance economic growth. Nguyen, Islam and Ali (2011) also support this view but added that if we compare the sub- categories of financial sector in Bangladesh internationally, then this sector is underdeveloped. At the initial stage of growth, financial development has small positive influence on economic growth. When financial sector develops more and more, well-developed financial system enhances economic growth rapidly through the various channels (Levine, 1997). Some authors support this positive influence of financial development on the economic growth of Bangladesh (for example, Golder et al., 2022; Uddin and Sjo, 2013; Mia,Qamruzzaman and Ara, 2014; Datta, 2021; Hossin, 2020; Biplob and Halder, 2018; Ahmed, Yusuf and Lubna, 2019; among others). In that case, they represented the necessity of channelling of long-term investment, broad money, stock market development, financial access, domestic credit to private sector, etc as the driving forces of this positive impact. Financial development can also have negative impact on the economic growth of Bangladesh. Several studies (such as, Ahmed et al., 2020; ; Hossain et al., 2017; Siddikee and Rahman, 2021; among others) support this view. They pointed out the factors of nonperforming loan, inefficiency in risk management, inefficiency in the allocation of bank credit, structural weakness of banking sector, inefficiency in resource allocation, etc which work behind the negative influence of financial development on the economic performance of Bangladesh. Some authors view that the connection between financial development and economic growth of Bangladesh is unclear. Shabaz et al. (2015) found positive influence of financial development but negative influence of market capitalization on the economic growth of Bangladesh. Uddin and Chakraborty (2009) & Satti et al. (2013) also noticed the unclear relation. Among various hypotheses maintained by financial development and economic growth of Bangladesh, several studies noticed different relationships. Hossain et al. (2017), Ahmed et al. (2020) noticed the evidence of demand following hypothesis. Golder et al. (2022) as well as Biplob and Halder (2018) support the view of supply- leading hypothesis. Qamruzzaman and Wei (2018) supports the view of feedback hypothesis in this respect. But some authors view mixed causal association between financial development and economic growth of Bangladesh. Mia, Qamruzzaman and Ara (2014) noticed bi-directional causality in the long run but uni-directional causality in the short run. Hossin (2020) noticed both bi-directional and uni-directional causality for different proxies of financial development. Ahmed, Yousuof and Lubna (2019) also noticed mixed causal association. Therefore, a considerable degree of ambiguity exists in the financial development-economic growth nexus of Bangladesh. Integrating economic and financial instruments is necessary for confirming economic stability of Bangladesh to maximize human well-being in the present without compromising the ability of future generations in meeting their requirements. In this aspect, development in financial sector can be quite beneficial as it reduces poverty, income inequality as well as financial risks and thereby lead to the promotion of investment activity and sustainable economic growth of Bangladesh. For financial and economic goals into implementation, it is high time for the country to reconstruct the financial sector and magnify its activities. Financial development offers Bangladesh a lot of promises for accomplishing the government's financial goals.

Rationale for the Study

Bangladesh is a rapidly growing economy in South Asia where financial sector is one of the major factors for propelling the nation's development. Recently, the economy whose demand for financial services is increasing with the vast population day by day, is facing issues like the non-performing loan, inefficiency in risk management, inefficiency in the operational and managerial activities as well as credit allocation, structural weakness of banking sector, etc. To resolve these looming crises in the financial sector, financial development needs to be prioritized. But for Bangladesh, there exists a narrower range of investigations in respect of financial development- economic growth nexus. Moreover, the previous studies of Bangladesh pointed out the positive, negative, mixed as well as no influence of financial sector development on the economic growth. That means the association between financial development and economic growth is ambiguous in Bangladesh. At the best of

author's knowledge, no study has been conducted in Bangladesh for the period 1981-2019 to investigate the relationship between financial development and economic growth. Moreover, no studies in Bangladesh has been carried out by including employed labor forces, capital, broad money as percentage of GDP and domestic credit to private sector as percentage of GDP at a time. Therefore, this study has included the measures for financial depth, financial efficiency, labor and capital simultaneously to capture the long-run and short-run relationship between financial development and economic growth in Bangladesh by using most recent available time-series data and by applying the sophisticated econometric technique namely ARDL model. This study has also examined the directional causalities between the variables of interest by performing Granger Causality technique.

Objectives of the study

The main objectives of this study are as follows:

- To investigate the effectiveness of financial development on the economic growth of Bangladesh.
- To identify the vital factors which describe the financial sector of Bangladesh.
- To explain the current trend of financial sector in Bangladesh.
- To identify the factors which hinder the channelling of financial development in economic growth.

Contribution of the study

The results of this study will be valid and reliable for policy making authority to reform future financial policies. Another great significance of this study is that, this study utilizes the current and longer period time-series data from 1980 to 2019 to represent the real scenario of financial development- economic growth nexus. As, the study incorporates the indicators of both financial depth and financial efficiency, it will be immensely helpful for various financial, public, and private institutions of Bangladesh especially the banks and central bank by representing the role of increased size of money supply and increased size of private sector lending. The findings can aid in giving the government guidance so that it can effectively contribute to keep Bangladesh's development wheels moving. Accordingly, this study will encourage new researchers to study more about this topic.

Ⅱ. Materials and Methods

The Cobb-Douglas production function is a suitable instrument to find the nexus between output and the factors of production. The function can be adjusted as:

$$Y_t = AL_t^{\beta 1} K_t^{\beta 2} B_t^{\beta 3} D_t^{\beta 4}$$

The logarithmic linear specification of the model is expressed in the following equation:

$$LnY_t = \beta_0 + \beta_1 LnL_t + \beta_2 LnK_t + \beta_3 LnB_t + \beta_4 LnD_t + \in_t$$

Where, LnY_t= Log of GDP, LnK_t= Log of Capital, LnL_t= Log of Labour, LnB_t= Log of Broad Money as a percentage of GDP, LnD_t= Log of Domestic Credit to Private Sector as a Percentage of GDP, β_0= Intercept, β_s= Elasticity Coefficient of the respective variables to GDP (where $s = 1 \dots 4$),ε_t= Stochastic Error Term. β_1, β_2, β_3, and β_4 are expected to be non-negative.

Data and Variables

This study uses annual time series data covering the period of 1980 to 2019 for Bangladesh. The data are sourced from World Development Indicators (WDI) published by the World Bank (WB) and also from Federal Reserve Bank of St. Louis (FRED). The information about the dataset of the study is presented on Table 1.

Table 1: Sources of Data and Description of the Variables

Variables	Notation	Description	Data Source
Gross Domestic Product	LnY	Current (LCU) in Logarithmic Form	World Development Indicator (WDI), WB.
Labour	LnL	Employed Labor Force (millions of persons * 1,000,000) in Logarithmic Form	Federal Reserve Economic Data.
Capital	LnK	Gross Fixed Capital Formation in Logarithmic Form	World Development Indicator (WDI), WB.
Broad Money	LnB	Broad Money (% of GDP) in Logarithmic Form	World Development Indicator (WDI), WB.
Domestic Credit to Private Sector	LnD	Domestic Credit to Private Sector (% of GDP) in Logarithmic Form	World Development Indicator (WDI), WB.

Rationale of the Research Variables

The empirical rationale for the selected variables is being elucidated as followings: In this study, all variables are measured in nominal form. That's why nominal GDP is utilized to measure the economic performance of Bangladesh. Moreover, recent studies such Misini and Pantina (2017), Agboli(2021) and Tasneem

(2023), utilized nominal measure of gross domestic product as a gauge of economic growth. Capital is an important factor of production that has been produced by itself and can be used in the further production of wealth. In this study, data on gross fixed capital formation are measured in current unit (nominal form). Labor is the human physical effort utilized in production. It is one of the major inputs for production process. As the labour data of FRED are in millions of persons, the data are multiplied by 10, 00,000. Credit to private sector is considered as more efficient tool in supporting economic growth rather than credit to the government and public sector in Bangladesh. So, we used domestic credit to the private sector as a percentage of GDP to measure financial performance. Recent studies such as Hassan et al. (2011), Biplob and Halder (2018) utilize domestic credit to private sector as a percentage of GDP as a measure of financial development. Here, the data on this variable are measured in relation to current year GDP. Narrow money is considered as poor proxy of financial development. Broad money is related to the ability of financial system, providing transactions and channeling of funds from savers to borrowers (Khan and Senhadji, 2000). Recent studies such as Giedeman and Compton (2009), Anwar and Cooray (2012), Biplob and Halder (2018) utilize the broad money as a percentage of GDP as the indicator of financial depth. Here, the data of broad money is derived as current-year broad money divided by current-year GDP times 100.

Econometric Analysis Procedure:

Before investigating the long-run relationship among the variables under consideration, especially to check the spurious effects of the variables in the analysis, Ordinary Least Squares (OLS) regression analysis will be carried out. If a spurious relationship is found then unit root tests will be carried out. To detect the stationarity of the series, no unit root in the series have to be ensured by using tests like the Augmented Dickey-Fuller (ADF) test according to Dickey and Fuller (1981), and the Phillips-Perron (PP) test according to Phillips-Perron (1988).Vector autoregression (VAR) lag order selection criteria are utilized to choose the optimal lag for the test of cointegration in the research analysis. The sequential modified LR test statistic (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn Information Criterion (HIQ) are used to determine the optimal lag length of VAR system in this study. In order to have robust findings, we employ the Autoregressive Distributed Lag (ARDL) bound testing approach which permits the estimation of the long run level relationship between variables. The method yields valid results irrespective of whether the variables are I (0), I (1) or a combination of both. This is suitable for the present study with only 40 observations. We know, in its basic form, an ARDL regression model looks like almost this:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \cdots + \beta_P Y_{t-p} + \alpha_0 X_t + \alpha_1 X_{t-1} + \cdots + \alpha_q X_{t-q} + \varepsilon_t$$

Where ε_t is a random "disturbance" term. Assuming that the bounds test leads to the conclusion of cointegration, we can meaningfully estimate the long-run equilibrium relationship between the variables:

$LnY_t = \alpha_0 + \alpha_1 LnL_t + \alpha_2 LnK_t + \alpha_3 LnB_t + \alpha_4 LnD_t + v_t$;

as well as the usual ECM:

$$\Delta LnY_t = \beta_0 + \sum \beta_i \Delta LnY_{t-i} + \sum \gamma_j \Delta Lnl_{t-j} + \sum \delta_m \Delta LnK_{t-m} + \sum \delta_n \Delta LnB_{t-n} + \sum \delta_r \Delta LnD_{t-r} + e_t$$

Where $Z_{t-1} = LnY_{t-1} - a_0 - a_1 LnL_{t-1} - a_2 LnK_{t-1} - a_3 LnB_{t-1} - a_4 LnD_{t-1}$ and the a's are the OLS estimates of the α's in the long-run equation.

To examine the causal relationship among variables, this study shall employ the Granger causality method by Granger (1969). To identify the well-specification of the model explaining by Autoregressive Distributed Lag Model, it is necessary to check the serial correlation, heteroskedasticity, specification error, multicollinearity, normality and the stability of the model.

III. Results and Discussions

This section presents the empirical findings from various stages of analysis. Discussions of the empirical findings are also presented in this section. The descriptive statistics assist to imply the descriptive numerical and distributional properties of data. The descriptive statistics has depicted in the following table:

Table 2: Descriptive Statistics

	LnY	*LnL*	*LnK*	*LnB*	*LnD*
Mean	*28.61716*	*17.51930*	*23.26120*	*3.512813*	*3.071156*
Median	*28.57598*	*17.52876*	*23.22195*	*3.392570*	*3.053287*
Maximum	*31.01590*	*17.99808*	*25.45195*	*4.166767*	*3.788819*
Minimum	*26.36083*	*16.99678*	*21.68607*	*2.643161*	*1.752905*
Std. Dev.	*1.315054*	*0.301114*	*1.103879*	*0.481306*	*0.556678*
Skewness	*0.123217*	*-0.052390*	*0.374300*	*-0.187165*	*-0.533738*
Kurtosis	*2.011388*	*1.808985*	*2.063591*	*1.704482*	*2.521595*
Jarque-Bera	*1.730140*	*2.382493*	*2.395439*	*3.030815*	*2.280627*

Probability	*0.421022*	*0.303842*	*0.301882*	*0.219719*	*0.319719*
Observations	*40*	*40*	*40*	*40*	*40*

Source: Author's Estimation Using Eviews 10

It is worth noting that, according to the probability values shown in the preceding table, all of the variables are normally distributed. Table 2 shows that LnY is most volatile and LnL is the least volatile. The variables LnY and LnK are positively skewed where the remaining three (LnL ,LnB, LnD) are negatively skewed. Table 2 indicates that all of the variables reflect platykurtic distribution as kurotosis values are less than 3. This study employs correlation matrix which is widely used to determine the strength of the linear association between the variables.

Table 3: Correlation Analysis

Variables	*LnY*	*LnL*	*LnK*	*LnB*	*LnD*
LnY	*1*				
LnL	*0.9948*	*1*			
LnK	*0.9924*	*0.9819*	*1*		
LnB	*0.950*	*0.9697*	*0.9218*	*1*	
LnD	*0.9555*	*0.9717*	*0.9197*	*0.9770*	*1*

Source: Author's Estimation Using Eviews 10

All variables are positively correlated with each other. The variable LnY is highly positively correlated with LnL.LnK, LnB, LnD with the degree of association 0.99,0.99,0.95 and 0.96 respectively. This indicates a good sign for further analysis in the model specified in this study. The estimated results on the basis of the OLS are given in the following table.

Table 4: Results of OLS Estimates of double-log Model

Variables	**Coefficients**	**Standard Error**	**t-statistic**	**P-value**
C	-14.01600	7.921946	-1.769262	0.0856
LnL	1.531988	0.600298	2.552044	0.0152
LnK	0.652674	0.093834	6.955623	0.0000
LnB	-0.208912	0.133386	-1.566223	0.1263
LnD	0.438172	0.141079	3.105853	0.0037

Note: $R^2 = 0.9972$, *Adj-*$R^2 = 0.9969$, $Fstatistic = 3215.06$, $p < 0.01$, $DWStatistic = 0.6997$.

Source: Author's Estimation Using Eviews 10

The p-value regarding F-statistic is significant at 1% level of significance, indicating the overall model is well fitted. The coefficient of determination, R^2 is 0. 9972 which implies that 99.72% of the total variation in LnY is explained by the explanatory variables. The results exhibit that the $R^2$is greater than the DW statistic. This result implies that there is a dubiety of spurious regression. Since the variables chosen for this study are all time series in nature, a unit root test for each variable must be performed before the analysis in order to avoid spurious regression results. The results of the unit root tests are presented below:

Table 5: Augmented Dickey-Fuller Test Results

Variables	*Level*	*1st Difference*	*Decision*
LnY	*0.826814*	*-5.272135****	*I(1)*
LnL	*-1.154341*	*-4.742745****	*I(1)*
LnK	*2.023461*	*-5.433292****	*I(1)*
LnB	*-1.656265*	*-4.921539****	*I(1)*
LnD	*-3.150700***	-	*I(0)*

Source: Author's Estimation Using Eviews 10

*Note: ***, ** and * depicts significance at 1%, 5% and 10% respectively. The ADF is specified under the null of non-stationary, signifying the Asterisks (*) rejecting the null at the mentioned significance level.*

As seen from Table 5, all of the variables except *LnD* are I(1), whereas variable *LnD* is I(0).

Table 6: Phillips-Perron Test Results

Variables	*Level*	*1st Difference*	*Decision*
LnY	*0.772315*	*-5.272135****	*I(1)*
LnL	*-1.247071*	*-4.582948****	*I(1)*
LnK	*3.381656*	*-5.487767****	*I(1)*
LnB	*-1.622010*	*-4.935760****	*I(1)*
LnD	*-3.317160***	*-*	*I(0)*

Source: Author's Estimation Using Eviews 10

Table 6 shows that, the variables *LnY*, *LnL*, *LnK*, and *LnB* are I(1) variables. On the contrast, *LnD* is I(0) variable.

Optimal Lag Length Selection

To mitigate the correlation of the residuals is one of the primary justifications for using optimal lag length.

Table 7: Lag Order Selection Criteria of VAR

Lag	*LogL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*
0	*163.3019*	*NA*	*1.04e-10*	*-8.794549*	*-8.574616*	*-8.717787*
1	***386.8468***	***372.5749****	***1.72e-15****	*-19.82482*	***-18.50522****	***-19.36425****
2	*411.0701*	*33.64347*	*1.95e-15*	*-19.78167*	*-17.36241*	*-18.93728*
3	*436.1350*	*27.84984*	*2.45e-15*	*-19.78528*	*-16.26635*	*-18.55708*
4	*466.0550*	*24.93332*	*3.10e-15*	***-20.05861****	*-15.44001*	*-18.44659*

Source: Author's Estimation Using Eviews 10

Here, *Indicates lag order selected by the criterion where LR: Sequential modified LR test statistic (each test at 5% level) ,FPE: Final prediction error ,AIC: Akike information criterion ,SC: Schwarz information criterion and HQ: Hannan-Quinn information criterion. Different lag length criteria, with the exception of the Akaike information criterion, demonstrate that lag length 1 is the best.

Estimation of ARDL Model and Bound Testing for Co-integration

By using the ARDL bound testing approach, it is possible to determine whether there exists a long-run relationship between the variables or not.

Table 8: The Results of ARDL Bounds Test

Critical Values	*F-statistic: 7.012886*	
	Lower Bound I(0)	*Upper Bound I(1)*
1%	*3.74*	*5.06*
5%	*2.86*	*4.01*
10%	*2.45*	*3.52*

Source: Author's Estimation Using Eviews 10

According to Table 8, the estimated F-statistic exceeds the upper critical bound value of 5.06 at the 1% level of significance. Therefore the variables used in this model are co-integrated. This co-integration implies that there is a long run relationship among LnY, LnL, LnK, LnB and LnD throughout 1980 to 2019 in Bangladesh. By running unrestricted vector auto regression (VAR) lag length criteria, the optimal lag order is found to be 1 and turn out to be ARDL (1, 1, 1, 1, 1) model for our estimation. The empirical finding of the long-run relationship is shown in Table 9.

Table 9: The Results of Estimated Long Run Coefficients

The Level Equations from ARDL model			
Dependent Variable: LnY			
Variables	*Coefficients*	*t-statistic*	*Probability*
Constant	11.19771	3.150433	0.0038
LnL	*-3.177136*	*-1.929507*	*0.0635*
LnK	*1.365842*	*5.372221*	*0.0000*
LnB	*0.350998*	*2.294794*	*0.0275*
LnD	*1.030037*	*3.290929*	*0.0026*
R-squared= 0.9997222		*Durbin-Watson statistic= 2.080780*	
Adjusted R-squared= 0.999635			

Source: Author's Estimation Using E-views 10

Therefore, the long-run equation can be written as follows;

$$LnY = 11.19771 - 3.177136LnL + 1.365842LnK + 0.35099LnB + 1.030037LnD$$

The error correction term which obtained from the long-run equilibrium is given as follows;

$$EC = LnY - (-3.1771LnL + 1.3658LnK + 0.3509LnB + 1.0300LnD)$$

Table 9 displays that Broad Money has a positive impact on Economic Growth in the long-run. The results show that, the elasticity of Economic Growth with respect to Broad Money is about 0.35, which suggests that, as Broad Money (*LnB*) goes up by 1%, on average, Economic Growth (*LnY*) rises by 0.35%, other things remain the same.

Analogously, the elasticity of Economic Growth with respect to Domestic Credit to Private Sector is about 1.03, which is significant at 1% level, suggesting that when Domestic Credit to Private Sector (*LnD*) goes up by 1%, on average, Economic Growth (*LnY*) rises by 1.03%, all else held constant. The findings also express that Capital Stock have significant positive impact on Economic Growth (*LnY*). More specifically, 1% increase in Capital Stock (*LnK*) leads to 1.36% increase in Economic Growth (*LnY*). However, Labor has negative impact on Economic Growth. As per result, 1% increase in Labor (*LnL*) decreases Economic Growth (*LnY*) by 3.17%. Given that the variables have a significant long-run equilibrium relationship, the error correction mechanism (ECM) gives the speed of adjustment to restore equilibrium in a dynamic model.

Table 10: The Results of Short Run Error Correction Coefficients

ECM-ARDL			
Dependent Variable: LnY			
Variables	*Coefficients*	*t-statistic*	*Probability*
C	*11.19771*	*6.374376*	*0.0000*
D(LnL)	*-0.189166*	*-0.570215*	*0.5729*
D(LnK)	*0.435207*	*6.532120*	*0.0000*
D(LnB)	*0.062219*	*0.679276*	*0.5023*
D(LnD)	*-0.020594*	*-0.356979*	*0.7237*
ECT_{t-1}	*-0.232287*	*-6.316716*	*0.0000*
R-squared= 0.784823		*Durbin-Watson statistic= 2.080780*	
Adjusted R-squared= 0.752220			

Eviews Source: Author's Estimation Using 10

The error correction coefficient (ECT_{t-1}) with a negative expected sign (-0.232287) is significant at 1% level of significance. This depicts that departure from the long-run equilibrium path of the Economic Growth (*LnY*) because of any certain shock will be corrected annually at the rate of 23.22% in the long span of time. Furthermore, Table 10 also presents the short-run coefficients of the explanatory variables. In the short-run, Broad Money as a percentage of GDP (*LnB*) has a positive and Domestic Credit to Private Sector as a % of GDP (*LnD*) as well as Labor (*LnL)* has a negative influence on Economic Growth (*LnY*) respectively but these effects are statistically insignificant. However, Capital Stock (*LnK*) has a significant positive impact on Economic Growth (*LnY*) in the short run which is analogous to long-run estimation. To ascertain the causal relationship between the variables, the Granger Causality test is utilized generally.

Table 11: Pairwise Granger Causality Test Results

Null Hypothesis	*Probability*	*Decision*	*Direction of Causality*
LNL does not Granger Cause LNY	*0.9978*	*Accept*	*No Causality*
LNY does not Granger Cause LNL	*0.2577*	*Accept*	
LNK does not Granger Cause LNY	*0.1903*	*Accept*	*No Causality*
LNY does not Granger Cause LNK	*0.2770*	*Accept*	
LNB does not Granger Cause LNY	*0.2224*	*Accept*	*No Causality*
LNY does not Granger Cause LNB	*0.6919*	*Accept*	
LND does not Granger Cause LNY	*0.6886*	*Accept*	*No Causality*
LNY does not Granger Cause LND	*0.2440*	*Accept*	
LNK does not Granger Cause LNL	*0.4817*	*Accept*	*No Causality*
LNL does not Granger Cause LNK	*0.3271*	*Accept*	
LNB does not Granger Cause LNL	*0.7998*	*Accept*	*No Causality*
LNL does not Granger Cause LNB	*0.3315*	*Accept*	
LND does not Granger Cause LNL	*0.8042*	*Accept*	*Unidirectional Causality*
LNL does not Granger Cause LND	*0.0492*	*Reject*	*LnL→LnD*
LNB does not Granger Cause LNK	*0.1419*	*Accept*	*No Causality*
LNK does not Granger Cause LNB	*0.8067*	*Accept*	
LND does not Granger Cause LNK	*0.3546*	*Accept*	*No Causality*
LNK does not Granger Cause LND	*0.3382*	*Accept*	
LND does not Granger Cause LNB	*0.7984*	*Accept*	*Unidirectional Causality*
LNB does not Granger Cause LND	*0.0076*	*Reject*	*LnB→LnD*

Source: Author's Estimation Using Eviews 10

This study includes an array of diagnostic tests that have been used in this study, in order to check the acceptability of the model. The Ramsey's RESET Test is applied to check for specification error in the estimated model.

Table 12: Ramsey's RESET Test

	Value	*DF*	*Probability*
t-statistic	*1.666540*	*28*	*0.1068*
F-statistic	*2.777354*	*(1, 28)*	*0.1068*

Source: Author's Estimation Using Eviews 10

Ramsey's RESET results in Table 12 show that the equations are in their correct functional form. Therefore, the model is correctly specified. The homoscedastic distribution of the residual variance of the model is very important for the model to give good and reliable results

Table 13: Breusch–Pagan–GodfreyHeteroskedasticity Test

F-statistic	*1.172942*	*Prob. F(9,29)*	*0.3480*
*Obs*R-squared*	*10.40797*	*Prob. Chi-Square(9)*	*0.3185*
Scaled explained SS	*10.58184*	*Prob. Chi-Square(9)*	*0.3055*

Source: Author's Estimation Using Eviews 10

The table shows that the residuals are homoscedastic in the model. This study employs pair-wise correlation analysis, which is widely used for detecting multicollinearity.

Table 14: Correlation Analysis

Variables	*LnY*	*LnL*	*LnK*	*LnB*	*LnD*
LnY	*1*				
LnL	*0.9948*	*1*			
LnK	*0.9924*	*0.9819*	*1*		
LnB	*0.950*	*0.9697*	*0.9218*	*1*	
LnD	*0.9555*	*0.9717*	*0.9197*	*0.9770*	*1*

Source: Author's Estimation Using Eviews 10

Table 14 represents that, the model is free from perfect multicollinearity since there is no exact linear relationship between the variables. The absence of serial correlation is vital for time series investigation.

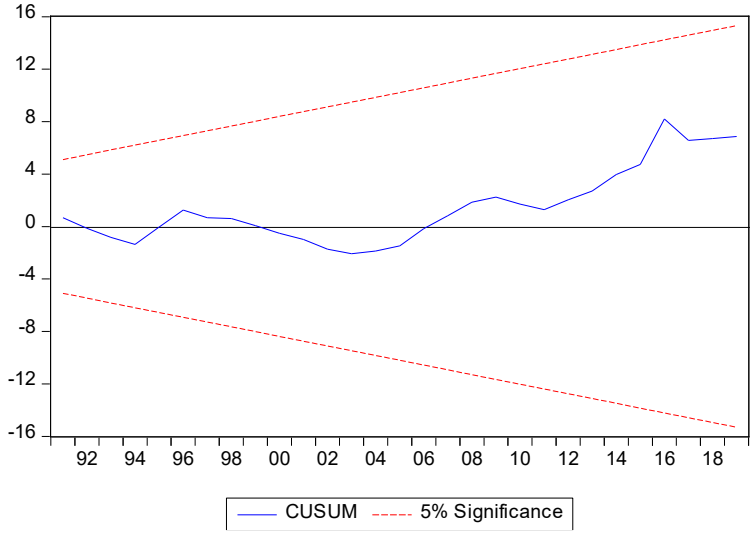
Table 15: Serial Correlation LM Test

F-statistic	*0.443593*	*Prob. F (1,28)*	*0.5108*
Obs R-squared*	*0.608225*	*Prob. Chi-Square (1)*	*0.4355*

Source: Author's Estimation Using Eviews 10

Results from the Table 15 show that that no autocorrelation at lag order exists in the model. We can verify the existence of structural stability for the estimated parameters of the selected ARDL model based on error correction model using Cumulative Sum Of Recursive Residuals (CUSUM) test.

Figure 1: Plot of CUSUM Test



The plot of CUSUM is lying within the 5% critical limit, which is depicted in Figure.1. We have found that the model is dynamically srable.

IV. Conclusions

There prevails a considerable degree of ambiguity regarding the role of financial development on economic performance of Bangladesh. Therefore, how financial development influences economic growth of Bangladesh is a matter of great interest to the researchers, academics and the policymakers. The fundamental objective of this study is to explore the link between financial development and economic growth in Bangladesh. The level equations have revealed that broad money as a percentage of GDP as well as domestic credit to private

sector as a percentage of GDP have positive influence on economic growth in the long run. This positive association between financial development and GDP has been shown by several studies i.e. Arouri et al.(2014), Biplob and Halder(2018) and Golder et al.(2022). Besides large firms, there are a huge number of small firms in Bangladesh. According to Cestone and White (2003), for producing goods and services, small firms feel the necessity of capital and depends highly on institutions that can provide them the required loan. In this case, domestic credit to the private sector lessens the budgetary constraints, makes movement of extra fund into the financial system, and thereby magnifies the private sector investment. Through the channeling of investment, this credit then raise the production of goods and services, flourish the export oriented industries and thereby enhances the overall economic growth in the long run. Increase in broad money supply in the long run reduces the investment risk, confirms the diversification in financial instruments and better financial services, increases financial activities, improves productivity of financial sector through the technological advancement and thereby magnifies the degree of financial depth, long term investment as well as accelerates the economic growth of developing countries like Bangladesh. This statement is consistent with Arouri et al.(2014), Qamruzzaman and Wei(2018) and Biplob and Halder (2018). Broad money supply is also essential for better management system in credit institution as it helps the credit institutions to have available funds for providing loans (Islam, 2022). Here, gross capital formation is positively associated with economic growth. As capital increases the level of investment, enhances job opportunities, improves the productive capacity as well as amplifies the production of goods and services, higher level of gross capital formation is helpful for boosting economic growth of Bangladesh through the channel of investment. Labour is inversely related to the economic growth here. It indicates that a huge number of workers in Bangladesh, are unskilled and inefficient. They have less productive capacity due to the lack of appropriate training, technical education, required level of education, advanced technologies and proper monitoring etc. As a result, they can't play appropriate role for boosting economic growth. This statement is consistent with Haque et al.(2019), Ahmed et al.(2020) and Siddikee and Rahman (2021). Moreover, the current system of recruitment in Bangladesh does not make proper collaboration among educational background and acquired skills with the job they are appointed with. So, the appointed workforce can't play proper and satisfactory role in enhancing economic performance.

In the short run, the influences of labour, capital and broad money on the economic growth are analogous to long run. But domestic credit to private sector as a percentage of GDP has negative influence on economic growth which is reverse of the long run findings. When credit moves from credit institution to various firms, it requires much time to make proper channeling of investment with a view to ensuring higher economic growth. A higher volume of private investment is injected to the various new ventures and this requires a long span of time to make positive and satisfactory influence on economic growth. So, in the short run, due to insufficient time, private sector credit is unable to make proper channeling of investment that hinders economic development (Siddikee and Rahman, 2021). Moreover, in the short run, the output of capital formation may be less than optimum and people have less access of information in financial market. Moreover, a unidirectional causality exists between broad money as a percentage of GDP to domestic credit to private sector as a percentage of GDP. In case of necessity of loan, stable money supply growth can provide credit institutions the required fund. Hence, broad money supply raises domestic credit to private sector. This result is supported by (Islam, 2022). Finally, it can be stated that financial development enhances economic growth of Bangladesh but it is not the only determining factor of economic growth in Bangladesh. The impact of financial sector development on the economic performance of Bangladesh differs in different periods, different proxies and different control variables. Hence, the author recommends some policies for implementation.

- To encourage savings, investment and to promote more efficient allocation of financial resources, the government should set an efficient credit management system.
- The government should maintain a stable growth of money supply that enhances economic growth with the stability in the rate of inflation.
- In isolation, Financial Reform policy can't work properly. So, the government should coordinate the appropriate fiscal and monetary policies with financial policy.
- The credit should be allocated to the genuine and productive investors.
- The government should increase investment in human capital development to increase the educated participants in financial sector as they contribute more in financial sector development by their improved knowledge.
- Establishing more technical schools, colleges and training institutions to ensure the availability of skilled and trained workforce that boosts economic growth.
- Emphasis should be given to increased capital formation in the economy.

Although the study has taken utmost care to maintain precision, it is not free from shortcomings. As the data are secondary in nature, the findings may be away from real scenario. According to various investigations, financial sector development is determined by several cultural and economic factors where only two indicators may be unable to represent the actual impact of financial development on economic growth as interaction effect

between several indicators of financial development is not taken into account here. Therefore, the role of financial development on economic growth by taking into account cultural, political and religious influence in financial sector may be an important topic of investigation. Future research can be done by utilizing primary data from various entities of financial sector to obtain reliable findings. Researchers can conduct several studies by making financial development index where more indicators of financial development will be incorporated. Further study can also be done to find out several factors behind the negative association between employed labor forces and economic growth of Bangladesh and for suggesting the mechanism of enhancing the productivity of employed workforces.

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