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Financial Deepening Parameters and Economic Progress in Bangladesh: A Causality and Impact Analysis

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Abstract- This research investigated the causality and impact analysis of financial deepening and economic growth in Bangladesh for the period of 1993 to 2020. The Johansen cointegration test is used to demonstrate a long-run association. The Granger causality test and the Error Correction Model are also used to determine causality between the variables and short-term or long-term kinematics among the parameters. The findings show that economic growth, broad money supply, market capitalization, and private sector credit have a long-run relationship with a strong adjustment rate toward long-run equilibrium. The findings also show that whereas broad money has a negative and negligible impact on economic growth, market capitalization has a negative and large impact. Broad money is thought to drive growth from a prior standpoint. However, the analysis found that broad money had no positive impact on economic development between 1993 and 2020. Following a pairwise Granger Causality test, it is discovered that GDP doesn't have an effect on money supply or private sector credit, and vice versa. Based on the findings, the research recommends implementing private sector-friendly policies to ensure that depositors not only have access to credit, but that credit is also available at a reasonable cost, i.e., at a low interest rate.

Keywords: financial deepening, granger causality, error correction model, economic growth & private sector credit.

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Financial Deepening Parameters and Economic Progress in Bangladesh: A Causality and Impact Analysis

Md. Saiful Islam

Abstract- This research investigated the causality and impact analysis of financial deepening and economic growth in Bangladesh for the period of 1993 to 2020. The Johansen co-integration test is used to demonstrate a long-run association. The Granger causality test and the Error Correction Model are also used to determine causality between the variables and short-term or long-term kinematics among the parameters. The findings show that economic growth, broad money supply, market capitalization, and private sector credit have a long-run relationship with a strong adjustment rate toward long-run equilibrium. The findings also show that whereas broad money has a negative and negligible impact on economic growth, market capitalization has a negative and large impact. Broad money is thought to drive growth from a prior standpoint. However, the analysis found that broad money had no positive impact on economic development between 1993 and 2020. Following a pairwise Granger Causality test, it is discovered that GDP doesn't have an effect on money supply or private sector credit, and vice versa. Based on the findings, the research recommends implementing private sector-friendly policies to ensure that depositors not only have access to credit, but that credit is also available at a reasonable cost, i.e., at a low interest rate. Monetary and fiscal policies should be linked to each other to ensure the economic goals of long-term growth and stability.

Keywords: financial deepening, granger causality, error correction model, economic growth & private sector credit.

I. Introduction

Bangladesh is now regarded as an example of development, despite the current global financial crisis. Bangladesh is considered a country with enormous potential. Many people trust that it is overloaded by its large population, while others see it as an asset. According to a tentative estimate by BBS, Bangladesh's GDP growth rate has been above 5% for the past decade. It hit 8.15 percent this fiscal year, shattering all prior records in the country's economic history. Economic growth is the most important priority for macroeconomic policy in every country, and gross domestic product (GDP) is a key indicator of that growth. If a country's GDP grows faster than its population, it means its GDP per capita is increasing and the people's standard of living is improving. The country's macroeconomic situation could be harmed by financial deepening. Due to financial deepening, the percentage of money supply that comprises GDP or the price index can usually be increased. This has the potential to improve liquidity. Money can open up new chances for investment and growth. Although there is broad agreement among researchers who fund it that it boosts economic growth and that the cause-and-effect relationship between the two has been established, there are more concrete issues. At the same time, the path of causality may pass through hypothesis giving, which claims that growth leads to development and financial demand for financial services, or hypothesis following the claim, which claims that growth leads to development and financial demand for financial services. Financial deepening indicators, according to this study, represent the ratio of private sector credit to gross domestic output (GDP). As a key financial deepening metric, take into account both the private sector credit ratio and GDP, but also use the money supply associated with GDP as a substitute indication.

Financial deepening is a term used by economists to refer to a state of adequate liquidity and seamless financial intermediation. To be sure, research has been conducted on financial depth and economic growth in a variety of economies. Such discourses shed light on the subject, while subsequent retrospect reveals knowledge gaps and the need for additional investigation. Several empirical studies on the subject include the following: In light of finance's critical role in promoting economic growth and development, particularly in developing nations like Bangladesh, Examining if Bangladesh's financial structure has a major positive effect on the country's economic growth and development. The findings may corroborate prior research indicating that the whole financial structure has a significant positive effect on economic growth. While certain industries (banks and markets) have a stronger influence on economic growth, others (such as insurance) may have little effect. Examining the long-run growth consequences of financial development in Bangladesh and suggesting that the growth effect of financial development is proxy-dependent. As a result, the study discovered that private sector credit-to-GDP and total domestic credit both contribute to growth, while the broad money supply-to-GDP ratio does not. The sensitivity of the effect to the proxy choice was

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tested using indexes built from principal component analysis indexes. The number of financial deepening indicators has an impact on a country's GDPG. The following are some of the financial deepening indicators. The most crucial component in financial deepening is broad money. It's a way of calculating how much money is distributed throughout the economy. It is defined as the most comprehensive way of determining a country's money supply— the quantity of assets that consumers and companies can use to pay for goods and services or keep as short-term investments, such as currency, bank account balances, and all money values. Many macroeconomic theories predict that expanding the money supply will lower interest rates in the economy. More money can be borrowed in the economy if the money supply is increased. According to the law of demand, an increase in supply tends to lower the cost of borrowing money.

When borrowing money becomes easier, spending rates and lending (and lending) rise. In the short term, the increased rate of consumption and borrowing can be linked to a growth in total economic production and expenditure, as well as, possibly, the country's GDP. This is not the real conclusion, despite the fact that it is expected (and predicted by economists). The long-term effects of a rising money supply are more difficult to predict. Throughout history, property prices have risen. Household goods and inventory have had a strong tendency to rise artificially after an increase in the money supply or anything else that results in a high degree of liquidity in the economy. A country's GDPG is influenced by a variety of factors, including: Financial deepening is also influenced by domestic loans to the private sector. Domestic credit to the private sector refers to financial resources provided by finance companies to the private sector, such as loans, acquisitions of unlawful securities, trade credits, and other receivables with repayment requests. Credit provided by the private sector is critical for private investment and economic development. Domestic banks play an essential role in boosting employment, assuring efficiency and productivity, and stimulating economic growth through funding investments. Market capitalization also influences financial deepening. The aggregate assessment of an enterprise based on the current share price and the quantity of unchanged inventories is known as market capitalization. It's computed by multiplying the company's current market price by the number of shares that haven't yet been issued. The stock market's capitalization to GDP ratio is used to analyze whether the market as a whole is undervalued or overvalued compared to the historical average. It could be argued that the market is undervalued if the valuation coefficient is between 50 and 75 percent.

However, depending on the economy, the size and direction of the influence may differ. As a result, the goal of this research is to look into the degree of correlation between economic growth, broad money supply, market capitalization, and private sector credit, all of which are moving towards long-run equilibrium at a fast pace. This project study will play a vital part in tracking Bangladesh's economic growth.

II. Literature Review

Several studies have been conducted to examine the impact and causality of financial deepening on economic growth in the context of various countries. Such a speech provides a broad overview of the subject, while his concluding glance reveals the knowledge gap and the need for future research. The following are some experimental studies linked to the topic:

In Tanzania, Akinboade, O.A., (2000) investigates the relationship between financial and economic growth. As a metric of financial growth and a model for the relationship with per capita income, bank loan rates for the country's natural resources are utilized. They employed the minimum field measurement method (SOLS) and the standard field measurement method (DOLS). This model looks at periods of financial tyranny as well as periods of financial liberty. The findings demonstrate that, while interest rates are normally minor, they are inconsistent during the two years under consideration. It had a tiny but positive impact on financial advancements during the period of financial liberation, despite having had a negative impact on the economy during the period of financial oppression. In general, and during periods of financial liberalization, the association between financial analysis and economic progress appears to be stressed and significant, but not during periods of financial oppression. Calderón, C., and Liu, L. (2003) analyze the causal trade between financial development and economic growth using a Geweke decomposition analysis of aggregate data from 109 developing and housing nations from 1960 to 1994. This paper identifies the following: (1) financial development frequently leads to economic growth; (2) Granger's co- existence causes from development financing to economic growth and Granger's causes from economic growth to development financing; (3) deep funding contributes more causal factors in developing countries than in developed countries; (4) the longer the model period, the greater the impact of financial factors on economic growth; and (5) financial stimulus stimulates economic growth. Hassan, A.K., and Islam, M.R., (2005) use a series of publications to study the relationship between FDI, trade openness, capital creation, and economic growth rate in Bangladesh from 1986 to 2008. The ADF and PP stop tests revealed that all variables remained constant at first, differentiating fixed and constant flow levels as well as trends. To assess the composite relationship between the variables, the Johansen-Juselius approach was used,

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followed by a vector error correction model. Empirical findings reveal a long-run equilibrium between the rate of GDP growth and variations that can be explained by nonlinear fluctuations. It has been demonstrated that total FDI and capital creation have a major impact on changes in gross domestic output. The degree of trade openness has a negative influence, but it lowers the rate of GDP growth. To enhance the overall economic growth rate, Bangladesh should build an FDI-led police force and ensure higher quality standards. N. Nazmi (2005) examines the consequences of money laundering and money laundering on the real sector using a general equilibrium model. According to the model, deregulation and the sophisticated banking sector, according to the model, boost production intensity, resulting in faster growth. The Latin American evidence model backs up the model's findings by proving that regulatory reform and financial expansion have a favorable influence on investment. Using a combination of theoretical and empirical literature, Townsend, R.M., and Ueda, K. (2006) investigate the relationship between economic growth, financial structure, and inequality. That is, we demonstrate how to determine a model's common denominator in a transition path. We examined the expected model path and conducted a thorough test. We create a four-covariance error measure based on the covariance and discover the most suited chemistry because the true route of the Thai economy is regarded to be the fulfillment of many model economic models. We also validated the model and created a confidence zone using a series of simulations. We recover actual data and look for anomalies. J.O. Chukwu and C.C. Agu (2009) explored the sources of Nigeria's deep financial and economic growth from 1971 to 2008. The findings indicate that economic growth and its depth have a long-term link. As long as it supports the lender's estimates on loan and debt savings rates by depositing money into the bank, this research supports the following assumptions about bank private sector debt demand and multi- sector financing: These findings support those of Agu and Chukwu (2008), who employed Toda and Yamamoto's causal analysis method (1995). The addition of VECM in this analysis revealed a causal association between financial depth and Nigerian economic growth in 1971, using the models of Johansen and Juselius (1990) and Juselius (1988, 1992). Financial performance and economic growth have no bearing on the long-term position. Abdul Wadud, M. (2009) evaluates the long-term relationship between financial development and economic growth for South Asian countries—India, Pakistan, and Bangladesh in the period 1976–2008. A financial system that supports financial stability and facilitates the implementation of successful economic policies is the foundation for financial development. For highly developed markets and institutions, a one-of- a-kind capital and capital management system is available. Financial systems based on banks may be in a good position to implement effective monetary and expansion plans. Financial liberalization and oppression may suggest that financial progress and economic growth are linked. The deficit correction model's findings reveal the variables that impede financial development and economic growth, from financial development to economic growth. Using Granger's legal reasoning through the "Vector Auto" regression approach and two proxies for financial development, Eita, J.H., and Jordaan, A.C. (2010) investigate the relationship between financial development and economic growth in Botswana from 1977 to 2006. Regardless of which financial development proxy is employed, the data suggests that there is a long-run relationship between financial development and economic growth. Furthermore, the findings demonstrate a demand-driven and demand-driven approach to financial growth, implying that Botswana's development strategy is to improve financial markets and real economic performance. O. Karahan and M. Ylgör (2011) study the literature to present an outline of the relationship between financial development and economic growth. From the standpoint of repayment rate, we investigate the relationship between financial development and economic growth in Turkey using the theory of monetary growth. Gross domestic product investigates the link between total investment in the GNP rate and annual gross domestic product data from 1980 to 2010 using the VAR model method. According to economic studies, there is a two-way interaction in the economy between financial and economic growth in Turkey. J.U.J. Onwumere, Ibe, I.G., Ozoh, F.O., and Mounanu, O. (2012) investigated the impact of financial growth on Nigerian economic growth. We find that the speed of money and market movements will drive economic growth in Nigeria if it appears that financial diversity, economic development, and capitalism did not exist in the study period (1992–2008) using supply chain methods through variables such as cash speed, ease of cash flow, economic development, market processing, and market volatility as proxies of financial growth and the growth rate of domestic production to economic growth. As a result, government policy should concentrate on strategically boosting investment and fostering efficient capital markets in order to improve overall economic performance, establish and expand governance, and mobilize reserves. Increase fundraising, shift resources from conventional sectors to growth- oriented sectors (such as manufacturing, agriculture, and services), and encourage skilled entrepreneurs to respond in diverse sectors of the economy. B.O. Ohwofasa and J.O. Aiyedogbon (2013) examine the level of financial management growth in the banking industry and its impact on economic growth during the last two decades. To examine the relationship

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between cash flow and economic growth, we use methodology and vector autoregressive derivatives (VARs), impulse response functions, and variance decomposition. The findings show that the series is cooperative in character and that the variables have long-term correlations. Economic growth is a factor for another year, according to the VAR prediction, with significant national savings for gross domestic product (height 1) and exchange rates (height 1). The GCF (lag 1) has a significant effect on current economic growth, whereas the GCF (lag 1) has a negative and statistically significant effect on current economic growth. Through a set of statistics on capitalism (GDP, GDP growth rate, and GDP growth rate), Jamil, T., and Shazia, F. (2013) investigate the impact of capital market growth on Bangladeshi economic growth. From 1991 to 2011, stock-GDP was used to calculate GDP. The Ordinary Least Squares Method Produces Economic Results It should be highlighted that the capital market's growth does not contribute significantly to the country's economic growth. This is owing to the company's dwindling market share and the high interest rates available elsewhere. The findings of this study also suggest that, in addition to the changes in attitudes examined here, there may be a slew of other factors influencing the country's economic progress.

The long-term relationship between fiscal growth (FD) and GDP growth for Pakistan, as well as direct investment (FDI) and inflation, is examined by L. Safdar (2014). The ADF was used to check the variability of the variables, and it revealed that all of them remained at the same level, i.e., I (0). Using the Johansen Co-integration test, this study discovered that financial management is becoming more sophisticated; foreign direct investment, inflation, and economic growth all combine to form a long-term link for Pakistan. The VECM results reveal a short-run relationship between variability and the error correction model for GDP, while the FD results show a long-run return correction effect. Finally, the Granger causality test demonstrated a correlation between the variables' differences. Pakistan, according to the newspaper, requires a robust and stable financial system in order to attract investor confidence and international direct investment. D.W.H. Alrabadi and B.A. Kharabsheh (2016) investigate the active interaction between financial and economic growth in Jordan from 1992 to 2014. The study's objectives were met using automatic vector analysis, Granger causality, and the Johansen-Juselius input test. Using quarterly data, the results demonstrate no significant statistical impact on the economy's financial growth in the short run. Regardless of which proxy for financial augmentation is utilized, the cointegration test revealed a statistically significant link between the two variables. Furthermore, when financial growth is assessed in terms of independent debt, the Granger causality test reveals two elements that contribute to economic and financial growth. When savings and investment (M2) are employed as a proxy for financial growth, however, there is a causal relationship ranging from economic growth to financial growth. These findings have had a big impact on Jordanian academics and policymakers. S. Abosedra, M. Shahbaz, and K. Nawaz (2016) use data from 1975Q1 to 2011Q4 to examine the relationship between financial development and poverty reduction in Egypt. The Zivot-Andrews root system was used to test the morality of the variables. The long-term association between the variables was investigated using the autoregressive stratore method of segmentation-limited lag testing for aggregation. The findings of our research give solid evidence that a long-term relationship exists between financial growth, economic growth, and poverty alleviation. When local debt to the private sector is used as a proxy for financial development, the results demonstrate that it improves poverty. If M2 is used as a proxy for financial development and child mortality per capita is used as a proxy for poverty, it is unclear. Despite the fact that the association between economic development and poverty reduction in Egypt is weak in the proxies employed to evaluate these variables, the findings imply that the poverty-reduction program is working. Furthermore, our findings suggest that proper reforms targeted at fostering a stable and nationwide financial industry in Egypt can assist in poverty reduction by securing debt in the country. Okafor, I.G., Onwumere, J.U.J., and Chijindu, E.H. (2016) employed the Phillips-Peron test to evaluate if the variable was moving or not. The histogram-normality test and VEC balance are employed elsewhere to evaluate if the data set is normally distributed. The Johansen simulation exam was used to conduct the long-term relationship test. The Granger causality test and the error correction model were also applied. The findings reveal that economic growth, free money financing, and lending to the private sector have a long-term connection, with high interest rates on long-term balances. The study's findings also suggest that even large sums of money have a small but favorable impact on the economy. Growth, on the other hand, has a negative and minor influence on the private sector. Granger's causality test reveals that there is a scarcity of money and funding for the private sector. The true causes of economic progress, as well as the reverse. M.A. Islam, M.R. Hassan, and M. Rana (2017) investigate the existence of causation and the direction of causation of financial growth, investment-direct money from abroad, and economic growth in Bangladesh, a low-income country according to the World Bank. The researchers looked at data from 1980 to 2017 to see if there was a link. In the example of Bangladesh, this study indicates that economic growth has both short- and long-term implications for financial growth, foreign direct investment, and economic growth. In terms of other

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regeneration strategies, such as Fully Modified OLS, these results are reliable (FMOLS). Canonical Regression with Dynamic OLS (DOLS) (CCR). This indicates that Bangladesh's sophisticated, trustworthy, and acceptable financial sector has the ability to attract international investment. Furthermore, a rise in foreign exchange inflows is expected to result in the creation of employment, technical advancements, and chances for innovation, as well as actual economic progress. In order to achieve actual economic progress, the report recommends developing FDI-friendly policies to attract international investors and multi-stakeholders. M.A. Islam, H. Liu, M.A. Khan, S.M. Reza, Y.E. Yahia, and L. Nasrin investigate the integrative and causal link between economic development, financial deepening, foreign investment consolidation, and innovation in China. The ARDL Bounds test's significant evidence of the link with the VECM Granger causes supports the relationship and the reasons between the variables. The paper proposes legislative measures to increase the financial system's depth and, therefore, the possibility of an improved FDI climate. Furthermore, policymakers must be cautious about gaining deep and efficient access to financial institutions in order to optimize genuine growth by establishing transparent effects and promoting the use of breath. Through the consolidation of actual domestic goods, capital, education, and natural resources through data, Faisal, F., Sulaiman, Y., and Tursoy, T. (2019) analyze the asymmetric link between financial growth and natural resources. In addition to typical root canal testing, this study applies to Carrion-i-Silvestre et al. (2009) five system suspension tests. Maki's (2012) coupling approach was also used to determine long-term associations up to a 5-year gap. Furthermore, NARDL coupling was used to find long-term asymmetric correlations between variables. Long-term findings also confirm the good and negative effects of natural resources on financial outcomes and long-term effort results. Furthermore, education has a positive and substantial impact on financial growth with long-term positive consequences, whereas capital has a negative and significant impact on financial growth with long-term positive consequences. Long-term asymmetry in all variables, as well as short-term asymmetry in all variables except natural resources, indicated the presence of an asymmetric connection. Finally, the asymmetric consistency factor indicates that financial development financial shocks and natural resource positive shocks have a two-way connection. This suggests that substantial bank investments in Turkey might assist the natural resources industry. K. Williams (2019) investigates the influence of financial market expansion on economic growth in developing and developed nations from 1970 to 2014. The newspaper also looked at whether political institutions had a role in mediating the link between the debt market and economic development. In the empirical analysis, there were two major results. According to preliminary research, credit market expansion slows economic development in emerging and developing nations. The second conclusion demonstrates that democratic institutions mitigate the effects of economic expansion on the debt market. These findings contribute to the economic and political discussion in emerging and developing countries in general.

The study will examine the degree of association between economic growth and the ratios of broad money supply to GDPG, market capitalization to GDPG, and private sector credit to GDPG, with a high speed of harmony towards long-run equilibrium and Causality Analysis, based on the discussion above about related literature. As a result, there are several possibilities to learn about this comprehensive relationship and its causality.

III. Objective of the Study

The goal of this research is to look at the degree of correlation between economic growth and the ratios of broad money supply to GDPG, market capitalization to GDPG, and private sector credit to GDPG, using a high speed of harmony approach to long-term equilibrium and Causality Analysis. This report will be useful in tracking an economy's progress. Rather than a description of fresh scientific results, it acts as a general instructional document.

IV. Data & Methodology

This research is looking into what has already happened. To put it another way, it's an ex-post facto study. The annualized time series data was gathered from the Bangladesh Central Bank statistical bulletins and the World Bank from 1993 to 2020. Our data will be subjected to diagnostic tests in order to increase the accuracy of our results and verify that they are not false. For normality tests, we will use the Jarque-Bera statistics, which will be supplemented with a group histogram- normality test. The Augmented Dickey-Fuller unit root test will be used to check for stationarity. The Johansen co-integration test will be used to determine if our variables are co-integrated, and the Error Correction Model will be used to determine the speed of adjustment to equilibrium, as well as the direction and size of the impact. To determine the causal relationships between our variables, we will use the paired Granger causality test.

V. Model Specification for the Study

While conducting experimental research on financial markets, financial deepening, and economic growth in Bangladesh, the results of this study will be illustrated in the model accepted. This empirical investigation employs the following model:

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$$gy = f(FD) = \lambda 0 + \lambda 1\, f(FD) + \varepsilon t \quad \text{(i)}$$

Where gy denotes per capita growth, $\lambda 0 = \alpha 0 + \beta 0$; $\lambda 1 = \alpha 1 + \beta 1$; FD indicates financial sector development, and εt denotes the error term with the usual properties. This study will modify the above model for our purposes, thus

$$GDPGt = \beta 0 + \beta 1 BMGDPt + \beta 2 PSCGDPt + \beta 3 MCGDPt + \varepsilon t \quad \text{(ii)}$$

Where,

GDPGt = Gross domestic product growth.
BMGDPt = Ratio of broad money to gross domestic product.
PSCGDPt = Ratio of private sector credit to gross domestic product.
MCGDPt = Ratio of market capitalization to gross domestic product.
βo = Constant term.
β1- β3 = Parameter estimates.
εt = Error term.

MCGDP is a conditioning variable that accounts for market capitalization's perceived role in explaining growth. Our estimating process has three parts. To check the unit root of the time series, we first use E-views' ADF (Augmented Dickey-Fuller) test to check for stationarity. If the mean and variance of a time series are constant across time, it is said to be stationary. This second stage allows us to see if there are any long-term correlations between the variables. If our variables have been co-integrated at this stage, we move to the third step, which is to run the Error Correction model (ECM).

$$\Delta GDPGR t = \beta 0 + \sum_{i=0}^{n} \beta 1 GDPG t-1 + \sum_{i=0}^{n} \beta 2 BMGDP t-1 + \sum_{i=0}^{n} \beta 3 PSCGDP t-1 + \sum_{i=0}^{n} \beta 4 MCGDP t-1 + \sum_{i=0}^{n} \beta 5 ECT t-1 + \varepsilon t$$

Where ECTt-1 is the lagged value of the error correction term.

VI. Result and Analysis

a) Unit Root Test

The test procedure given below:

Ho = GDP series have a unit root (time series is non-stationary)
H1= GDP series have not a unit root (time series is stationary)

If the null hypothesis is rejected, the series is a stationary time series. Accept the null hypothesis, however, and the series is a non-stationary time series. The trend coefficient value is the ADF test statistic. Accept the null hypothesis if the estimated t statistics are less than the critical value of tau statistics. This indicates that the time series are non-stationary and have a unit root.

Table 1: Summary Statistics of ADF Unit Root Test

Variable	Augmented Dickey-Fuller test statistic	1% critical value	5% critical value	10% critical value	Order of integration	Prob.*	Decisions
GDPG	-5.521693	-2.664853	-1.955681	-1.608793	I(1)	0.0000	Ho reject
BMGDP	-3.424689	-3.724070	-2.986225	-2.632604	I(1)	0.0196	Ho reject
PSCGDP	-3.445259	-2.660720	-1.955020	-1.609070	I(1)	0.0014	Ho reject
MCGDP	-7.249488	-2.660720	-1.955020	-1.609070	I(0)	0.0000	Ho reject

GDPG, as well as BMGDP and PSCGDP, are non-stationary at I(0), implying that they have a unit root. MCGDP, the independent variable, is the only one that is stationary at I(0). GDPG, BMGDP, and PSCGDP are stationary at I(1). A misleading regression could result from the non-stationary variables and their regression. The regression will not be spurious if the independent variables are co-integrated with the dependent variable. As a result, we must examine the co-integration of the variables.

b) Normality Test

Normality tests are frequently used to determine when a set of well-defined data fits a normal distribution and how much space fluctuation is permissible before the statement set becomes normally distributed.

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Table II: Summary Statistics of Jarque-Bera Normality test

Variable	Skewness	Kurtosis	Jarque-Bera	Probability
GDPGR	0.262705	2.197213	1.035589	0.595833
BMGDP	-0.210949	2.069019	1.175315	0.555627
PSCGDP	-0.575867	2.395019	1.904056	0.385958
MCGDP	0.238253	1.309957	3.468680	0.176517

The normality tests for the important variables that formed the database's foundation are shown in Table II. It has a positive skewness of 0.262705, as evidenced by the GDPG skewness. This indicates that the deviation from the average distribution is positive, and that GDPG has risen steadily between 1993 and 2019. The kurtosis for the variables in the second panel was 2.997213, 2.869019, 2.395019, and 2.309957, respectively. Because each normal/standard value is more than 2.0, the maximum score during the study period is normally distributed because the majority of the values cluster around the mean. The p values of the Jarque-Bera statistics were all greater than the crucial value of 0.05 in the third panel. As a result, the null hypothesis that our variables are regularly distributed is accepted. This demonstrates that the model passed a thorough appropriateness check.

c) Johansen Co-Integration Test

Given that all of our variables are absorbed from the same command (and thus stationary at first difference), we can establish if the dependent and independent variables have a long-term relationship. This will be accomplished through the application of the Johansen co-integration test.

Table III: Summary Statistics of Regression Analysis

Date: 04/20/21 Time: 11:05 Sample (adjusted): 1995 2020
Included observations: 25 after adjustments Trend assumption: Linear deterministic trend Series: LGDPG BMGDP MCGDP PSCGDP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.641661	49.19888	47.856130.0372	
At most 1	0.414627	23.54198	29.797070.2205	
At most 2	0.318675	10.15433	15.494710.2691	
At most 3	0.022207	0.561426	3.8414650.4537	

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.641661	28.65691	27.18434	0.0464
At most 1	0.414627	13.38765	21.13162	0.4172
At most 2	0.318675	9.592904	14.26460	0.2401
At most 3	0.022207	0.561426	3.841465	0.4537

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The results for the trace statistic and max-Eigen statistics are shown in the first two panels of Table III. In each case, the ordered Eigenvalues are presented in the second column. The critical value of 49.19888 is surpassed by the trace statistic (of 47.85613). However, because the trace statistic (0.0372) has a probability of less than 5%, the null of no co-integrating vectors is rejected. When we continue to the following row, the trace statistic (of 23.54198) is smaller than the crucial value (of 29.79707), allowing us to accept the null of at most one co-integrating vector, and vice versa. The results of the Max-Eigen statistic test, shown in the second panel, reveal that the variables are co-integrated. As a result, the dependent variable and the independent variables have a long-term relationship.

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d) Regression Result: Error Correction Model

The ECM regression findings are shown in Table IV. The residual of the short-term regression is stationary when an error correction term (ECT) is found. This is why you should use the ECM. The long-term correlation is specified by residual stability. The results showed that the total regression model was significant from the dependent variable to the independent variable. The statistical probability F (0.000002), which is less than 0.05, demonstrates this. It's worth noting that the error correction term (ECT) is considerable and negative. In our model, this shows a shift toward long-term equilibrium, explaining that long-term causes include everything from economic growth to broad money supply and private sector credit. Furthermore, the residual coefficient (ECT) (.0.794613), which measures adjustment speed, revealed that 79 percent of long-term mistakes were corrected on an annual basis. BMGDP coefficient was negative and had no statistically significant effect on GDPGR. The MCGDP coefficient, on the other hand, was negative and had a statistically significant effect on GDPGR, as seen in the preceding figures. At the time of this study, PSCGDP had a positive and extensive impact on GDPG, but BMGDP had a negative and minor influence on economic growth and MCGDP had a negative and large impact on economic growth.

Table IV: Result of Hypothesis Testing

Dependent Variable: D(GDPG)
Method: Least Squares
Date: 04/17/21 Time: 12:1 1
Sample: 1993 2020
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.065594	0.307946	-0.213004	0.8332
D(BMGDP)	-0.361245	0.266425	-1.355895	0.1883
D(MCGDP)	-0.081255	0.035195	-2.308695	0.0303
D(LPSCGDP)	0.987662	0.292620	3.375244	0.0026
ECT(-1)	-0.794613	0.167027	-4.823241	0.0000
R-squared	0.715206	Mean dependent var		1.732251
Adjusted R-squared	0.678059	S.D. dependent var		0.203545
S.E. of regression	0.115491	Akaike info criterion		-1.343293
Sum squared resid	0.306779	Schwarz criterion		-1.151317
Log likelihood	22.13445	Hannan-Quinn criter.		-1.286208
F-statistic	19.25339	Durbin-Watson stat		1.036692
Prob(F-statistic)	0.000002			

Table-V shows that broad money supply did not explain Granger's economic growth (P = 0.4496) and that economic growth had no reaction to broad money supply. Similarly, market capitalization and private sector credit have no causal relationship with economic development; the variables are unrelated.

Table V: Granger causality test

Pairwise Granger Causality Tests
Date: 05/18/21 Time: 12:15
Sample: 1993 2020
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
BMGDP does not Granger Cause GDPG	25	0.83216	0.4496
GDPG does not Granger Cause BMGDP		0.84845	0.4429
MCGDP does not Granger Cause GDPG	25	0.27804	0.7601
GDPG does not Granger Cause MCGDP		0.06058	0.9414
PSCGDP does not Granger Cause GDPG	25	3.17491	0.0635
GDPG does not Granger Cause PSCGDP		1.18644	0.3259

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VII. Conclusion

Despite the fact that current estimates put Bangladesh's GDP growth rate at 8.15 percent, the country's economy is at a crossroads where authorities must confront the country's growing macroeconomic challenges. For almost all administrations and financial leaders, GDP is utilized as a yardstick for planning and strategy implementation. This research uncovered important statistical tools in the quest for strategies to control the impact of financial deepening points on economic growth, as well as to examine the causality between underlying variables. The Johansen co-integration test revealed that economic growth and broad money supply, as well as private sector credit, have a long-run relationship. The long-run interconnectedness or causality between GDP and broad money and private sector credit was also validated by the Engel and Granger residual building conclusion. The results of the error-correcting model revealed that broad money has no statistically meaningful impact on economic growth. Market capitalization, on the other hand, has a statistically significant effect on economic growth, as shown by the following statistics. At the time of this study, private sector credit had a positive and large impact on economic growth, while broad money had a negative and minor impact, and market capitalization had a negative and significant impact. Broad money is thought to drive growth from an a priori standpoint. However, the analysis found that spending money had no positive impact on economic development between 1993 and 2019. According to a pairwise Granger Causality test, GDP does not cause money supply or private sector credit, and vice versa. Based on the findings, the research suggests implementing private sector-friendly policies to ensure that depositors not only have access to credit, but that credit is also available at a reasonable cost, i.e., at a low interest rate. Monetary and fiscal policies must be linked to achieve the economic goals of long-term growth and stability. These insights could be used by a decision maker to develop measures to enhance the country's GDP. Our research is limited to Bangladesh's economy, but it might be applied to other nations with similar economic conditions.

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