Banking Sector Development and Economic Growth in Bangladesh: An Empirical Analysis

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Abstract

Economic growth and banking sector development are closely related or not is critical question empirically. This study attempts to examine the relationship between economic growth and financial development where some banking sector indicators have been used as financial development indicator from 1980 to 2016. The paper has used Augmented Dickey-Fuller and Philips- Perron test to test for the existence of unit root, Co-integration test to examine long run relationship and Granger Causality test to find out whether there is any causal relationship. In addition, vector error correction method has been applied to find out the speed of adjustment and the dynamics of relationship. The empirical evidence confirms that the banking sector development causes economic growth. In fact, financial development is one of the prime cause for economic growth in short-term and long-term dynamics. Based on the empirical findings, this study recommends that it is necessary to improve the efficiency and effectiveness of the financial system.

Key Words**:** *Bank credit, Broad money, Per capita gross domestic product*

JEL Classification: *C51, E44, E47, G34, O11*

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I. Introduction

Economic growth is considered as one of the crucial objectives by the world of the countries more than half a century. However, investment and production, the two main requirements of the development, take place through transformation of surplus financial resources of the economy by financial institutions. Especially, developing countries face many economic problems like as unemployment, poverty, low living standards and inflation. Thus, these countries always try to increase their national income and hence create more jobs with maintained economic growth.

In fact, financial and banking sector development leads to the increase in economic growth in any economy through financing economic development. This argument has been confirmed by many of empirical researches worldwide. Most of the researchers argue that financial intermediation especially bank helped inch up productivity of the economy and bank is an essential instrument for innovation and development in any developing and underdeveloped country (Schumpeter, 1911).

The pace of the growth of real economy highly depends on banking system as it has the ability to facilitate investment through channeling funds from savers to borrowers in an efficient way. Its role in providing entrepreneurs required loans in order to finance the adoption of new production techniques. Hence, facilitate financial intermediating activities and contributing on economic expansion to the most of economic sector such as; Agriculture, industry and trade sector. Banking industry contributes to the formation of initial capital for investment projects and increasing capability to drive real growth by finding and employing new combination of factor use (Allen and Ndikumana, 1998; Blum, et al., 2002).

The economy of Bangladesh continues to perform well during the last few years with significant growth in private consumption and investment. Though historically the economy witnessed an increasing trade deficit with higher import growth and slower export growth, in recent few years export increases notably, therefore private investment and private credit has increased. Banks credit supply laid a strong support to growth of production and employment. So to keep pace with continuous higher GDP growth rate monetary authority has taken initiative to monitor private credit for ensuring financial stability and reduce nonperforming credit.

However, the causal relationship between banking credits and economic growth has been widely debated and controversial in financial literatures. Significant work has been done by Gurley and Shaw (1955) and Goldsmith. They argue that financial institutions stimulate economic growth and that under-developed financial systems retard economic growth. Hicks (1969) stated supply leading effect of financial system on economic growth, where the financial system contributed by providing more funds in terms of credit. Similarly, King and Levine (1993) and Miller (1998) asserted that economic growth is a result from financial development. This implies that financial development has significant positive impact on economic growth. Therefore, this paper empirically analyzes the relationship between banking sector development and economic growth of Bangladesh.

In this regard, broad money (M2) as money supply indicator, domestic credit and private sector credit have been used as predictors of economic growth.
Per capita Gross domestic product (GDP) has been used as a proxy of economic growth rate. Therefore, the results contribute to the knowledge by appraising the influence of financial intermediations density on economic development. Consequently, this paper argues that the unidirectional and bidirectional causality between the financial development and economic growth in Bangladesh.

The algorithm of the study is organized as follows: section II focuses the previous literatures related to banking sector development and economic growth. Section III presents Data and Methodology and Section IV Empirical Result. Section V conclusions and Recommendations.

II. Review of Literature

The directional association between financing and economic growth has confirmed the significant and positive relationship between banking sector development and economic growth.

Existing literature has supported the linkage between banking sector development and economic growth. The supply-leading hypothesis was logically argued out by McKinnon (1973) and Shaw (1973) logically proved the supply leading hypothesis that confirms the accelerating effect of the development of banking services and financial activities on economic growth.

In 1993, King and Levine has performed a study and found that financial markets, especially banks play a significant role in the growth of real economy by providing required funds in terms of credit to entrepreneurs to finance investment which stimulate the movement of economic activities.

Nevertheless, using data of sixteen developing countries in 1996 Demetriades and Hussein found the causal relationship between financial development and economic growth but argued no meaningful relationship.

Likewise, Miwa et al (2000) explored that the Japanese economy developed their own fund of manufacturing firms through decentralized and competitive capital markets rather than banking credits supply.

Using data from developing and industrial countries Calderon and Liu (2003) found bidirectional causality between financial development and economic growth and they suggested that over long period of time financial depth has significant contribution through the causal relationship in the developing countries.

In 2006 a strong supply- leading relationship between banking sector and economic growth in emerging and developing countries has been tested by Hshin-Yu Liang and Alan Reichert using Granger causality and Odedokun model to conclude the results.

Furthermore, Christopolus and Tsionas (2004) examined the relationship between financial development and economic growth in ten developing countries and found no causal link between financial deepening and output growth in the short run while they found unidirectional though no bidirectional causality between financial developments to output in the long run.

In Bangladesh, Rahman (2007) investigate the causal relationship between financial development and economic growth in Bangladesh, particularly the long-run impact of financial development on capital formation and per capita income.

Sikder and Wadud and Hasan (2015) investigate the presence of long-run relationship between financial development and economic growth in Bangladesh and India. They are found the evidence of bidirectional causal relationship between financial development and economic growth in both countries.

In some neighborhood countries, Gautum (2014) examined the relationship between economic growth and financial development in Nepal using data from 1975 to 2012. He found the evidence which confirms that the financial development causes economic growth. In fact, financial development is the cause for economic growth in terms of short-term dynamics, while economic growth sustains financial development in the long-run.

Petkovski and Kjosevski (2014) investigate the negative relation between economic growth to bank credit and interest margin in central and south Eastern Europe. They used bank credits, interest rate and ratio of quasi money as independent variables while gross domestic product as proxy variable.

However, Abubakar and Gani (2013) re-investigated the long-run relationship between financial development indicators and economic growth in Nigeria. The findings of the revealed that in the long-run, liquid liabilities of commercial banks and trade openness exert significant positive influence on economic growth, conversely, credit to the private sector, interest rate spread and government expenditure exert significant negative influence.

Recently, Medjahed and Gherbi (2016) investigated the impact of development of banking sector on economic growth in MENA countries. They found that negative impact of financial development on economic growth of MENA countries during short and long-run.

Similarly, Furqani and Mulyany (2009) investigated the dynamic interactions between Islamic banking and economic growth of Malaysia by employing the co-integration test and Vector Error Model (VECM) to see whether the financial system influences growth and growth transforms the operation of the financial system in the long-run. They found the evidence of bidirectional relationship between Islamic bank and fixed invest and there is evidence to support demand following hypothesis of GDP and Islamic Bank.

Abdulh and Omar (2012) examine the short-run and the long-run relationships between Islamic banking development and economic growth in the case of Indonesia. They found a significant bi-directional relationship in short-run and long-run period between Islamic financial development and economic growth.

In addition, Prochniak and Wasiak (2017) examine the impact of financial system on economic growth for 28 EU and 34 OCED countries. Their empirical result shows a positive significant relationship between banking system and economic growth. However, some banking variables have negative effect on economic growth.

Furthermore, Bongini et al (2017) investigate the role of financial development in economic growth of Central, Eastern and South Eastern European Countries (CESEE) between1995-2014. They found CESEE economy benefits from the presence of foreign owned banks and those banks foster economic growth.

In fact, few studies in Bangladesh that primarily discussed and analyzed the role of financial development in fostering economic growth. So, this study adds new evidence from Bangladesh economy. Therefore, this study extends the existing literatures through examining the impact of banking trends on Bangladesh economic growth.

III. Data and Methodology

3.1 Data

This paper examines the impact of changes in banking sector on economic growth. So time series data over the period 1980-2016 has been employed to estimate the coefficients. Data are annually organized and its sources are Economic trends of Bangladesh bank and World Bank development Indicator. The choice of the time period in this study was entrusted to the data availability included in the estimated model. On other hand, this paper uses some financial indicators to measure the banking industry development such as domestic credit (DC), Private credit (PC), Broad money (BM). Moreover, it uses Per capita Gross domestic product as a proxy of economic growth.

3.2 Model and Variable

The econometric model has been employed in order to evaluate the impact of banking sector variables on per capita gross domestic product. Typically, the functional relationship between financial development and economic growth can schematically be formulated as follows:

$$\Delta\, PCGDP = f(PC, DC, BM)$$

Thus, this hypothetical model can be specified including logarithm for banking indicators as follows:

$$\text{Log PCGDP}_t = \beta_0 + \beta_1 \text{ Log PC}_t + \beta_2 \text{ Log DC}_t + \beta_3 \text{ Log BM}_t + \upsilon_t \qquad \ldots\ldots\ldots (1)$$

Where, PCGDP represents log of per capita GDP at time t. β_0 represents constant or intercept term. Further, coefficients of explanatory variables include β_1, β_2 and β_3 represents the effect of private credit, domestic credits, and broad money supply respectively. υ_t is the error term at the same time period.

3.3 Statistical Approaches

First of all, unit root test has been carried out to each series individually in order to test the time series properties of the data. Non-stationary data contain unit root and generates spurious result. Here, Augmented Dickey-Fuller Test (ADF)[2] test statistics are computed.

Testing number of co-integrating relationships(r) is an important issue in this analysis because the long run relationship among variables cannot be indentified if $r \neq 1$. The result is derived using Johansen Co-integration Test.

Following Johansen (1988), we employ two likelihood ratio tests namely Eigen value [λ_{max} (r/*r* +1)] and trace statistic [$\lambda_{max}(r / p)$] tests for the determination of r as follows:

$$\lambda_{max}(r / p) = -T \sum_{i=r+1}^{P} \log (1 - \lambda i) \qquad \ldots\ldots\ldots\ldots\ldots (2)$$

[2]The error in DF test might be serially correlated

$\lambda_{max}(r / r+1) = -T\log(1-\lambda i)$ …….(3)

Where λcomputed Eigen value up to p is lags and *p* is chosen up to the level which removes serial correlation. Equation (2) tests the null hypothesis that there are at most *r*co-integrating vectors against *k* where *k* is number of variables used in the model, whereas Eq. (3) tests the null hypothesis of *r* co-integrating vectors against the alternative of *r* +1. In this setting, a significant and positive sign of l indicates that financial development has a positive impact on economic growth. However, a negative sign of parameters implies contractionary impact and insignificant coefficient of the parameter denotes no effect on economic growth. The critical values for examining the λ_{max} (r/*r* +1) and $\lambda_{max}(r / p)$ are taken from Osterwald-Lenum (1992).

It is also to be noted that the co-integration tests are very sensitive to the choice of lag length. Following Islam et.al. (2004) and Tahir (2008) after confirmation of the existence of co-integration between the variables in the equation, the Granger Causality test has been performed.

The traditional practice in testing the direction of causation between two variables is the Granger causality test. According to Granger (1988), X causes Y if the past values of X can be used to predict Y more accurately than simply using the past values of Y. In other words, if a past value of X improves the prediction of Y with statistical significance, then we can conclude that X "Granger Causes" Y. The Granger causality test consists of estimating the following equations:

$$Log\ PCGDP_t = \beta_t + \sum_{i=1}^{n}\beta_{1i} Log\ PCGDP_{t-i} + \sum_{i=1}^{n}\beta_{2i}\ LogPC_{t-i} + \sum_{i=1}^{n}\beta_{3i} Log\ DC_{t-i} + \sum_{i=1}^{n}\beta_{4i}\ LogBC_{t-i} + U_t \quad \ldots\ldots\ldots\ldots\ldots (4)$$

$$LogPC_t + LogDC_t + LogBM_t = \alpha_0 + \sum_{i=1}^{n}\alpha_{1i} Log\ PC_{t-i} + \sum_{i=1}^{n}\alpha_{2i} Log\ DC_{t-i} + \sum_{i=1}^{n}\alpha_{3i}\ LogBM_{t-i} + \sum_{i=1}^{n}\alpha_{4i}\ LogPCGDP_{t-i} + V_t \quad \ldots\ldots\ldots (5)$$

Where U_t and V_t are uncorrelated and white noise. Causality of financial development indicators to economic growth may be determined by estimating Equations (4) and (5) and testing the null hypothesis that $\sum_{i=1}^{n}\beta_{2i}$, $\sum_{i=1}^{n}\beta_{3i}$, $\sum_{i=1}^{n}\beta_{4i}$ =0 and $\sum_{i=1}^{n}\alpha_{4i}$ =0 against the alternative hypothesis that $\sum_{i=1}^{n}\beta_{2i}$, $\sum_{i=1}^{n}\beta_{3i}$, $\sum_{i=1}^{n}\beta_{4i}$ ≠0 and $\sum_{i=1}^{n}\alpha_{4i}$ ≠0 for equations (4) and (5) respectively.

If the coefficient of $\alpha_{1i,}$ α_{2i}, α_{3i} is statistically significant but β_{1i} is not statistically significant, then Log PCGDP is said to have been caused by Log PC, Log DC and Log BM (unidirectional). The reverse causality holds if coefficients of $\beta_{2i,}$ $\beta_{3i,}$ $\beta_{4i,}$ are statistically significant while α_{4i} is not. But if both $\beta_{2i,}$ $\beta_{3i,}$ β_{4i} and $\alpha_{1i,}$ α_{2i}, α_{3i} are statistically significant, then causality runs both ways (bi-directional).

The evidence of co-integration allows using a vector error correcting modeling of the data to formulate the dynamics of the system. If both variables Log PCGDP and Log PC, Log DC, Log BM are co-integrated then there is a long run relationship between them. Short-run relationship between the variables will be conducted using error correction model (ECM) under the frame work of co-integrating relationship.

According to Engle and Granger (1987), the Error Correction Model can be specified as follows for any two pairs of test variables:

$$\Delta Log\ PCGDP_t = p_1 Z_{t-1} + \alpha_1 Log\ PC_t + \alpha_2 Log\ DC_t + \alpha_3 Log\ BM_t + U_{1t} \quad \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$\Delta LogPC_t + \Delta LogDC_t + \Delta Log\ BM_t = + p_2 Z_{t-1} + \beta_1 \Delta\ LogPCGDP_t + U_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Statistical significance tests are conducted on each of the lagged Z_t term in Equations (6) and (7). The coefficients of the Z_t reflect the short run disequilibrium in the model. The parameters, p_1 and p_2, are the speed of adjustment parameters in equation (6) and (7) when there is a discrepancy from long run equilibrium.

IV. Empirical Results

Table 1 presents the results of unit root test. The ADF Test results confirm that the time series data of the variables in the model are non-stationary in their level form. However these variables are found to be stationary in their first difference.

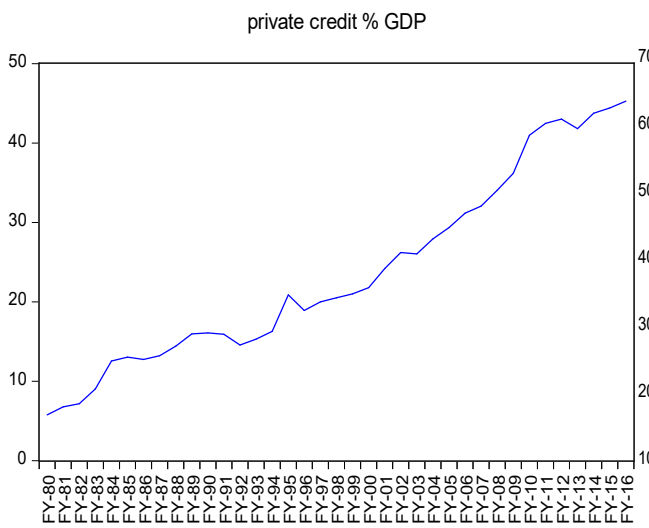
Table 1: Unit Root Test

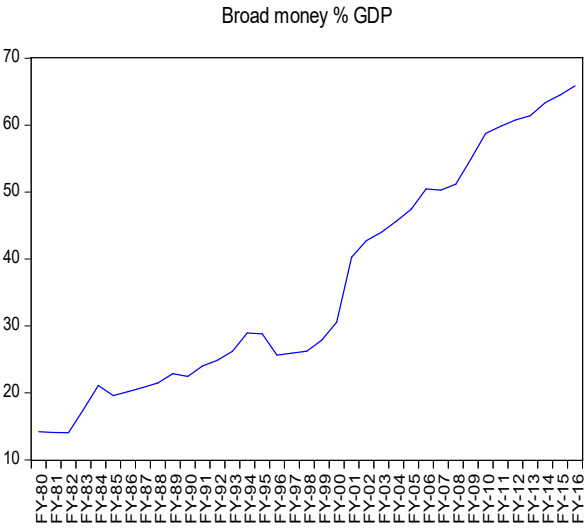
	ADF Test statistics (Level)		ADF Test statistics (First difference)		Order of Integration
Variables	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
PCGDP	18.8840	6.2997	0.4339	-3.2942**	I(1)
PC	0.36463	-1.5499	-5.7584*	-5.7620*	I(1)
DC	0.27151	-1.8419	-5.3157*	-5.3597*	I(1)
BM	0.6590	-1.9206	-4.5847*	-4.5908*	I(1)

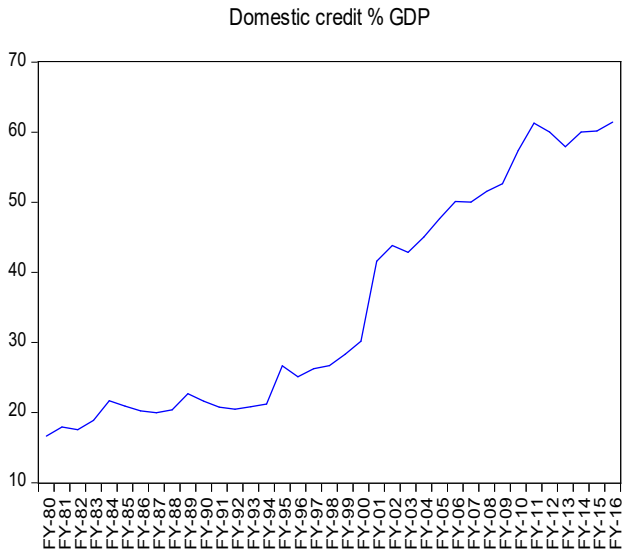
Note: Critical values for 1 percent, 5 percent and 10 percent are -4.2436, -3.5443, -3.2047 respectively.

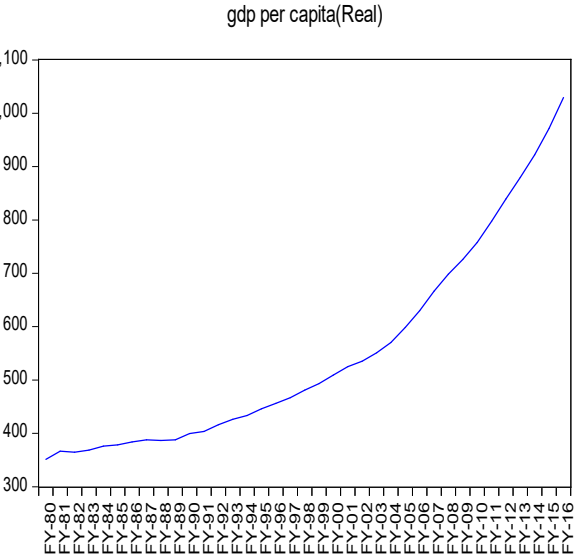
* (**) indicates stationarity at 1 percent and 10 percent significance levels respectively.

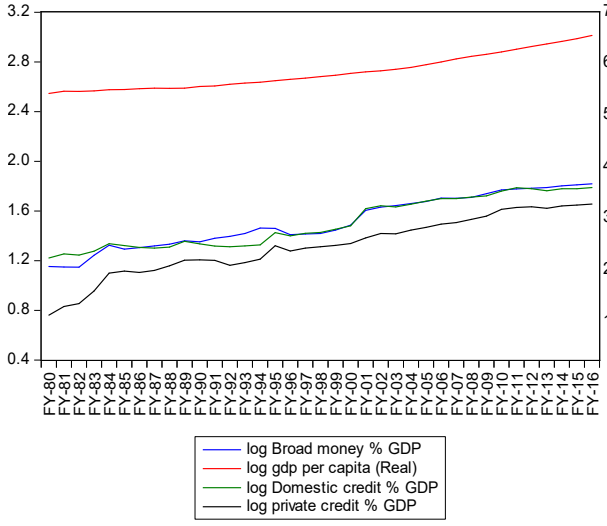
The result of Augmented Dickey Filler test shows that all variables are non-stationary at level but becomes stationary after taking first difference. That is, all variables are integrated of order one, I (1).


private credit % GDP


Broad money % GDP


Domestic credit % GDP


gdp per capita(Real)


log Broad money % GDP
log gdp per capita (Real)
log Domestic credit % GDP
log private credit % GDP

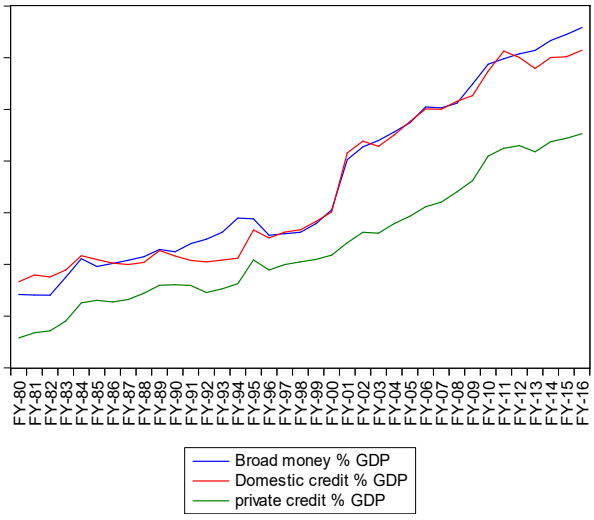

Broad money % GDP
Domestic credit % GDP
private credit % GDP

Table 2: Johnson's Co-integration Test

Null Hypothesis No. of Co-integrating Equation(s)	Eigen value	λ_{max}	Critical value 5%	probability	λ_{trace}	Critical value 5%	probability
r = 0	0.6605	37.8076	27.5843	0.0017*	67.2128	47.8561	0.0003*
r ≤ 1	0.4145	18.7362	21.1316	0. 1047	29.4052	29.7971	0.0554
r ≤ 2	0.2439	9.7862	14.2646	0.2263	10.6690	15.4947	0.2327
r ≤ 3	0.0249	0.8828	3.8415	0.3474	0.8828	3.8415	0.3474

* denotes rejection of the hypothesis at 1% level of significance.

Since all variables are integrated of order one, the best approach is Johnson co-integration approach. The result of Johnson co-integration approach is reported at table 2. The result reveals that there is a long run relationship among PCGDP, DC, PC, and BM. This is because critical value at 1% is less than the Trace and Max-Eigen-value. Both Max-Eigen value and trace statistic indicate 1 co-integrating relation.

Table 3: Granger Causality Test

Null Hypothesis	Lag 1	Lag 2	Lag 3
LPCGDP does not Granger cause LBM	1.0406 (0.3151)	1.9323 (0.1624)	1.5813(0.2169)
LBM does not Granger cause LPCGDP	1.0984 (0.3022)	3.2031 (0.0549)***	1.4808 (0.2420)
LDC does not Granger cause LBM	0.5310 (0.4713)	5.4253 (0.0097)*	3.4645 (0.0300)**
LBM does not Granger cause LDC	0.8044 (0.3763)	3.0383 (0.0629)***	2.2658 (0.1036)
LPC does not Granger cause LBM	0.0321 (0.8590)	3.9297 (0.0305)**	1.7373 (0.1830)
LBM does not Granger cause LPC	9.2150 (0.0047)*	7.0523 (0.0031)*	8.7504 (0.0003)*
LDC does not Granger cause LPCGDP	0.8680 (0.3583)	1.5954 (0.2196)	0.9593 (0.4262)
LPCGDP does not Granger cause LDC	0.5564 (0.4610)	0.5696 (0.5717)	0.2144 (0.8855)
LPC does not Granger cause LPCGDP	0.0036 (0.9527)	2.4164 (0.1064)	0.1819 (0.9077)
LPCGDP does not Granger cause LPC	5.19634 (0.0292)**	3.5850 (0.0402)**	3.8327 (0.0208)**
LPC does not Granger cause LDC	9.6E-05 (0.9922)	0.1422 (0.8680)	0.3571 (0.7844)
LDC does not Granger cause LPC	3.9264 (0.0559)***	1.9225 (0.1638)	3.4698 (0.0298)**

Note: The value inside the parenthesis is probability and outside parenthesis is F-Statistic.

*/ **/ *** indicates rejection of hypothesis at 1%, 5% and 10% significance levels respectively.

To examine the causal relationship among PCGDP, DC PC and BM, Granger causality test is used. It is possible to determine the direction of causality among variables using the test. The result of the Granger Causality Test between economic growth and variables of financial development are reported in table 3. The second row in the table shows unidirectional causality from broad money supply to per capita GDP at lag 2. The third and fourth rows in the table show no causality between domestic credit and per capita GDP. The last row in the table shows unidirectional causality from per capita GDP to private sector credit at all lags. Thus, the result shows that the past values of economic growth and variables of financial development granger causes for each other. The analysis confirms the unidirectional and bidirectional causality between the financial development and economic growth in Bangladesh during the period FY1980-2016.

Table 4: VEC Estimates

Regressors	D(LPGDP)	D(LPC)	D(LDC)	D(LBM)
Constant	0.0082 * (0.0019)	0.0124 (0.0132)	0.0165 (0.0143)	0.0179 (0.0119)
D(LPGDP(-1))	0.3576* (0.1301)	0.3648 (0.9139)	-0.2970 (0.9900)	0.3306 (0.8220)
D(LPC (-1))	0.0089 (0.0.02)	-0.0079 (0.2123)	-0.1978 (0.2300)	-0.3946** (0.1910)
D(LDC (-1))	-0.0382 (0.0351)	-0.4903*** (0.2464)	-0.2010 (0.2669)	-0.2231 (0.2216)
D(LBM (-1))	0.0237 (0.0313)	0.7787* (0.2200)	0.5743** (0.2383)	0.5634** (0.1978)
Error correction terms	-0.0147* (0.0032)	0.0453** (0.0224)	0.00023 (0.0243)	0.0425** (0.0202)
Adjusted R^2	0.6871	0.4133	0.1854	0.3564

Note: The values inside the parentheses are standard errors and outside parentheses are Coefficients.

*/ **/ *** indicates coefficients are significant at 1%, 5% and 10% level respectively.

VEC estimates have been obtained to find the speed of adjustment in long run relationship. The result presented in table 4 indicates that the error correction term is -0.0147 with standard error 0.0032 which is statistically significant at 1%. The result supports the existence of long run relationship running from financial development to economic growth.

V. Conclusions and Recommendations

This paper examined the impact of banking sector development on economic growth in Bangladesh during the period from 1980 to 2016 using the VEC model approach. Three explanatory variables have been used to measure banking sector growth such as private sector credit, domestic credit, and broad money while per capita gross domestic product to measure economic growth in Bangladesh.

In summary, banking sector development has a positive impact on economic growth in short and long run. Especially private sector credit has strong effect on economic growth.

Conclusively, private sector credit from banks is the main determinant of economic growth in Bangladesh and is considered the core internal funding source for Bangladesh economy. However, funding for economic sectors in Bangladesh is relatively low and under the required level. Therefore, this finding could be interesting for some policymakers.

Based on empirical findings this paper recommends that banks should lower cost of lending in order to provide more space for domestic funding and to improve their credit policy in the aim of reinforcing local fund raising capacity and investments. Indeed, the most important implication for this study is that Monetary Authority should develop an efficient credit allocation system in order to sustain economic growth.

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