An Empirical Analysis between Banking Sector Development and Growth Rate of GDP in Bangladesh

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Abstract
The objective of this research is to investigate the impact of banking sector development on economic growth in Bangladesh over the year 1990-2011. In this research, we have used five different explanatory variables by incorporating multivariate linear regression model. To examine the assumptions of best linear unbiased estimator, we apply ordinary least square method (OLS). Durbin–Watson and Augmented–Dickey-Fuller test reveals that there is no autocorrelation among the disturbances and growth rate of GDP is stationary. Our empirical findings suggest that policy makers should adopt the cost effective policies in the banking sector to accelerate the economic growth in Bangladesh.

Keywords: Banking Sector, Economic Growth, Multiple Regression Analysis.
JEL Classifications: E01, G21, G22 and G23.

1. Introduction
The banking sector in Bangladesh is relatively larger than other economies with similar per capita income and development. Financial development leading a second force for economic development in China after using their first force like labor input in the development process. Actually the growth in stock market, efficient banking system and proper foreign participation in financial operation are important for economic development. Kenawy (2009) stated that the efficiency of the banking system depends on the impact of globalization and quality of management methods. Moreover, Mwenda and Mutoti (2009, Zambia) also found that the economic growth depends on comprehensive financial development regulations. Because of these regulations, the banks can be able to achieve cost efficiency and economic flexibility. Malik (2010) illustrated that global economic recession and financial crisis unable to achieve the profit margin and return on investment in the banking sector of Pakistan. Financial sector development enhances high return investment by proper risk management, liquidity management and lowering the cost of trading (Levine, 1997). So it can be said that proper financial sector not only accelerates domestic capital but also enhances economic growth in the long run.

Banking sector development can induce economic growth by reducing information and transaction costs, proper monitoring to borrowers, risk management as well as providing appropriate exchange of goods. These services enhances economic growth but it depends on how well a high-quality banking system provide these services to economy (Demirguc-Kunt, Levine, 2008). As a financial sector, banking sector has positive and significant impact on GDP which we are trying to investigate in this paper. In order to do this we have used five different factors to analyses their impact on the growth rate of GDP.

Although banking sector dominant the financial sector in Bangladesh but this sector face major difficulties in provisions and the banking sub-sector is not technically solvent. The adjustments for this understated is higher and state owned commercial banks become as an inexplicable assets. In addition,
banking sector combined with 32% NPL ratio and in mid 2001 encountered losses of US$685 after adjusting for the shortfall. However, the total proportion of the banking sector is all about 26.54% of GDP where non-bank financial institutions namely capital markets occupied only 3.22% of GDP. The non-performing loans in banks are reduced by 31.61% in 2001 but it is noticeable that about 86% of total classified loans are bad loans or irrecoverable loans. The NPL ratio is higher in SCBs than private banks and foreign commercial banks. The operational cost is higher (about 3.13%) against international level (about 1%). Despite this, the performances of the banks are relatively better in 2001 than before. After 2001, the NPL and operational costs in banks are continuously reduced but unfortunately after 2011, NPL is increased and simultaneously banks operational costs are also increased. Therefore, at present the banking sector growth rate is lower than before.

Kamal (2006) stated that after 1971, the Government of Bangladesh expanded the economic development through market mechanism. As a result, privatization and private entrepreneurs started their journey to establish banking sectors at the beginning of 21st century. In Bangladesh the private banking sectors started its journey since 1983 for the purpose of smooth competition, better quality services, to provide easy finances for entrepreneurs as well as business and to expansion of overall economic performances of a country. Therefore private banking sectors emerged in the late 1980s and 1990s. According to Levine (2005), there are five ways by which the finance system of the country can enhance the economic growth such as: available information about possible investment and allocation of capital, proper corporate governance, monitoring the activities of the firms and managing risk, organize appropriate saving for the economy as well as flexibility of exchanging goods and services. The banking sector development has the significant impact on the economic growth. The banking developments provide the high productivity driven growth of the economy. So the concept of banking development and growth is useful for the policymakers and practitioners.

The aim of this research to analyses the contribution of banking sectors on economic growth in Bangladesh. The rest of the research is discussed as follows: Section 2 covers the history of banking sector development in Bangladesh. Section 3 explains the literature review to explore the related research done by other researchers. Section 4 describes the methodology by which we can explore the multiple regression equation. Section 5 reveals the empirical findings and section 6 implies the conclusion and recommendation of our research.

2. History of Banking sector Development in Bangladesh:

A Bank is an institution that deals with money and provides financial service to the society through the process of intermediation. The main function of a commercial bank is:

- To mobilize deposits (Deposit Banking)
- To provide loans to people and organizations to finance their consumptions and business activities (Investment Banking)
- To trade among the world (Foreign Trade Banking)

Thus banks encourage the flow of money to productive use and investment which accelerates the flow of economic growth

Bangladesh banking system has undergone unprecedented changes over the last twenty years. The country moved away from state control to a relatively market-based open economy by adopting a major stabilization, liberalization and deregulation programme under the influence of the World Bank and the IMF. The entire development of banking sector in Bangladesh is divided into several phases:

Phase-1 (After Liberation):

After the liberation, the Bangladesh government initially nationalized the entire domestic banking system by Presidential Order No. 26 titled Bangladesh Banks Nationalization Order, 1972 and proceeded to
reorganize and rename the various banks. Foreign owned Banks were permitted to continue doing business in Bangladesh.

This is one of the Major Service sectors in Bangladesh economy, which divided into four categories of scheduled Banks. These are

- Nationalized Commercial Banks (NCBs),
- Government Owned Development Financial Institutions (DFIs),
- Private Commercial Banks (PCBs), and
- Foreign Commercial Banks (FCBs).

Phase-2 (Period from 1972 to 1982):

During this infant period, banks faced lot of crisis and the position of business cycle of our economy remains on ‘financial repression’ due to recovery of destruction of independence war of 1971. The system, both the market and institutions, in the post-independence period faced major structural problems, evident both in banking and other components of the money market as well as the capital market. In this period, the credit delivery relatively easier but poor recovery of loans posed a major problem for their “Loan Portfolio Management”. To overcome these problems, the financial sector reform was initiated in 1982 with liberalization policy in the form of denationalization and privatization of commercial banks, followed by the establishment of the “National Commission on Money, Banking and Credit” in 1984.

Phase-3 (Banking Sector Deregulation period):

The major reforms in the sector were launched in the early 1990s. The reform programs focused on several dimensions, most notably privatization of state-owned commercial banks (SCBs), and entry of new private and foreign banks.

Phase-4 (Pre-Financial Sector Reform period from 1972 to 1989):

Given the changing perspective towards denationalization and private participation, the initial phase of banking reform (1980-1990) focused on the promotion of private ownership of commercial banks and denationalization of nationalized commercial banks (NCBs).

Phase-5 (Financial Sector Reform period from 1989 to 1996):

On the basis of the reports submitted by the National Commission and the World Bank Mission, Bangladesh Bank adopted wide-ranging banking reform measures under “Financial Sector Reform Project (FSRP)” to reform the banking sector in 1989. The focus of reforms, among others, has been on gradual deregulations of the interest rate structure, providing market-oriented incentives for priority sector lending and improvement in the debt recovery environment.

Moreover, a large number of private commercial banks were awarded licenses in the second phase of reforms. Although second generation banks have addressed many demand side issues, such as, development of a wide range of financial products and services, the measures have not been successful in addressing the banking sector’s key problems. These include high NPL ratios both in state banks and private banks and a lack of enforcement of the capital adequacy and other regulatory requirements.

Phase-6 (Post Financial Sector Reform period from 1996 to Present):

Since denationalization, greater private participation and market based pricing of financial products did not generate the anticipated results even until the late 1990s, the focus had shifted to risk-based regulations and supervisions in early 2000s. This was largely due to the absence of firm supervision and effective regulations of Bangladesh Bank. To solve these problems, the banks adopted BASEL- I norms (maintaining adequate capital to endure crisis) in 1996. Moreover, the Central Bank Strengthening Project initiated in 2003 focused on effective regulatory and supervisory system for the banking sector.
Phase-7 (Recent Developments in Banking Sector of Bangladesh):

Automation and Technological Development:

- Automated Credit Information Bureau (CIB) service provides credit related information for prospective and existing borrowers.
- L/C Monitoring System has been introduced for preservation
- The e-Returns service has been introduced to submit Electronic Returns using predefined template.
- Online Export Monitoring System is used for monitoring export of Bangladesh.
- Bangladesh Automated Clearing House (BACH) started to work
- Electronic Fund Transfer (EFT) has been introduced to make payments instantly.
- Mobile Banking has been one of the most noteworthy advancement in banking.

3. Literature Review

Hicks (1969) explained that financial sectors enhanced the growth by capital accumulation through accumulated savings rate. Goldsmith (1969) found a positive correlation between financial development and economic growth after analyzing this correlation among several 35 sample countries. Mackinnon and shaw (1973) also stated that state development depends on financial system. Patrick (1966) and Richard (2003) explained that developed financial system promotes the economy. FSD can play an active or passive role in economic development. Moreover, efficient financial sector development persuades a country to utilize its scarce resources productively.

Levine (1997) illustrated that there is a connection between financial market and economic growth. According to Odedokun found a positive relationship between FSD and economic growth. He analyzed this relationship over some less developed countries from the period of mid 1960 to 1980s and stated that FSD is another growth determining factor like real investment, labor force and export growth. There is a strong supply leading relationship between financial sector development and aggregate output of the economy. In addition, FSD has also the demand –following relationship because FSD drive the economic growth which in turn leads higher income, education as well as the higher demand. Economic growth is an up most important global issue for the developing country. However, Bhatia and Khatkhate (1975) found no supply leading relationship between FSD and economic growth over the study of less developed African countries. But Levine and Zervos (1998) as well as Levine and Beck (2004) illustrates the positive influence of banking sector development and stock market growth on country’s economic growth. Therefore, this correlation promotes economic development, capital formation and enhanced productivity of the country.

Efficient financial sector provide firms an access to get external capital for growth after controlling the economic and political factors of the country. Arestis (2001) investigated among five developed economies and found that banking sectors and stock market are important to enhance economic growth. Schich and Pelgrin(2002) found a positive relationship between financial development and investment levels after investigating 19 OECD developed countries. Nourzad (2002) illustrated that financial efficiency decreases the productive inefficiency in both developed and developing countries.

Al-Yousif (2002) stated that financial development and economic growth is bi-directional and shouldn’t be generalized across countries. However Al-Tamimi, Al-Awad and Charif (2001) found that financial sectors is not affected by economic growth or is not affects the economic growth among the Arab countries. Cole and Patrick (1986) found that financial sectors as well as banking sectors and economic growth has a complex relationship. That’s why according to them we need to incorporate overall banking system and economic growth efficiently. According to Levine and Zervos (1998) assured that stock market and banking efficiency promote economic growth. There is a significant impact of service sector on gross domestic product (GDP). The global economic integration enhances the competitiveness of the domestic markets. The
competitive domestic market promotes the economic growth and reduces poverty. Bangladesh has taken wide range of policy reforms like trade policy, exchange rate policy, fiscal and monetary policy and foreign direct investment policy. Due to these reforms Bangladesh achieved liberalized economy especially in financial and telecom sectors. Financial liberalization increases the annual average growth from 4.48 percent at 1991-2000 to 5.67 percent at 2001-2005. The expansion of service sectors is one of the strength parts of economic development. In addition financial sectors induce structural change of economic development. Poshakwale and Qian (2007) found the positive and significant relationship between the efficiency of banking system and economic growth in Egypt over the period of 1992-2007. Actually in Egypt, the formation of financial sectors especially the banking sectors are important aspects for economic growth process of the country. In addition Khatib et al. (1999) study the impact of commercial banks on economic growth in Qatar and this study suggest that these banks are large profit maximize organizations.

Yazdani (2011) found that the performance of private banks have significant impact on economic growth in Iran. Eatzaz Ahmed and Aisha Malik found the positive relationship between per capita GDP and financial development among the 35 developing countries over the period of 1970-2003 through efficient resource allocation.

There is a close relationship between financial sector development, domestic capital and foreign capital in economic growth by enhancing the total factor productivity growth and efficient resource allocation. Goldsmith (1969), McKinnon (1973) and Shaw (1973) stated that financial development is needed for growth. Financial development is not only the by product of growth but also the engine of the growth.

The distribution of capital and risk across the economy can be reduced by improving financial system.

Financial development can measured by using total credit to GDP or can use bank credit as a measure of financial development. (BIS Working Papers, No 381 by Stephen G Cecchetti and Enisse Kharroubi)

Private credit has a significant impact on growth. Countries with higher private credit can developed the economies more but the private credit must be lower than the total credit of banks. Excess credits cannot always tend to higher growth and financial deepening depends on the productivity growth. Therefore we can say that financial sector size has the inverted U shaped impact on productivity growth as well as economic growth. The government expansion of public sector generally has negative impact on growth until it is essentially improve the productivity.

According to Billington (1999) and Tsai (1994) stated that per capita GDP has positive signal to attract FDI. The higher level of human capital in a country can exploit technology by FDI (Borensztein et al; 1998). So the country which labor force has higher human capital can enhance FDI in that country. According to Edward (1990) trade openness has a positive relationship with FDI. The relationship between FDI and real exchange rate variations is shown by Froot and Stein (1991) because the depreciation of domestic currency influences the foreign firms to increase their investment abroad.

Actually spreading the service sectors encourage exports and foreign direct investment (FDI) which in turn induces national output, employment as well as economic growth.

In modern growth theory, free trade enhances economic growth by allowing the domestic firms to buy inputs at world prices. We can measure growth rate of trade by taking domestic imports and exports or net export to GDP ratio. According to Levine (1997) and the World Bank (1998), we utilize total credit (public and private) as an indicator of financial development. Jordon Shan and Qi Jianhong (2006) found the two way causality between financial development and economic growth. According to them financial development is a contributing factor not the essential important factor to GDP growth.

The trade balance is relatively positive by enhancing the efficiency of the export sector. Foreign participants will increase by assuring the appropriate environment for investments.

In addition open economy (increasing net export) also expected to enhance productivity as well as growth of the economy through increased competition and broadcasting technology with the rest of the
An increase in exports will increase the supply of foreign exchange to purchase imported goods.

Financial sector plays a vital role in the growth rate of GDP in order to accumulate the source of funding for capital accumulation and for new technologies. According to Pagano, 1993 and Levine, 1997 illustrated that the efficient functioning of financial system can decrease the information and transaction costs. As a result the savers and investors altogether in the economy can increase economic growth through TFP and capital accumulation with the help of efficient resource allocation.

Greedwood and Smith (1997) stated that efficient financial sectors provide credit which in the long run enhances economic activity. Choe and Moosa (1999) also find the positive relationship among them in Korea. In addition King and Levine as well as Ghali (1999) find the causality relationship between them.

According to Kasekende (2009) stated that market oriented financial sector reforms have some impact on the competitiveness and efficiency of commercial banks. Financial liberalization, financial intermediation or raise investment has positive impact on economic growth. Khan and Senhadji (2003) found that proper financial regulatory policies enhances the efficiency of banking system but too much strict regulation affect banking efficiency through higher cost and conservativeness of banking system (Beck and Honohan, 2007). Despite this, Allen and Ndikumana (2007) illustrated that financial development decreases liquidity risk; provide proper facilities to the savers as well as create appropriate investment opportunities to the investors. There is some controversial argument between the financial development and economic growth from the theoretical and empirical perspective. Many economic research mentions that economic growth promotes financial development but many also stated that financial development enhances the economic growth.

Some researcher believe that improved financial system reduce cost and progress resources allocation which also encourages economic growth (Levine, 2004). Actually financial development and economic growth strengthen each other (Blackburn and Hung,1998). Financial development can play as a predictor of economic growth (king and Levine, 1993 and Garretsen, 2004).

Stable financial system insures stable economic growth and unstable financial system creates uncertainty about future growth of the economy. Actually instability enhances the probability of insolvency in the banking sector (Pierre Monnin and Terhi Jokipii, 2010). Zhicheng Liang (2007) in his paper showed that the relationship between banking sector development and economic growth in China by using a panel data set of 29 Chinese provinces from period of 1990 to 2001. Result shows that the private credit has positive and significant effect on China’s economic growth. In contrast, the public credit has negative effect on China’s economic growth due to loans which is allocated by the state- owned sectors. In addition, the contribution of foreign direct investment tends to stimulate economic growth in China.

Tuuli Koivu (2002) empirically found that development in banking sector accelerates economic growth in 25 transition countries for eight years from 1993-2000. He found that bank credit to private sector is negatively correlated with the economic growth due to numerous banking crisis arise in transition economies during these periods.

Habibur Rahman (2004) empirically and theoretically found that there is a close association between economic growth and financial sector development. According to him from the studies of McKinnon (1973) and Shaw (1973) also showed that financial liberalization increase saving and credit growth. According to Hussain (2004) illustrated that banking sectors (90% of financial sector) have positive impact on economic growth in Pakistan. The financial growth of the banking sectors is a significant factor for economic development. Shah (2008) one of the ADBs publication (Bangladesh financial sector –An agenda for further reforms) pointed out that financial sector development is necessary for economic growth and poverty reduction in Bangladesh.

Banking sectors reform can be able to achieve the expansion of the financial institutions and capital markets, provide quality services with proper technological transformation, and decrease the number of state owned banks to reduce corruptions as well as increase the efficiency of the banks.
4. Methodology

To explore the relationship between banking sector development and economic growth in Bangladesh, we used multiple regression analysis. We emphasize on secondary type of data which has been collected from Bangladesh Bank (BB), World Bank (WB) and Bangladesh Bureau of Statistics (BBS) over the period of 1990-2011. In our analysis the growth rate of GDP (current US $) employed as dependent variable and five other factors indicators used as independent variables.

The five explanatory variables in banking sector development are private credit to GDP ratio (prcrgdp), public credit to GDP ratio (pucrgdp), net export to GDP ratio (netexgdp), FDI to GDP ratio (fdigdp) and remittance to GDP (remittgdp). After considering above variables, we can construct the economic growth function of Bangladesh in the following way:

\[ \text{Growth rate of GDP (Y)} = \beta_0 + \beta_1 \text{private credit to GDP ratio} + \beta_2 \text{public credit to GDP ratio} + \beta_3 \text{net export to GDP ratio} + \beta_4 \text{FDI to GDP ratio} + \beta_5 \text{remittance to GDP ratio} + e_i \]

Our research findings are based on the following null hypothesis such as:

- \text{H}_1: \text{Private credit has no significant impact on economic growth.}
- \text{H}_2: \text{Public credit has no significant impact on economic growth.}
- \text{H}_3: \text{Net export has no significant impact on economic growth.}
- \text{H}_4: \text{FDI has no significant impact on economic growth.}
- \text{H}_5: \text{Remittance has no significant impact on economic growth.}

Assumptions

In this research, we will use the following assumptions:

- Linearity (linear relationship between).
- Normality (error should be normality distributed).
- Homogeneity of variance (error variance should be constant).
- Independence (the errors with one observation are not correlated with errors of other observations).
- Model specification (the model should be properly specified)

5. The Empirical Analysis

In our research, we can examine our empirical analysis by using STATA software.

The results of multiple regression model with dependent variable = growth rate of GDP is shown in APPENDIX Table 1.

In the table 1, we select growth rate of GDP is our dependent variable and five other independent variables to show the impact on economic growth in Bangladesh.

The beta values show the relationship between the independent variables and dependent variables. The positive coefficient of the independent variables implies the positive relation with dependent variable and vice versa. The value of dependent variable will be increased by increase in independent variable. The coefficient of Beta influenced the dependent variable to response against the independent variables.

The values of coefficients beta and constant are incorporated to construct the regression model:

\[ \text{Growth rate of GDP} = 3.50778 + 16.36703 (\text{prcrgdp}) - 25.08362(\text{pucrgdp}) - 9.572746 (\text{netexgdp}) + .0583491 (\text{fdigdp}) + 114.4844 (\text{remittgdp}) \]
Here all independent variables have positive beta coefficient except public credit to GDP ratio and net export to GDP ratio. So the dependent variable will be increased by increasing the independent variables like private credit to GDP ratio, FDI to GDP ratio and remittance to GDP ratio. But the dependent variable will be decreased by increasing the independent variables like public credit to GDP ratio and net export to GDP ratio.

**Remittance:**

According to the table the remittance to GDP ratio has significant impact on growth rate of GDP. Here p value of remittance is 0.020 which is lower than both 5% and 10% level of significance. So remittance in Bangladesh has positive and significant impact on the growth rate of GDP. After analysing the data over the year 1990-2011, we found that the trend of remittance to GDP ratio is increasing in each year.

**FDI:**

Here the FDI has insignificant contribution to growth rate of GDP because p value is equal to 0.942 which is greater than 5% and 10% level of significance. Over the year 1990-2011, FDI has no significant impact on the growth rate of GDP due to poor infrastructure, political instability and availability of bank’s loan. Therefore FDI is decreasing afterward 1997.

**Net export:**

Although p value of net export to GDP 0.059 is greater than 5% level of significance but lower than 10% level of significance. Here 0.059 is closer to the value of 5% level of significant. Therefore we can say that net export has negative but somewhat insignificant at 5% level but highly significant at 10% level. According to balance sheet of Bangladesh, our import is higher than our export over the year 1990-2011. But this net export has negative but significant impact on the growth rate of GDP. However to enhance the GDP of Bangladesh we should emphasis on RMG sector, pharmaceutical sector, shipping industry as well as have to boost our ICT industry. Here net export of GDP ratio is fluctuating over the time period 1990-2011.

**Public credit:**

The p value of public credit to GDP is 0.185 which is highly insignificant at 5% and 10% level of significance. Therefore it is imply that public credit has negative and insignificant impact on growth rate of GDP in Bangladesh. Due to the poor policy making, political intervention in the public banking sector diminishes the probability to achieve the professionalism and efficiency in this sector. For this reason, the impact of public sector to growth rate of GDP is decreasing over time.

**Private credit:**

The p value (0.095) of private credit to GDP ratio is also insignificant at 5% and 10% level of significance. So it is also noticeable that private credit has positive but insignificant impact on growth rate of GDP. Private banking sector operates more efficiently than the public banking sector in Bangladesh but this private sector has positive and insignificant impact on the growth rate of GDP because of high domestic interest rate, the lack of proper foreign borrowing strategy and poor loan management. Bangladesh is a rapidly growing and capital emerging market needs to overcome the all obstacles to enhance the growth rate of GDP.

**Autocorrelation Test (Durbin – Watson test):**

In the classical linear regression model, autocorrelation defined as the correlation between the disturbance terms. If the disturbance term of any observation is not affected by the disturbance of any other observations then we can say that there is no autocorrelation between the disturbance terms.

In order to examine the autocorrelation, we construct the hypothesis such as:

\[ H_0 : \text{No positive autocorrelation} \]
\[ H_1 : \text{No negative autocorrelation} \]

The results are reported in table 2 of appendix.
We can examine the autocorrelation by Durbin–Watson test. According to the findings, our d value is equal to 2.2037.

At 5% level of significance, our critical \(d_L\) (lower limit) = 0.863 and critical \(d_U\) (upper limit) = 1.940.

So our calculated d value is higher than upper and lower limit of d values. Therefore according to d-statistics there is no positive first order correlation because we accept our null hypothesis of no positive autocorrelation.

**Unit root test:**

We can investigate the stationary or non stationary of growth rate of GDP by using unit root test. In order to do that we estimate the Augmented-Dickey–Fuller test. The results are reported in table 3 of appendix.

\[H_0: \delta = 0 \text{ (there is unit root – time series under consideration is non stationary where } \rho = 1)\]

\[H_1: \delta < 0 \text{ (time series under consideration is stationary where } \rho = 0)\]

The t \(= \tau\) (tau) of growth rate of GDP is -5.474334. Here the absolute t value is higher than critical t value at 5% level of significance. So we can say that our calculated t value higher than the critical t value, we can reject our null hypothesis of time series of growth rate of GDP is non stationary. Therefore our empirical result implies that our dependent variable is stationary. Here we can reject our null hypothesis at 10% level of significance.

**Multicolinearity:**

We examine the multicolianirity (the relationship between independent variables) by variance–inflating factor (VIF). It shows how the multocliarity of the independent variables inflated the variance of an estimator. The results are reported in table 4 of appendix.

According to the rule of thumb, there is no multicollinerity problem because all of our regressors have VIF<10. Therefore all the regressors have no collinearity relationship.

**Model specification and selection:**

We know the model is perfectly specified if the parameters as well as the variables are linear. Here our constructed multiple regression model is correctly specified because all the parameters and variables are linear.

In our regression analysis, we find that not all independent variables are statistically significant. In this research, we take the most influential variables to construct the multiple regression models. The results are reported in table 5 of appendix.

We can test it by backward selection in STATA. According to our result in the case of model selection procedure we find that FDI and public credit to GDP should be removed from the model because of their insignificanc at 5% and 10% level of significant.

But we incorporate these two variables into the model to explain their impact on growth rate of GDP because these two are important macroeconomic factors which have some influential affect on the economy of Bangladesh.

**R\(^2\) and Adjusted R\(^2\):**

\(R^2\) examines how the sample regression line fits the data.

Here the \(R^2\) value of 0.6449 which means that approximately 64.49 percent of the variation of growth rate of GDP is explained by variation of all independent variables in the model.

Here the value of adjusted \(R^2\) is 0.5340 or 53.40%. So we can say that dependent variable is moderately explained.
6. Conclusion and Recommendations

The long run better performances of an economy depend on the development of financial sector. Through resource allocation and mobilization, investment is the ultimate goals for the financial sector which make the highest return on capital. Among all of the financial sectors the banking subsectors have a dominant role rather than non banking financial institutions and capital markets. In Bangladesh including 48 banks, banking sectors alone occupied about 90% of the total shares of all financial assets in end of December 2007. Compare to SCBs and specialized banks, the private sectors banks (PCBs and foreign commercial banks) continuously doing better in terms of growth in deposits and bank advances since 2002. According to the estimation of last quarter September 2008 loan disbursement accounted about 43% in whole country. For this reason, the credit market in Bangladesh had a minor effect from the global financial crisis which occurred in 2008. Bangladesh banking sector is not working perfectly for high interest spreads, high transaction cost, and lower strengths of financial system and appropriate lack of diversification. But this sector plays a vital role for macroeconomic stability. Though Bangladesh faced two shocks like global recessions and floods and cyclone-Sidar in last year (2007) but during FY2008-09, the economy of Bangladesh achieved a flexible or stable growth. It was possible due to our agricultural sector, industry and service sector growth. In addition, our remittance and exports’ were satisfied the growth. During FY 2008-09, the government took some efficient steps like ‘Task Force’ for stakeholders of public and private sector as well as constructed a ‘Technical Committee’ to monitor several macroeconomic crises.

There are several reasons for which the banking system in our country operates inefficiently like:

- The structures, policies as well as the corporate governance of the banks are so ineffective.
- Inefficient skills of the executive and staff.
- Lack of accountability.
- Lack of professionalism.
- Poor policy making in State owned Enterprise.
- Political benefaction in private and public banks.
- Non profit branches and unproductive assets.
- Uncontrolled bank union activity.
- Weak cost effective operation management.
- Persistent default system in bank.

There are remaining some unsettled issues which need to be solved by legislation to sustain the macroeconomic stability as well as the soundness of the banking system:

- Need regulatory authority to ensure efficient banking system.
- Credit discipline among borrowers should be ensured.
- The Banking Reform and Development (BRD) should take strategic framework for the finance sector to enhance the performance and potentiality of the banking sector.
- The time bound quantitative targets should be set up for the banking sector.
- Several quantitative techniques should be taken like recapitalization of SCBs should be met, transformation of BASIC bank, adopt AMC to avoid bad debts for commercial banks’ etc.
- Banking laws, rules and regulation should be reviewed.

Policy makers should take several policies to promote the banking sector in order to enhance the economic growth.

According to our research, there are some recommendations by which we can resolve the above obstacles to accelerate the economic growth in Bangladesh:

- To reduce the transparency and transaction cost, Bangladesh needs to introduce E-governance.
- Promote the service sectors to work efficiently to enhance growth of the economy.
- Need to build up skilled workforce to play a significant role in the financial service sectors.
- Should take appropriate law and polices to maintain the sustain growth of the financial sectors.
Law and political stability should be improved to enhance FDI.

To achieve gain from the competitive import markets, Bangladesh needs to provide appropriate training for workers. In addition, developed country’s restrictions should be relaxed.

To increase the growth of the banking sector, foreign banks can play a significant role to open new branches and promote new capital investments.

References


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Appendix:

1. Multiple regressions with the dependent variable and five independent variables.

Number of observation = 22,  \( F (5, 16) = 5.81 \)  \( R^2 = 0.6446 \)

\textbf{Adjusted } R^2 : 0.5340

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<tr>
<td>netexgdp</td>
<td>-9.572746</td>
<td>4.718652</td>
<td>-2.03</td>
<td>0.059</td>
<td>-19.57584, 1.30387</td>
</tr>
<tr>
<td>fdigdp</td>
<td>0.0583491</td>
<td>0.788596</td>
<td>0.07</td>
<td>0.942</td>
<td>-1.613402, 1.7301</td>
</tr>
<tr>
<td>remittgdp</td>
<td>114.4844</td>
<td>44.17104</td>
<td>2.59</td>
<td>0.020</td>
<td>20.84597, 208.1228</td>
</tr>
<tr>
<td>_cons</td>
<td>3.507782</td>
<td>3.998194</td>
<td>0.88</td>
<td>0.393</td>
<td>-4.96801, 11.98357</td>
</tr>
</tbody>
</table>

2. Autocorrelation Test (Durbin-Watson Test)

<table>
<thead>
<tr>
<th>Number of</th>
<th>Number of variables</th>
<th>Critical value ( d_L ) (lower limit)</th>
<th>Critical value ( d_U ) (upper limit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>observation</td>
<td>(K)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>5</td>
<td>0.863</td>
<td>1.940.</td>
</tr>
</tbody>
</table>

According to Durbin-Watson, \( d \) value

2.20378

3. Augmented Dickey Fuller Test (Stationary Test):

Null Hypothesis: D(GRTRTGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

<table>
<thead>
<tr>
<th>Test critical values:</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% level</td>
<td>-3.808546</td>
<td></td>
</tr>
<tr>
<td>5% level</td>
<td>-3.020686</td>
<td></td>
</tr>
<tr>
<td>10% level</td>
<td>-2.650413</td>
<td></td>
</tr>
</tbody>
</table>

Augmented Dickey-Fuller test statistic \(-5.474334\)  \( p = 0.0003 \)

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRTRTGDP,2)
Method: Least Squares
Date: 07/29/13   Time: 12:26
Sample (adjusted): 1992 2011
Included observations: 20 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(GRTRTGDP(-1))</td>
<td>-1.136216</td>
<td>0.207553</td>
<td>-5.474334</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>0.436474</td>
<td>0.994533</td>
<td>0.438873</td>
<td>0.6660</td>
</tr>
</tbody>
</table>

R-squared          | 0.624752    | Mean dependent var | 0.436987|
Adjusted R-squared | 0.603905    | S.D. dependent var  | 7.066992|
S.E. of regression | 4.447686    | Akaike info criterion | 5.917284|
Sum squared resid  | 356.0744    | Schwarz criterion   | 6.016858|
Log likelihood     | -57.17284   | Hannan-Quinn criter. | 5.936722|
F-statistic        | 29.96833    | Durbin-Watson stat  | 2.203789|
Prob(F-statistic)  | 0.000034    |                        |          |

4. Multicollinearity:

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>I/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>pucrgdp</td>
<td>4.22</td>
<td>0.237050</td>
</tr>
<tr>
<td>remittgdp</td>
<td>4.10</td>
<td>0.243750</td>
</tr>
<tr>
<td>prcrgdp</td>
<td>2.95</td>
<td>0.339327</td>
</tr>
<tr>
<td>fdigdp</td>
<td>2.50</td>
<td>0.399850</td>
</tr>
<tr>
<td>netexgdp</td>
<td>1.27</td>
<td>0.789621</td>
</tr>
</tbody>
</table>

Mean VIF 3.01

5. Model Selection Test (Backward selection at 5% and 10 % level):

At 5% level:
Number of obs = 22
F (3, 18) = 8.75
Prob > F = 0.0009  R-squared = 0.5933  Adj R-squared = 0.5255
Root MSE = 3.2209

| P = 0.9419 >= 0.0500 removing fdigdp
| p = 0.1347 >= 0.0500 removing pucrgdp

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>272.40751</td>
<td>3</td>
<td>90.8025034</td>
</tr>
<tr>
<td>Residual</td>
<td>186.740105</td>
<td>18</td>
<td>10.3744503</td>
</tr>
<tr>
<td>Total</td>
<td>459.147615</td>
<td>21</td>
<td>21.147615</td>
</tr>
</tbody>
</table>
At 10% level:
Number of obs = 22
F (3, 18) = 8.75
Prob > F = 0.0009  R-squared = 0.5933  Adj R-squared = 0.5255
Root MSE = 3.2209

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>272.40751</td>
<td>3</td>
<td>90.8025034</td>
</tr>
<tr>
<td>Residual</td>
<td>186.740105</td>
<td>18</td>
<td>10.3744503</td>
</tr>
<tr>
<td>Total</td>
<td>459.147615</td>
<td>21</td>
<td>21.8641721</td>
</tr>
</tbody>
</table>

6. Summarize of dependent and independent variables:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>grtrtgdp</td>
<td>22</td>
<td>6.802332</td>
<td>4.675914</td>
<td>-.29089</td>
<td>16.28</td>
</tr>
<tr>
<td>prcrgdp</td>
<td>22</td>
<td>.15605</td>
<td>.1296866</td>
<td>.0297</td>
<td>.556</td>
</tr>
<tr>
<td>pucrgdp</td>
<td>22</td>
<td>.2822227</td>
<td>.0789787</td>
<td>.1746</td>
<td>.3711</td>
</tr>
<tr>
<td>netexgdp</td>
<td>22</td>
<td>-.1115364</td>
<td>.166122</td>
<td>-.74</td>
<td>-.0477</td>
</tr>
<tr>
<td>fdigdp</td>
<td>22</td>
<td>.4361941</td>
<td>1.396853</td>
<td>.0001</td>
<td>5</td>
</tr>
<tr>
<td>remittgdp</td>
<td>22</td>
<td>.0587546</td>
<td>.0319407</td>
<td>.0248524</td>
<td>.1177337</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>year</th>
<th>grtrtgdp</th>
<th>prcrgdp</th>
<th>pucrgdp</th>
<th>netexgdp</th>
<th>fdigdp</th>
<th>remittgdp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>12.31503</td>
<td>0.0373</td>
<td>0.1868</td>
<td>-0.74</td>
<td>0.00107</td>
<td>0.025351</td>
</tr>
<tr>
<td>1991</td>
<td>2.7504</td>
<td>0.033</td>
<td>0.1746</td>
<td>-0.0556</td>
<td>4.49</td>
<td>0.024852</td>
</tr>
<tr>
<td>1992</td>
<td>2.42</td>
<td>0.0297</td>
<td>0.175</td>
<td>-0.476</td>
<td>1.00E-04</td>
<td>0.028754</td>
</tr>
<tr>
<td>1993</td>
<td>4.597</td>
<td>0.0318</td>
<td>0.1764</td>
<td>-0.0508</td>
<td>4.00E-04</td>
<td>0.030373</td>
</tr>
<tr>
<td>1994</td>
<td>1.8154</td>
<td>0.0345</td>
<td>0.1776</td>
<td>-0.0486</td>
<td>3.00E-04</td>
<td>0.034081</td>
</tr>
<tr>
<td>1995</td>
<td>12.35</td>
<td>0.556</td>
<td>0.2109</td>
<td>-0.0648</td>
<td>5.00E+00</td>
<td>0.031673</td>
</tr>
<tr>
<td>1996</td>
<td>7.185</td>
<td>0.0619</td>
<td>0.2248</td>
<td>-0.076</td>
<td>3.00E-04</td>
<td>0.033066</td>
</tr>
<tr>
<td>1997</td>
<td>4.064</td>
<td>0.0682</td>
<td>0.2311</td>
<td>-0.0602</td>
<td>0.0032</td>
<td>0.036071</td>
</tr>
<tr>
<td>1998</td>
<td>4.189</td>
<td>0.0703</td>
<td>0.2324</td>
<td>-0.0494</td>
<td>0.0043</td>
<td>0.036426</td>
</tr>
<tr>
<td>1999</td>
<td>3.63</td>
<td>0.0748</td>
<td>0.2429</td>
<td>-0.0546</td>
<td>0.0039</td>
<td>0.039541</td>
</tr>
<tr>
<td>2000</td>
<td>3.13</td>
<td>0.0842</td>
<td>0.2574</td>
<td>-0.0524</td>
<td>0.0059</td>
<td>0.041751</td>
</tr>
<tr>
<td>2001</td>
<td>-0.29089</td>
<td>0.1327</td>
<td>0.345</td>
<td>-0.0611</td>
<td>0.0016</td>
<td>0.044789</td>
</tr>
<tr>
<td>2002</td>
<td>1.24</td>
<td>0.152</td>
<td>0.3523</td>
<td>-0.0477</td>
<td>0.0011</td>
<td>0.06008</td>
</tr>
<tr>
<td>2003</td>
<td>9.128</td>
<td>0.1498</td>
<td>0.3467</td>
<td>-0.0582</td>
<td>0.0051</td>
<td>0.06148</td>
</tr>
<tr>
<td>2004</td>
<td>8.95156</td>
<td>0.1666</td>
<td>0.3519</td>
<td>-0.0534</td>
<td>0.0079</td>
<td>0.063362</td>
</tr>
<tr>
<td>2005</td>
<td>6.5713</td>
<td>0.1856</td>
<td>0.3634</td>
<td>-0.0646</td>
<td>0.0134</td>
<td>0.071577</td>
</tr>
<tr>
<td>2006</td>
<td>2.69</td>
<td>0.2102</td>
<td>0.3711</td>
<td>-0.0627</td>
<td>0.0112</td>
<td>0.08768</td>
</tr>
</tbody>
</table>
Figure 1: Normal distribution of disturbance term $u_i$.

Figure 2: No outliers, absence of heteroscedasticity.
Figure 3: Trend of FDI to GDP ratio year to year basis

Figure 4: Trend of Growth rate to GDP year to year basis
Figure 5: Graph Matrix, correlation between numeric variables

Figure 6: Trend of net export to GDP year to year basis
Figure 7: Trend of public credit to GDP year to year basis

Figure 8: Trend of remittance to GDP year to year basis
Figure 9: Trend of private credit to GDP year to year basis