

Bangladesh at 50 Does Bank Financing Propel Economic Growth in Bangladesh?*

Dr. Md. Golzare Nabi¹

Md. Syedul Islam²

Md. Jasim Uddin³

Md. Sanaullah Talukder⁴

ABSTRACT

The current paper attempts to explore the role of bank financing in economic growth in Bangladesh during the post-independence period. To this end, it would apply Co-integration and Vector Error Correction Model (VECM) to examine the impact of bank financing on Bangladesh GDP during 1980-2020. The empirical results confirm the superior role of bank financing in spurring GDP in Bangladesh. The paper suggests for choosing bankable projects with proper feasibility study to avoid diversion of funds and keep non-performing loan (NPL) at tolerable limit. It also recommends for developing capital market for long-term financing to lessen the adverse impacts of maturity mismatch in funds of banks. In this case, Islamic Shariah compliant sukuk based financing model can ease the pressure on banks by financing industrial and infrastructural projects in more sustainable way.

Keywords: GDP Growth, Bank Financing, Sukuk, Bangladesh.

JEL Classification: E01, E21, E22, E23, G21, O4.

¹ Director (Research), Bangladesh Bank Training Academy, e-mail: golzare.nabi @ bb.org.bd, golzare@gmail.com.

² Additional Director (Research), Research Department, Bangladesh Bank, e-mail: syedul.islam@bb.org.bd

³ Additional Director (Research), Research Department, Bangladesh Bank, e-mail: jasim.uddin@bb.org.bd

⁴ Additional Director (Research), Research Department, Bangladesh Bank, e-mail: sanaullah.talukder@bb.org.bd

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1. Introduction

Bangladesh has reached at 50 years in 2021 after attaining independence in 1971. On the eve of independence, she inherited a war-torn agrarian economy with an array of challenges of abject poverty, high unemployment, weak physical infrastructure and poor condition of social development. Defying all negative projections, Bangladesh has achieved impressive economic growth during the last 50 years with some exceptions. She has drawn attention of economists, development partners, policy makers and academicians on robust economic growth earned during the last half century. A number of economists attempted to find out the factors affecting gross domestic product (GDP) in Bangladesh using elegant econometric models (Rahman, M. 2009; Rao, B. B., & Hassan, G. M., 2012; Beyer, R. C. M. & Wacker, K. M., 2022). Some studies like Hossain Altaf et al., (2017) and Paul U C, (2020) examined the role of bank financing in propelling GDP in Bangladesh and found direct association between bank finance and GDP growth. A growing number of empirical studies also supported the bank finance-growth nexus in developed and emerging economies (Levine, R., 2005; Garcia-Escribano, M. M., & Han, M. F., 2015; Durusu-Ciftci, D., et al., 2017). Empirical evidences reveal that though many factors affect GDP growth of a country, bank financing plays significant roles in promoting GDP in countries where capital markets are in initial stages (Khwaja (2009; Lin, 2009). Several factors such as macroeconomic stability, financial deepening, and arrival of new lending instruments along with rising economic growth have also contributed to rapid expansion of bank credit. Bangladesh as a lower middle-income country has experienced robust economic growth and fast expansion of bank credit during the last four decades, particularly since 1990s.

Bangladesh recorded higher GDP growth of 6.7% over the period of 2011-2020 which was 4% in 1974-1980, 3.7% in 1981-90, 4.8% in 1991-2000, 5.8% in 2001-2010. Bank financing also increased to support GDP growth as capital market is in poor condition. The ratio of private sector credit to GDP rose to 39.2% in 2020 which were 7.52% in 1974, 13.67% in 1980, 21.12% in 1990, 21.32% in 2000 and 33.95% in 2010 (World Bank, 2020).

Presently, Bangladesh financial sector consists of commercial banks, specialized banks, non-bank financial institutions, insurance companies, stock markets, microfinance institutions, and merchant banks. However, the banking sector

accounts for lion share of assets of the financial sector which comprises government commercial banks, public specialized development banks, local conventional private commercial banks, domestic Islamic private commercial banks and foreign-owned commercial banks. In fact, commercial banks play dominant roles in Bangladesh banking sector as capital market is underdeveloped. Among 59 banks, 56 operate as commercial banks comprising 6 state-owned commercial banks, 33 domestic conventional private commercial banks, 8 domestic Islamic private commercial banks and 9 foreign commercial banks in 2020. The domestic commercial banks comprising conventional and Islamic commercial banks are the major financial intermediaries in the banking industry accounting for 67.04% assets, 66.00% deposits and 74.94 % loans/advances of the entire banking sector in 2020 (Bangladesh Bank, 2020a).

GDP growth as the most important macroeconomic variable plays vital role to adopt key decisions in investment, trade, revenue, money and prices. Economic growth is also a potent tool for generating jobs, reducing poverty and improving the living standard of the people with the aid of better health, education and shelter (Rahman, M. M., et al., 2019). Bank financing plays as one of the key drivers to promote GDP in Bangladesh which is increasing with the expansion of economic activities particularly since 1990s due to mainly growing Readymade Garments (RMG) industry, construction sector, internal and external trade financing. As capital market is underdeveloped, banking sector has to work as the major player in financing economic activities in the country. The ratio of private sector credit to GDP stood at 39.2% of GDP in 2020 while the ratio of market capitalization of domestic companies to GDP was 24% in 2020 (World Bank, 2020). So, it is imperative to conduct research on bank finance-GDP nexus in Bangladesh with quality method based on long time span. Only a few studies attempted to find out drivers of Bangladesh Gross Domestic Products (GDP)'s growth (Biswas, B. P., & Masuduzzaman, M, 2016). Against this backdrop, the current paper seeks to find out the magnitude of contribution of bank finance on economic growth in Bangladesh during 1980-2020.

The objectives of the paper include (a) analyzing growth trend of gross domestic products (GDP) and bank financing in Bangladesh; (b) investigating determinants of Bangladesh gross domestic products (GDP)'s growth and suggesting for policy

options for sustained economic growth. To achieve the objectives of the paper, the paper would apply Vector Error Correction Model (VECM) based on secondary time series data.

After introduction, the remaining parts of the paper are structured as follows: Section 2 examines growth trends of gross domestic product (GDP) and banking financing in Bangladesh. Section 3 deals with review of literatures. Section 3 is devoted to explain research method. Section upholds empirical results and analysis. Finally, section 5 concludes with policy implications.

2. Growth Trends in Gross Domestic Product (GDP) and Banking Sector of Bangladesh

This section focuses on growth trends in Gross Domestic Product (GDP) and Banking Sector of Bangladesh during 1972-2020.

2.1 Trends in Growth of Gross Domestic Product (GDP) in Bangladesh

Bangladesh, a Muslim majority South Asian country became independent in 1971. With a geographical size of 1,47,570 square kilometers, she started its journey with a weak economy which was heavily dependent on agricultural sector. The economy started picking up during 1990s thanks to restoration of democracy in 1991 and undertaking massive reforms in financial, trade and other sectors. Such policies helped the economy attain higher GDP growth during 2000-2020 which leads to a fall in poverty rate substantially. Bangladesh has achieved significant human and social development even at a very low level of income by combating many constraints (Mujeri, 2014).

The size of GDP stood at USD 324.2 billion in 2020 which was USD 6.29 billion in 1972, USD 18.1 billion in 1980, USD 31.6 billion in 1990; USD 53.4 billion in 2000 and USD 115.3 billion in 2010. GDP per capita grew in the same direction as the size of GDP increased. Per capita income was USD 91.5 in 1972 which increased to USD 227.75 in 1980, USD 306.27 in 1990, USD 418.07 in 2000, USD 718.15 in 2010 and USD 1968.79 in 2020 (Table 1).

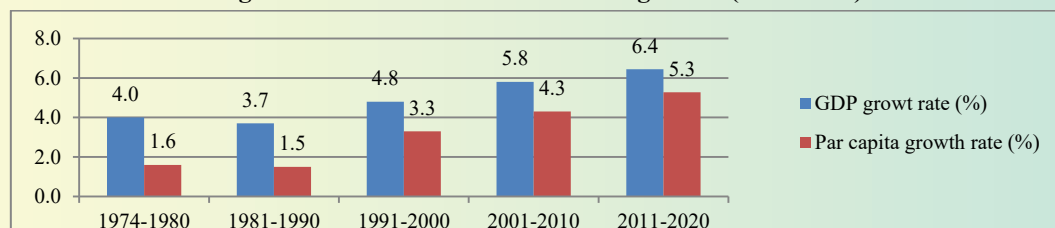
Table 1. GDP and GDP Per Capita in Bangladesh

Items	1972	1980	1990	2000	2010	2020
GDP (USD, billion)	6.29	18.1	31.2	53.4	115.3	324.24
GDP Per capita (USD)	91.5	227.75	306.27	418.07	718.15	1968.79

Source: World Development Indicators, World Bank.

Bangladesh experienced lower 4% GDP growth during 1974-1980 which decelerated further to 3.7% during 1981-90. Since 1990s, GDP growth started picking up due to higher productivity in agriculture and ready-made garments (RMG). It increased to 5.8% in 2001-2010 from 4.8% in the period of 1991-2000 and it further accelerated to 6.7% in 2011-2020. By the same way, per capita GDP increased during the same period (Figure 1).

Figure 1: GDP Growth Trend in Bangladesh (1974-2020)



Source: Bangladesh Bureau of Statistics (BBS).

Higher production in agriculture and export-oriented RMG sector, massive external remittance inflows, increasing banking finance, huge microfinance operations and improved rural infrastructures have contributed to promotion of GDP. Following continued economic growth, Bangladesh has achieved tremendous success in poverty reduction, higher literacy and life expectancy rate. Now Bangladesh economy faces some key challenges such as low productivity of labor, rising pressure in agricultural sector due to declining cultivatable land and unfavorable climate changes, heavy dependence of export sector on few items, price instability, energy supply gaps, increasing inequality and acute unemployment.

2.2 Growth Trends in Banking Sector of Bangladesh

On the eve of attaining independence in 1971, Bangladesh inherited a weak banking system which included 12 Banks owned by West Pakistanis, 2 banks owned by Bangladeshis, 3 foreign banks and 5 inoperative Indian banks. The banking sector had 1191 branches, deposits of BDT 5.24 billion and investment of BDT 4.25 billion in 1971 (Bangladesh Bank, 1973).

Bangladesh undertook rapid steps after independence to revamp banking sector for re-building war-ravaged economy by financing economic activities in line with objectives of the mass people. Bangladesh Bank as Central Bank was established

under Bangladesh Bank Order, 1972 and all commercial banks except foreign banks were nationalized under ‘The Bangladesh Banks (Nationalization) Order, 1972’. All commercial banks were re-organized and grouped into 6 nationalized commercial banks. For development of agricultural and industrial sector of the new born country, the two specialized banks were renamed and reorganized under government ownership. Bangladesh Bank as central bank adopted the directed monetary management tools which included fixing interest rates on deposits and loans and undertaking credit control steps for channeling credit to socially desirable sectors, namely Agricultural sector, exports and industries.

During 1970s banking sector was operated to implement the economic development objectives of the Government. Interest was kept at low level that hampered the commercial objectives of bank. Major portion of bank loan became overdue and profit of banks declined heavily. Thus, government-controlled credit policies, underpricing of financial resources and undue intervene created underperforming inefficient banking sector which was also occurred in banking sectors of other countries under financial repression paradigm (Thornton, 1991).

Following poor performance of the banking sector, the Government started undertaking reform measures during 1980s in order to inject competition and bring discipline and momentum in the banking sector. Under paradigm shift towards private sector, the Government allowed 6 private banks including a full-fledged Islamic bank in 1983 and privatized two nationalized commercial banks. Following different reform measures and continued robust economic growth over the years, Bangladesh banking sector grew in terms of number of banks, branches, deposits, loans/investments and financial deepening during 1973-2020. The Progress of Bangladesh banking system achieved during 1973-2020 is illustrated in Table 2.

Table 2: Developments of Banking System in Bangladesh (1973-2020)

Particulars	(BDT in Billion)					
	1973	1980	1990	2000	2010	2020
1. Number of Banks	11	14	24	50	47	59
SCBs	6	6	4	4	4	6
SBs	2	2	3	5	4	3
PCBs@	-	-	10	27	30	41
FCBs	3	6	7	13	9	9

2. Number of Branches	1295	3820	5539	6056	7246	10752
SCBs	1139		3545	3607	3394	3798
SBs	107		1145	1185	1365	1492
PCBs@	-	-	827	1231	2427	5531
FCBs	14		22	33	59	67
3. Total Deposits	7.02	28.07	203.67	709.81	3379.20	13791.5
SCBs	6.14	24.96	136.34	396.18	963.35	3585.28
SBs	0.12	1.27	9.43	42.32	177.94	349.78
PCBs@	-	-	50.48	215.07	1990.36	9250.37
FCBs	0.56	1.83	14.57	56.25	247.55	606.07
4. Total Loan/Advances	5.54	25.64	199.09	593.61	2574.44	10963.04
SCBs	4.47	20.01	103.60	288.05	558.12	2094.6
SBs	1.30	4.49	42.84	101.44	179.29	322.95
PCBs	-	-	40.63	173.11	1682.11	8199.15
FCBs	0.33	1.13	12.02	31.02	154.91	346.34
5. FD Indicators						
M2 to GDP (%)	21.92	24.54	30.23	31.53	45.52	43.3
Private Sector credit to GDP (%)	07.52	13.67	21.12	21.32	33.95	39.2

Source: Annual Report, Bangladesh Bank, Various Issues

Notes: SCB=State-owned Commercial Banks; SBs=State-owned Specialized Banks; PCBs=Private Commercial Banks; FCBs=Foreign Commercial Banks; BDT=Bangladesh Taka (Currency), FD=Financial Development

In spite of having progress during 1973-2020, currently Bangladesh banking industry encounters major problems such as higher financial intermediation cost, increasing non-performing loan (near 10%), concentration of loan in trading sector (34%) and low investment in social sectors such as agriculture, micro and small enterprises (5%) (Bangladesh Bank, 2020a,b,c).

3. Literature Review

Most economists have identified a number of factors affecting GDP of a country based on theoretical and empirical research. The neoclassical growth theory of Solow (1956) postulates that a country attains economic growth over time thanks to changes in the rates of population, saving (capital formation) and technological progress. The endogenous growth theory developed by Paul Romer (1986) and Robert Lucas (1988) stress on investment in research and development (R&D) and human capital (education) and adoption of new technologies for economic growth. Grossman and Helpman (1991) identified productivity factors (technological growth) as the key determinants of economic growth. Fischer (1992) opine that the growth process of a country also depends on efficiency enhancing factors of savings and investment which include macroeconomic stability, good governance and social infrastructures.

Researchers have used different variables in the empirical research for pointing out determinants of economic growth (Udejaja, E. A., & Onyebuchi, O. K. 2015; Rahman, M. M., et al., 2019). The key variables used by researchers include financial development, international trade, government expenditure, energy consumption, savings rate, total factor productivity, investment rate, inflation, education, infrastructure, budget deficit, foreign direct investment and technological progress and diffusion. We examine some relevant studies to explore theoretical framework for finding out role of bank financing (financial development) and other relevant factors which affect Bangladesh GDP over the years.

Garcia-Escribano, M. M., & Han, M. F. (2015) explored the contribution of credit growth and the composition of credit portfolio (corporate, consumer, and housing credit) to economic growth in emerging market economies (EMs). Using cross-country panel regressions, the study found significant impact of credit growth on real GDP growth, with the magnitude and transmission channel of the impact of credit on real activity depending on the specific type of credit. In particular, the results showed that corporate credit shocks influence GDP growth mainly through investment, while consumer credit shocks are associated with private consumption.

Fetahi-Vehapi et al. (2015) attempted to analyze the effects of openness to trade on economic growth of South East European (SEE) countries over the period 1996 to 2012. The authors used pooled Ordinary Least Squares (OLS), fixed effects and first differenced generalized method of moments (GMM) for robust estimation of the model. The estimation results indicate that the positive effects of trade openness on economic growth are conditioned by the initial income per capita and other explanatory variables, otherwise there is not robust evidence between the two variables.

Leon (2016) distinguished the effects of household and enterprise credit on economic growth covering 143 countries over the period 1995-2014. The paper found that overall credit has not been related to growth in the past two decades and household credit tends to be negatively related with growth.

Usman, O.A. and Adeyemi, A.Z. (2017) examined the relationship and direction of causality between financial system development and economic growth in

Nigeria using the data from 1970 to 2013. Johansen co-integration technique was used to test long run relationship among the variables while Granger causality test was used to investigate the direction of causality between financial system development indicators and economic growth. The results showed that there was long run relationship between financial system developments and economic growth. Also, there was unidirectional causality, running from financial system development to economic growth in Nigeria, and there was no feedback effect.

Akinsola, F. A., & Odhiambo, N. M. (2017) surveys the existing literatures on the association between inflation and economic growth in developed and developing countries. The authors found four types of relationships between inflation and economic growth based on empirical studies. The first type of finding reveals no impact of inflation on growth while the second category shows a positive impact of inflation on economic growth. The third kind of finding exhibits negative impact between inflation and economic growth while the fourth category of finding demonstrates that inflation impacts economic growth in terms of certain threshold.

Rahman (2009) re-examined the effects of exports, FDI and expatriates' remittances on real GDP of Bangladesh, India, Pakistan and Sri Lanka during 1976 to 2006. Mixing of stationary and non-stationary variable of sample countries are performed by autoregressive distributed lag (ARDL) model. In case of Pakistan, bi-directional causality is observed. Consequently, VAR model was performed. For the country, Bangladesh, India and Sri Lanka co-integration was found, which is done by VEC model. Findings reveal that close similarities of long-run and short-run dynamics of the variables between Bangladesh and India exist.

Rao, B. B., & Hassan, G. M. (2012) developed a framework to analyze the determinants of the long-term growth rate of Bangladesh. The paper used the Solow (1956) growth model and its extension by Mankiw et al. (1992) and followed Senhadji's (2000) growth accounting procedure to estimate Total Factor Productivity (TFP). The Growth Accounting Exercise (GAE) shows that growth rate in Bangladesh, until the 1990s was primarily due to factor accumulation. Since then, however, TFP has made a small positive contribution.

Hossain Altaf et al., (2017) intended to find important financial factors causing economic growth in Bangladesh during the period 1988-2013 using Factor Analysis on some selected indicators of Bangladesh financial sector. Their paper attempted to check whether the identified financial factors cause economic growth or economic growth causes financial factors using the Granger–Causality test. Being consistent with economic sense, Granger–Causality test shows that no financial factor significantly causes economic growth rather economic growth causes “depth/stability” (‘private credit + capitalization’ /non-performing loan) factor of financial sector during the period. In summary, on average, financial sector of Bangladesh is being unstably (being increased non-performing loan) deepened with response to the demand of economic growth since 1988.

Paul U C (2020) investigated into the causal relationship between private sector credit growth and economic growth in Bangladesh by using annual time series data over the period of 1976-2017. The author used the Autoregressive Distributed Lag (ARDL) Approach to investigate the relationship. In addition, this paper examined the direction of causality by adopting the Toda-Yamamoto procedure of Granger Causality test. The empirical results showed that the annual growth rate of private sector credit (PC) and industrial production index (IPI) have a positive and significant effect on annual growth rate of GDP in both long-run and short-run. But there is only a short-run positive effect of export (X) and a negative effect of broad money (M2) on GDP growth rate. Finally, the results of the Toda- Yamamoto Granger Causality test found that there is unidirectional causality from GDP growth rate to private sector credit growth rate.

4. Research Method

This sub-section focuses on methodological issues to examine the bank finance-growth nexus in Bangladesh.

4.1 Data and its Sources

We collect data on relevant variables over the period of 1980 to 2020 from World Development Indicators published by World Bank and Annual Report 2020, Bangladesh Power Development Board and Bangladesh Bureau of Statistics. We use data since 1980 as volatility persisted in the economy of Bangladesh during

1971-1979 following economic damage owing to independence war in 1971, oil shock in 1973 and food crisis in 1974.

4.2 Model Specification

We specify the following regression model for determining relationships between GDP growth and its major variables affecting GDP in Bangladesh during 1980-2020 after reviewing of literatures on relationship between GDP growth and its key determinates.

$$gdp = f(psc, gc, openness, cpi, powerpc) \text{-----}(1)$$

where gdp, psc, gc, openness, cpi, powerpc indicate nominal gdp, private sector credit by banks, government consumption (expenditure), consumer price index and per capita power consumption.

By taking natural logarithm both sides we get-

$$\ln gdp = \beta_0 + \beta_1 \ln psc + \beta_2 \ln gc + \beta_3 \ln openness + \beta_4 \ln cpi + \beta_5 \ln powerpc + \epsilon_i \text{-----}(2)$$

As the model is in logarithm form, the coefficient will express the elasticity of the variables. So we focus on the values of β .

We include bank financing to private sector in the model as Bangladesh hinges significantly on it due to underdeveloped capital market and low level of foreign capital inflow following other studies (King, R. & Levine, R. 1993; Levine, R. 2005; Jedidia et al., 2014; Durusu-Ciftci et al., 2017).

As Bangladesh spends significant amount of funds in the Government sector, we incorporate Government expenditure in our model to capture its effects on GDP as suggested by other studies (Cooray, A., 2009; Dao, M. Q., 2012; Churchill, S. A., et al., 2015).

Bangladesh has adopted an export-oriented economic growth strategy in order to reap benefits of globalization. A number of studies cited that trade spurs growth due of enhanced economies of scale and adoption of new technology (Frankel, J.N. and Romer, D., 1999; Fetahi-Vehapi, M., Sadiku, L., & Petkovski, M., 2015). Inspired by other studies, we include trade in the model to find out its impacts on GDP.

We consider inflation in the model to capture its effects of on GDP as recommended by some studies (Akinsola, F. A., & Odhiambo, N. M., 2017; Adaramola, A. O., & Dada, O., 2020).

Consumption of electricity is included in the model in order to capture the effects of electricity on GDP growth as suggested by other studies (Acaravci, 2010; Iyke, 2015).

4.3 Estimation Techniques

Following Elias A. Udejaja & Obi, Kenneth Onyebuchi (2015) and Biswas, B. P., & Masuduzzaman, M (2016), we have used the Cointegration Technique and Vector Error Correction Model (VECM) to estimate the relationship between Bangladesh's GDP growth and its determinants during 1980-2020.

We will choose the Johansen-Juselius cointegration technique as it is robust in case of dealing with variables of the same order of integration. The number of cointegrating vectors is detected through the two likelihood ratio test statistics (trace test and maximum eigen value test). Although cointegration test considers long run dynamics, it does not consider short-run disequilibrium. The Vector Error Correction Model (VECM) is applied to address short-run disequilibrium. In the VEC Model, long run is expressed as the error correction term where the sign must be negative and significant for ensuring long-run equilibrium. The negative sign indicates that any disequilibrium occurred in the short run will converge to long-run equilibrium.

At first step of the estimation, we perform the unit root test to all variable in order to check whether related variables are stationary or not. It is essential to maintain stationary feature of time series in order to avoid spurious result. For testing the nature of time series, we also examine the order of integration to determine the subsequent long-run relationships among the variables. In our study, we have employed Augmented Dickey Fuller (ADF) test developed by Dickey and Fuller (1979) and Phillips and Perron (PP) test promoted by Phillips and Perron (PP) (1988) to check unit root of the variables.

In the next step, we proceed to run test for cointegration among the variables under study. The cointegration is applied to testing for the presence of cointegration among variables of the same order of integration through framing cointegrating equation. This helps us to find out a long-run relationship among variables. In our model, we follow Johansen (1988) and Johansen & Juselius (1990) approach to run cointegration test.

After testing for cointegration, we proceed to specify a Vector Error Correction Model (VECM) which explains the short-run relationships among the variables. With a view to maintaining the stability of equilibrium relationship, we need to have at least one of the Error Correction Terms to be significant as they indicate the coefficients for the speed of adjustment in case of any shock.

5. Empirical Results and Analysis

We use statistical software package E-views 11 to estimate parameters and conduct relevant tests in our study.

5.1 Unit Root Test

With a view to testing for the presence of unit root in the data using both trend and intercept and determining the integrating level of variables, we conduct ADF and PP techniques. The results of ADF and PP test are presented in Table-3 which reveals the behavior of the variables in level and first difference. The results show that all variables are non-stationary in their levels and they are stationary in first difference meaning that they are integrated of order one i.e., I(1).

Table 3: Results of Stationary Tests of Variables

Variables Name	Augmented Dickey-Fuller Test					Phillips-Perron test statistic					
	Levels		First Difference		Critical value at 5%	Levels		First Difference		Critical value at 5%	Order
	Intercept	Trend and intercept	Intercept	Trend and intercept		Intercept	Trend and intercept	Intercept	Trend and intercept		
IGDP	-0.619029 (0.8552)	-2.282661 (0.4336)	-4.31711 (0.0081)	-4.278890* (0.0090)	-3.5266	-0.53508 (0.8737)	-2.141299 (0.5083)	-4.23531** (0.0018)	-4.21677* (0.0095)	-2.9369	I(1)
lpse	-7.1451 (0.8318)	-1.84706 (0.6633)	-5.93259* (0.0000)	-5.87838* (0.0001)	-3.5266	0.715136 (0.8316)	-1.938693 (0.6163)	-5.913552* (0.0000)	-5.852277* (0.0001)	-2.9369	I(1)
IGC	1.554689 (0.9992)	-2.547358 (0.3052)	-7.532525* (0.0000)	-7.829413* (0.0000)	-3.5266	2.026477 (0.3182)	-2.518375 (0.3182)	-7.5561225* (0.0000)	-8.737867* (0.0000)	-2.9369	I(1)
lopenness	-1.121954 (0.69818)	-1.422243 (0.8393)	-5.814994* (0.0000)	-5.763667* (0.0001)	-3.5266	-1.122796 (0.6977)	-1.511861 (0.8092)	-5.814493* (0.0000)	-5.764077* (0.0000)	-2.9369	I(1)
ICPI	-2.2798 (0.1830)	-4.3958 (0.0059)	-3.1079** (0.0336)	-3.6350** (0.0387)	-2.933158	-2.2135 (0.2047)	-3.4022 (0.0647)	-3.2034** (0.0268)	-3.8454** (0.0237)	-3.520787	I(1)
lpowerpc	-1.132995 (0.6936)	-2.5180 (0.3183)	-7.3636* (0.0000)	-7.3019* (0.0000)	-3.5266	-0.5335 (0.8738)	-2.7118 (0.2375)	-7.2744* (0.0000)	-7.2245* (0.0000)	-2.9369	I(1)

*Indicates 1% level of significance ** indicates 5% level of significance

Source: Computed by the authors based on statistical software package E-views 11.

5.2 Empirical Results based on Cointegration Test

After deriving the order of integration of variables i.e. I (1), we conduct cointegration test among the series. As the results of Johansen Cointegration Test

are lag sensitive, we used both the AIC and SBC to determine the optimal lag length subject to the condition that residuals follow White Noise Process (Enders 2010). Results of Johansen Cointegration test are reported in Table 4.

Table 4: Results of Johansen Cointegration Test

Cointegration Rank Test						Cointegration Max-Eigen test					
H ₀	H ₁	Eigenvalue	Trace statistics	0.05 Critical Value	Prob.**	H ₀	H ₁	Eigen value	Max-Eigen statistics	0.05 Critical Value	Prob.**
r=0	r=1	0.702444*	140.8784	117.7082	0.0008	r=0	r>1	0.702444*	49.69826	44.49720	0.0125
r≤1	r=2	0.532646*	91.18014	88.80380	0.0333	r≤1	r>2	0.532646	31.18740	38.33101	0.2617
r≤2	r=3	0.472325	59.99274	63.87610	0.3920	r≤2	r>2	0.472325	26.21029	32.11832	0.2216
r≤3	r=4	0.344674	33.78245	42.91525	0.2985	r≤3	r>3	0.344674	17.32753	25.82321	0.4305

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level.

Max-eigenvalue indicates 1 cointegrating eqn(s) at the 0.05 level.

*Denotes rejection of null hypothesis at the 0.05 level.

**MacKinnon-Haug-Michelis (1999) p-values.

Results from Table 4 suggest that the null hypothesis of no cointegration among the variables is rejected at 5% level for both Trace statistics and Maximum Eigen statistics. Both trace statistics and maximum eigenvalue provide one cointegrating equation at 5% level of significance.

5.3 Vector Error Correction Model (VECM)

The presence of long-run relationships among the variable scan be shown with the aid of Vector Error Correction Model (VECM). The long-run estimates of co-integrating vectors are shown in Table 5.

Table-5 Long-run estimation

	LPSC(-1)	LGC(-1)	LOPENNESS(-1)	LCPI(-1)	LPOWERpC(-1)	TREND	Constant
Coefficient	-3.05542	-0.52347	-0.61831	-0.08523	-0.46916	0.021734	-12.4817
Std. Dev	0.48354	0.06319	(0.26379)	0.09217	0.14007	0.01225	----
t-statistics	-6.31889*	-8.28459*	-2.34392*	-0.92466	-3.34955*	1.77420	----

Note * indicates 5% levels of significant.

The long run equation can be shown in the following way:

$$\ln gdp = -12.4817 + 3.05542 \ln(psc) + 0.52347 \ln(gc) + 0.61831 \ln(openness) + 0.46916 \ln(powerpc)$$

It is evident from Table 5 that long-run coefficients of private sector credit, trade openness and power consumption are statistically significant and these factors affect Bangladesh GDP positively.

The error correction term obtained from long-run equilibrium is mentioned below.

$$\phi \lgdp EC_{t-1} = LGDP - 3.05542 \lgdp (psc) - 0.52347 \lgdp (gc) - 0.61831 \lgdp (openness) - 0.46916 \lgdp (powerpc)$$

Table 6- Error Correction Term

Error Correction Term	Coefficient	Std. Deviation	t-value
EC _{t-1}	-0.176248	0.073447	-2.399668

The coefficient of error correction term that measures the speed of adjustment towards long run equilibrium is negative (-0.176248) at 1% level of significance (Table-6). This implies that the adjustment towards long run equilibrium requires nearly six years when the equilibrium is disturbed due to any shock.

We require VCEM to estimate the short run dynamics among the variables. The results of the Error Correction Model are shown in Table 7. This Table reports the parsimonious regression results for nominal GDP growth and its determinants in Bangladesh during 1980-2020. It is assumed that cointegrating equations follow a linear trend and intercept.

Table 7: Error Correction Estimation

Regressors	Coefficient	Std. Error	t-Statistic	Prob.
ECT(-1)	-0.176248	0.073447	-2.399668	0.0222
D(LGDP(-1))	0.146336	0.118322	1.236758	0.2249
D(PSC(-1))	1.433305	0.348623	4.111329	0.0002
D(LGC(-1))	0.034662	0.056101	0.617855	0.5409
D(LOPENNESS(-1))	-0.003254	0.146204	-0.022258	0.9824
D(LCPI(-1))	0.107874	0.174950	0.616599	0.5417
D(LPPOWER(-1))	-0.019770	0.063946	-0.309168	0.7591
C	0.076560	0.022628	3.383433	0.0019
R-squared	0.745548	Mean dependent var		0.115925
Adjusted R-squared	0.691573	S.D. dependent var		0.034124
S.E. of regression	0.018951	Akaike info criterion		-4.920699
Sum squared resid	0.011852	Schwarz criterion		-4.586344
Log likelihood	108.8743	Hannan-Quinn criter.		-4.798945
F-statistic	13.81291	Durbin-Watson stat		2.063515
Prob(F-statistic)	0.000000			

The empirical findings showed that financial development measured by private sector credit affects GDP growth positively and heavily with 1% level of significance. The result implies that 1% increase in private sector credit will generate 1.43 percent growth in GDP. The strong relationship between private sector credit and GDP is also corroborated by other studies conducted in other countries (Cojocaru et al., 2016; Durusu-Ciftci et al., 2017). The result is not a surprise for Bangladesh as she depends on bank credit heavily for financing economic activities due to poor capital market performance and low level of foreign financing. The ratio of private sector credit by banks to GDP has increased over the year. The ratio stood at 39.2 in 2020 which increased from 13.675 in 1980, 21.12% in 1990, 21.32% in 2000 and 33.95% in 2010 (World Bank, 2020). The higher relationship between GDP and private sector credit by banks is also found by some other studies done on Bangladesh economy (Biswas & Masuduzzaman, 2016; Paul U C, 2020).

The result revealed that GDP is positively associated to the growth of GDP in the past period. However, the relation is not statistically significant. We found that GDP is positively related to Government consumption. However, the relation is not statistically significant. The result exhibited that trade (exports plus imports) has negative impact on GDP. However, the relation is not statistically significant. We also found that the impact of inflation on GDP is positive. However, it is insignificant.

The result also showed that the impact of electricity consumption on GDP is insignificant. This may be explained by low level of production and distribution of electricity during initial years that has dampened economic activities leading to retardment in economic growth in Bangladesh.

We found that the coefficient of adjusted R-square is 0.69 implying that all explanatory variables used in the study explained 69% variations in GDP growth. The omitted variables not considered in the study can explain the remaining 31% variation in GDP growth. The omitted variables may include FDI, technology, infrastructure and liberalization policy.

5.4. The Robustness Test

We conduct several diagnostic tests to check robustness of the Error Correction Model as shown in Table 8. These tests include Jarque-Bera test for normality, LM test for Serial Correlation and White Heteroscedasticity Test for Heteroscedasticity. The Jarque-Bera test is usually run for large data set and it matches the skewness and kurtosis of data to check whether it possesses a normal distribution. The Breusch-Godfrey (B-G) test also known as Lagrange Multiplier (LM) is used to conduct Serial Correlation test. White Heteroscedasticity Test is applied to check Heteroscedasticity in the residuals from a least square regression.

Table 8: Summary of Robustness Check

Test	t-statistics (probability)
Jarque-Bera Test	11.52462 (0.4846)
Breusch-Godfrey (B-G) Test (Serial correlation LM Test)	0.77745 (0.6779)
Heteroskedasticity Test (No cross term)	322.0028 (0.1256)
Heteroskedasticity Test (include cross term)	756.8347(0.2805)

Note: Probability values are given in the parenthesis.

Source: Computed by the authors applying E-Views 11.

It is evident from the results as shown in Table 8 that the VEC model has passed the diagnostic test or robustness successfully. The JB test for normality is satisfied implying that the residuals are normally distributed under null hypothesis. The result of Breusch-Godfrey (B-G) test showed no Serial Correlation. The white Heteroscedasticity Test confirms the absence of Heteroscedasticity. Thus, the results of all tests suggest that the model is well-specified and it provides consistent results.

6. Conclusions, Policy Implications and Direction for Future Research

The current paper aims to find out the role of bank financing and other key factors affecting Bangladesh GDP during 1980-2020 by employing Co-integration and Vector Error Correction Model (VECM). We select bank financing (private sector credit), Government consumption, trade, consumer price index and

electricity per capita as potential variables in the model. The empirical results find that bank financing is the most important factor to stimulate the GDP in Bangladesh in the long run. Government consumption (expenditure), trade openness and power consumption also affect Bangladesh GDP positively in the long run. The strong relationship between private sector credit and GDP is also found in the short run. The impacts of other factors are statistically insignificant in the short run.

Our study suggests for proper selection of projects with appropriate feasibility study so that credit flows to unproductive sectors can be avoided. It also recommends for developing capital market for long-term financing to lessen the adverse impacts of maturity mismatch in funds of banks. In this case, Islamic Shariah compliant sukuk based financing model can play vital role in financing projects, infrastructure projects in particular.

The policy implications based on the findings of the paper may be summarized in the following ways.

- i. We found that private sector credit has emerged as the most important factor to stimulate the Bangladesh's GDP during the period under study. It is essential to select proper projects with appropriate feasibility study so that credit flows to unproductive sectors can be avoided and non-performing loans can be confined to a tolerable limit. Focus should be paid on cottage, micro, small and medium enterprises (CSMES) so that credit disbursement can ensure equity and avoid concentration of loans among few people.
- ii. Despite achieving marked success in case of GDP growth and poverty reduction, one-fourth people still live below poverty line in Bangladesh. For further reduction of poverty, she requires to raise GDP growth over 8%. To this end, Bangladesh needs to increase private investment-GDP ratio to over 32% from the present level of 24 percent for which financial sector, banks in particular must be efficient and well-performing for augmenting saving-investment process toward higher GDP growth and poverty elimination.
- iii. It is imperative to develop capital market for long-term financing to lessen the adverse impacts of maturity mismatch in funds of banks. The ratio of market capitalization of Bangladesh capital market to GDP stood at 11.6

percent at the end of June, 2020, which is very low compared to our neighbor countries (Bangladesh Bank, 2020d). In this case, Islamic Shariah compliant sukuk based financing model can play vital role in financing projects, infrastructure projects in particular. Recently, Bangladesh Government has issued sukuk al Ijara worth BDT 80 billion for safe drinking water project which has received massive response (Bangladesh Bank, 2021). The maiden sukuk issue was oversubscribed by 8 times. Beximco group, a large corporate house has issued Ijarah Istisna sukuk for the first time to purchase textile machineries and implement solar plant project. Some other big corporate houses have also adopted steps to issue sukuk.

- iv. Our model has been able to explain 69 percent of variation of GDP in the long run in Bangladesh (adjusted R², 69%). This implies that there are some omitted factors which can also affect GDP. The future research on GDP growth needs to include other variables in the model such as environmental and equity issue, labor productivity, innovation, infrastructure other than electricity. Special attention is required to conduct research to find out factors which can promote sustainable development based on economic, social and environmental issues.

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