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Factors Affecting Gross Domestic Product of Bangladesh

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Abstract: *To achieve the higher economic growth is the vision of Bangladesh. This study tries to find out the scenario of the GDP in Bangladesh and identify the significant factors of GDP based on the secondary data collected from World Bank from the period of 1990 to 2017. GDP is considered as dependent variable and price inflation, gross savings, FDI net inflows and labor force are considered as independent variables. Several diagnostic test namely normal probability plot and heteroscedasticity test are used in this study. The result of the test is that the data are normally distributed and the variance of error term is homoscedastic. The result of this study is that the GDP of Bangladesh are growing up. Gross savings and labor force total are statistically significant factors of GDP growth. Good governance and political stability play an important role to increase the economy of Bangladesh.*

Key words: *Gross Domestic Product, Price inflation, Foreign Direct Investment, Labor force, Gross savings, Regression, Heteroscedasticity.*

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I. Introduction

There are some economic facts of life that emphasize all macroeconomic explanations of growth. Possibly the most significant factor is that accumulate the capital goods, the consumer good will have to be foregone at present to generate more units of consumer goods in the future. An increase in the amount of capital goods or capital formation is termed as an investment. For the economic growth to occur the level of investment has to be greater than the amount of depreciation, i.e. the quantity by which machines wear out or become outdated during the year. Economic growth indicates the growth in economic output over the period which is measured by GDP where GDP is the market value of all the products and services that are produces by the people and property of a given country, for the period of one year. The evaluation process also involves the sum of value added at every stage of production (the intermediate stages) of all final commodities (goods and services) produced within a country in a given period of time monetarily Real economic growth (GDP) can be studied using a concept of two-component, economic growth – a deviation or business cycle and an economic trend component. The trend component or economic growth is accountable for the long-term expansion and describes economic efficiency. The deviation component of economic growth has to have a zero mean value in the long run (Kitov, 2006). The most influencing indicators used for assessing economic growth are Gross Domestic Product (GDP), Gross National Product (GNP) and Balance of Payments (BOP). In this study we have tried to identify the "Factors Affecting Gross Domestic Product (GDP) of Bangladesh".

There are many factors affect economic growth (GDP) such as inflation, FDI, population growth, capital formation, export, import, employment, unemployment, personal remittance, life expectancy, personal income, industrial growth. Other factors can be living standard, geographical location, demographics, urbanization, democracy, inequality, government spending, poverty etc. Economic growth (GDP) can affect positively and negatively where both are important for a country. Bangladesh is a densely populated with 1,278 people per square kilometer (2018) and now considered as a lower middle income country. The economic development of Bangladesh is growing faster. Bangladesh has become independent in 1971 from Pakistan. The war almost completely destroyed the physical infrastructure. There has been huge economic progress in Bangladesh since its independence, accelerated from an average of less than 4% per year during 1972-1990 to 6.4% in 2010-2013. Now the vision of Bangladesh Government is to attain middle income status by the year 2021. From the report of Bangladesh bank, annual growth rate in Bangladesh averaged 5.69% from 1994 until 2017 and it has reached 7.30% in 2017 which is the highest growth rate in economic history of Bangladesh.

II. Literature Review

The linkage between this study and past researches can be found in this section and are taken into consideration and used as guidance to determine a connection between GDP growth and its factors. FDI has always been the major source to finance the economic activities of a country. There are some studies on the relationship between FDI and economic (GDP) growth. To analyze the role of FDI in economic growth Faruk (2013) used GDP took as dependent variable and FDI as the independent variable. The result showed that FDI is statistically significant and can explain 83% Fluctuation about of GDP. The correlation showed that GDP and FDI is highly correlated (0.912024), in the perspective of Bangladesh economy, especially different sector like Garments, Banking, Telecommunication, Fertilizer and other manufacturing sectors. Herzer et al. (2008), have mentioned that there is a positive relationship between FDI and economic growth (GDP). However, Duasa (2007); Karim and Yusop (2009), found that there is no causal relation between FDI and GDP growth. Based on empirical studies it showed that female labor force participation rate has proved a significant impact on GDP growth. Through the female labor force participation rate, the average household income has improved thus it did increase the GDP growth. The study about the relationship between GDP growth and gender equality in labor force especially female participation rate seems to be the longest research conducted by many researchers. The common result from research done by Bryant et al. (2004), concluded that by increasing the labor force participation of women, it increases the rate of GDP. Roy (1991) in his study analyzed the determinants of export performance of Bangladesh using an econometric analysis and demonstrated that the export performance of Bangladesh is associated with greater commodity diversification of exports. In a study over the 1962-1992 periods, Begum and Shamsuddin (1998) find that export growth significantly increases economic growth through its positive impact on total factor productivity in Bangladesh. According to Sidrauski (1967), the inflation has insignificant impact on economic growth. This study was then supported by Sarel (1996). Iqbal (2010) argued that FDI is generally considered as a factor which enhances economic growth, as well as the solution to the economic problems of developing countries. Fotopoulos and Louri (2004) examined a modal which consists of five variables as GDP, FDI, labor force, and gross capital formation as a percentage of GDP, which founded that Pakistan's capacity to progress on economic development will depend on performance in attracting FDI Shirazi and Manap (2005) analyze the export-led growth (ELG) hypothesis for five South Asian countries including Bangladesh using co-integration and multivariate Granger Causality tests. They showed feedback effects between exports and GDP and imports and GDP for Bangladesh.

III. Material And Methods

Data used in this study were records of GDP and its different factors (i.e. price inflation, gross savings, FDI and labor force) for the period from 1990 to 2017 from World Development Bank. The line diagram used to show the scenario of GDP in Bangladesh. The ordinary least square (OLS) method and normality test is used for the analysis. Multiple regression model have used for the study and OLS method is used to estimate the model of GDP in Bangladesh. We have used GDP as a dependent variable and price inflation rate (INF), gross savings(SAV), foreign direct investment (FDI) and labor force total (LF) as independent variables. The model of GDP is specified as

$$GDP_t = \beta_0 + \beta_1 INF_t + \beta_2 SAV_t + \beta_3 FDI_t + \beta_4 LF_t + u_t$$

Where β_0 is the constant term, $\beta_1, \beta_2, \beta_3 \; and \; \beta_4$ represents the coefficient of selected independent variables and u_t represents the random error term.

After model specification we have find the most influencing factors of GDP. Our main hypothesis are stated as follows:

H_1: Price inflation affect the GDP of Bangladesh.

H_2: Gross savings affect the GDP of Bangladesh.

H_3: FDI affect the GDP of Bangladesh.

H_4:Labor force total affect the GDP of Bangladesh.

Then we check normality by plot the histogram of residuals of the GDP and ARCH heteroscedasticity test is used to check the variance of error term is homoscedastic or heteroscedastic.

IV. Results and Discussion

Gross Domestic Product in Bangladesh

The Gross domestic Product (GDP) is the market value of all final goods and services produced within a country in a given period of time. The GDP is the officially recognized totals. The following equation is used to calculate the GDP:

$$GDP \; = \; C + I + G + \; (X - M)$$

Written out, the equation for calculating GDP is:
GDP = private consumption + gross investment + government investment + government spending + (exports – imports).

Figure-1 shows the GDP (per million US$) of Bangladesh from 1990 to 2017. We can say that in 1990 the GDP of Bangladesh was 31598 US$ (per million) but from 1990 until 2017 it was growing up and in 2017 it was 249723.86 US$ (per million). Table-1 shows the descriptive statistics of different variables namely GDP, Price inflation, Savings, FDI net inflows and labor force total (Per million US$) of Bangladesh from year 1990 to 2017. The average GDP of Bangladesh from 1990 to 2017 is 87992.13 US$ (per million) and its minimum and maximum values are 30957.48 US$ (per million) and 249723.9 US$ (per million) respectively.

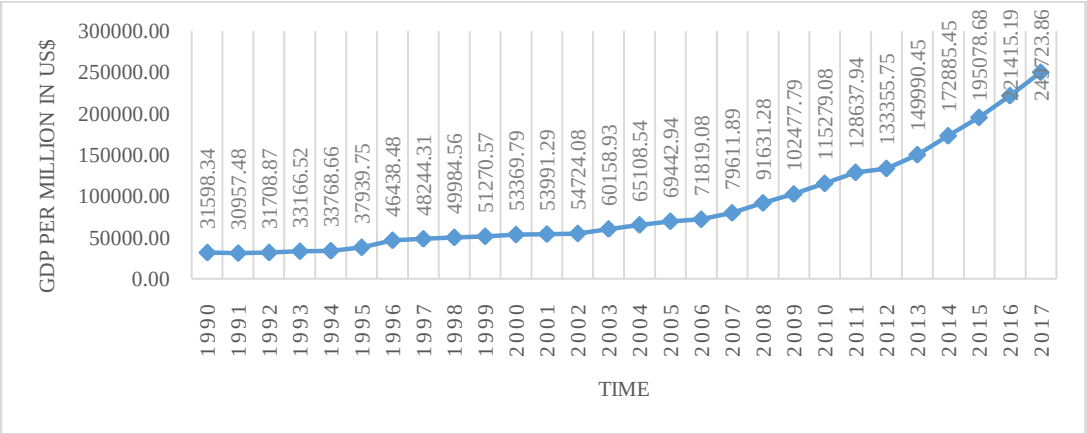

Figure-1: GDP of Bangladesh.

Table-1: Descriptive Statistics of different variables.

Variable	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
GDP	30957.48	249723.9	87992.13	61083.53	1.307897	0.876083
Price Inflation	0.155518	19.14321	5.752347	3.237191	2.528632	10.7622
Savings	6932.201	87996.55	30173.58	24706.95	1.036176	-0.07904
FDI net inflows	1.390444	2831.153	797.2513	930.4838	1.047558	-0.25552
Labor force total	34.58584	66.64226	51.19169	9.896017	-0.16111	-1.22254

Regression Analysis
The purpose of this analysis is to explain on the relationship between dependent and independent variables through a model. In addition Ordinary Least Square (OLS) method has been chosen to model of multiple regression function. The estimated regression model is

$$GDP_t = 39114.75 - 613.71INF_t + 2.94SAV_t - 7.03FDI_t - 594.14LF_t$$

Table-2: OLS Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.	R^2	Adjusted R^2	F-Sig.
C	39114.75	10679.74	3.662517	0.0013	0.993	0.991	0.000
PRICE INFLATION	-613.7109	510.8768	-1.201289	0.2419			
SAVINGS	2.938064	0.173669	16.91758	0.0000			
FDI NET INFLOWS	-7.027073	3.914769	-1.795016	0.0858			
LABOR FORCE TOTAL	-594.1415	265.8747	-2.234667	0.0354			

From the above table-2 we can say that the model of GDP in Bangladesh is the best fitted model since the p-value of F test is less than 0.05 and the value of R^2 is close to 1. The value of coefficient of determinant $R^2 = 0.993$ tells that the 99.3% of the variations in the GDP is explained by the independent variables such as national price inflation, gross savings, labor force total and FDI net inflows. It also can be noticed that among the factors of gross saving have positive impact on GDP in Bangladesh. On the other hand the price inflation, FDI net inflows and labor force total has a negative impact on GDP in Bangladesh. The coefficient of price inflation measure that if the values of price inflation increase 1 US$ on an average the values of GDP goes down 613.71 US$. The coefficient of gross savings measure that if the values of gross savings increase 1 US$ on an average the values of GDP goes up 2.93 US$. The coefficient of FDI net inflows measure that if the values of FDI net inflows increase 1 US$ on an average the values of GDP goes down 7.02 US$. The coefficient of labor force total measure that if the values of labor force total increase 1 US$ on an average the values of GDP goes

down 594.14 US$. However, the p-value of t-Statistic of gross savings and labor force total fall in rejection region at 5% significant level and it leads to significant to the GDP growth. While the p-value of t-Statistic of price inflation and FDI is fall in acceptance region. It concluded that these variables influence insignificantly to GDP growth.

Based on the hypothesis that has been tested. It shows that gross savings and labor force total is to be statistically significant factors in the explanation of GDP growth in Bangladesh.

Normality and Heteroscedasticity Tests

From figure-2 we can say that the data is normally distributed since it is bell shaped. The normal probability plot (shown in figure-3) also shows that the data is normally distributed since the observed value and predicted value are approximately equal of each other.

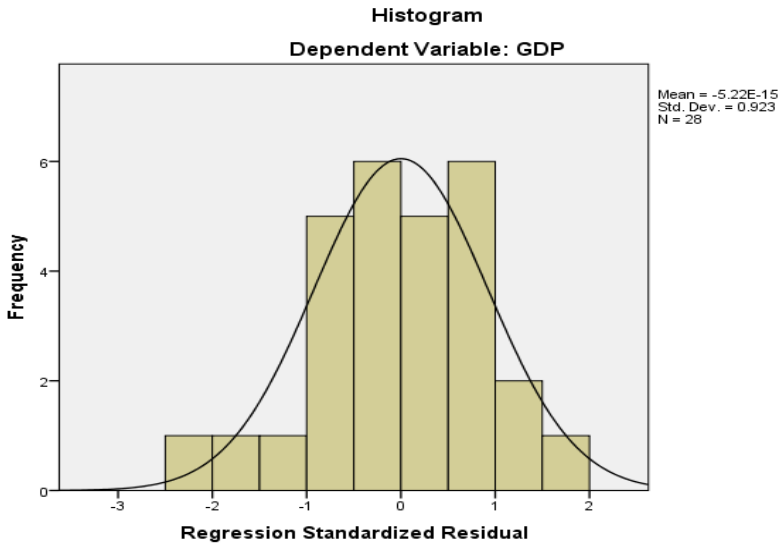

Figure-2: Residual plot of GDP.

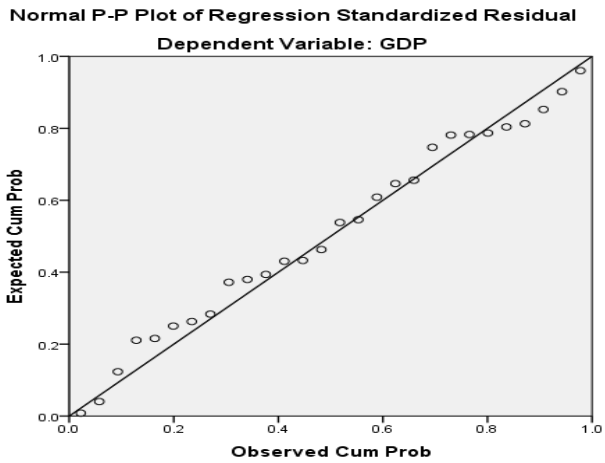

Figure-3: Normal P-P plot of residual.

To run the heteroscedasticity test we assume the following hypothesis
H_0: The variance of error term is homoscedastic.
H_1: The variance of error term is heteroscedastic.

Since the p-value on table-3 is larger than 5% level of significance therefore we can say that the null hypothesis is accepted that leads to the variance of error term are homoscedastic.

Table-3: Heteroskedasticity Test: ARCH

F-statistic	0.154132	Prob. F(1,25)	0.6979
Obs*R-squared	0.165443	Prob. Chi-Square(1)	0.6842

V. Conclusion and Implications

This paper has presented an analysis for determining the factor affecting Gross Domestic Product (GDP) in Bangladesh. For this study secondary data are collected from World Bank from year 1 990 to 2017. Based on the result we can say that the GDP of Bangladesh curve concave up. i.e. In this study it can be concluded that gross savings and labor force total is to be statistically significant factors in the explanation of GDP growth in Bangladesh and the gross savings has a positive relationship with GDP. While the other variables such as price inflation and FDI are insignificant factors. It does not mean the other factors are not important or significant. It might be because of limited access to the availability to the data and missing data on the certain variables.

From the last few years the economic growth of Bangladesh has been achieving sustainable GDP growth. The root of the GDP growth in Bangladesh is "good governance. So good governance can play vital role to the economy of Bangladesh. Corruption and political instability is the main problem of our country. So when good governance will be established political instability will be decreased.

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