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RESEARCH ARTICLE

IMPACT OF MACROECONOMIC VARIABLES ON ECONOMIC GROWTH: BANGLADESH PERSPECTIVE

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ABSTRACT

The impact of macroeconomic variables on the economic growth of Bangladesh is investigated in this study by considering GDP growth (GDP) as the representative of economic growth. In addition, inflation (INF), real interest rate (INT), exchange rate (EXR), and household consumption expenditures growth (HCE) are selected to represent the macroeconomic variables for the period of 1987-2015. Correlation and multiple regression analysis are conducted to evaluate the data. In correlation analysis, it is found that GDP has positive correlation with all the variables except INT. In regression analysis, GDP is selected as the dependent variable and INF, INT, EXR, and HCE are considered as the independent variables. It is observed that the independent variables explained 75.60% of the variability of GDP and the relationship is also found statistically significant at 95% confidence level. Therefore, this study has concluded that macroeconomic variables have significant effect on the economic growth of Bangladesh.

KEYWORDS

Economic Growth, Macroeconomic Variable, GDP, Inflation, Bangladesh.

1. INTRODUCTION

Economic growth is the prime priority of macroeconomic policy in any country and Gross Domestic Product (GDP) is considered as a key indicator of this economic growth [1]. If GDP of a country increases sooner than the population, then it specifies that GDP per capita of that country is growing and the standard of living of people in that particular country is also improving. GDP of a country is influenced by numbers of variables i.e. inflation, interest rate, exchange rate, foreign direct investment, household consumption and so on [2-6].

Inflation has multiple economic implications for an economy and most of the countries try to maintain a sustained high economic growth with low inflation [7]. Inflation raises the price level of commodities, services and other factors thus creates economic difficulties for a country. It causes the deterioration in purchasing power of money, therefore, value of money also decreases simultaneously. This price level increase and decline in value of money triggered by inflation affect the growth of an economy. Higher inflation also causes high interest rate and as interest rate, generally, drives opposite to GDP, the increase in interest rate leads to decrease in economic growth of a country and vice versa [5].

Exports that help to fuel economic growth of a country can be limited through the exchange rate volatility as it reduces the trade by making the expected return from exports uncertain. Household consumption expenditure is also deemed to be a primary indicator of economic-wellbeing and influences the economic growth vibrantly by stimulating the aggregate expenditure. So, it can be seen that different macroeconomic phenomenon influences economic growth of a nation. But, the magnitude and direction of the influence may vary depending on particular economy. Therefore, this study attempts to explore the impact of macroeconomic variables on economic growth in perspective of the economy of Bangladesh.

2. OBJECTIVE OF THE STUDY

The objective of this study is:

- To investigate the impact of macroeconomics variables on economic growth of Bangladesh

3. REVIEW OF LITERATURES

To examine the impact of macroeconomic variables on economic growth in perspectives of different countries, numbers of studies have been conducted. The relationship between inflation and economic growth of Pakistan was examined for the period of 1972-73 to 2009-10 by Ayyoub, Chaudhry and Farooq [7]. They used the Ordinary Least Squares (OLS) regression and concluded significantly inverse relationship between inflation and economic growth in Pakistan. Negative inflation and economic growth relationship was also observed by Faria and Carneiro [8]. They studied the economy of Brazil for 1980-81 to 1996-97 and found that inflation had no impact on real output in the long run but a negative impact on output in the short run.

In Nigeria, for 1970-2005, Omoke Philip identified a unidirectional causality and no co-integrating relationship between Inflation and economic growth through Co-integration and Granger causality test [9]. Studying 13 Sub Saharan Africa (SSA) countries for 1969 to 2009, Mamo found a negative significant relationship between inflation and economic growth [2]. Anaripour explored the relationship between interest rate and economic growth for 22 countries during 2004-2010 and concluded a negative relationship [3]. Agalega and Antwi studied the economy of Ghana for 1980-2010 to examine the impact of inflation and interest on GDP [10]. By running multiple linear regressions, a strong positive correlation between GDP, interest rate and inflation was identified by them and the variance of interest rate and inflation explained about 44% of the variability of GDP. They further added that GDP and inflation have a positive coefficient where interest rate and GDP have a negative coefficient.

For Nigeria, based on the data of 1979 to 2010, Inyima found that inflation was negatively related with real GDP and exchange rates and interest rates were positively related with inflation [11]. Some researchers used the structural vector error correction model (SVECM) approach to study the relationship between economic growth, fixed investment, and household consumption in Malaysia and found that household consumption and foreign direct investment had a significant impact on GDP in short run only and in the long run, economic growth had a permanent impact on household consumption and investment [12].

A group of researchers investigated the economy of Pakistan for 1980-2013 to understand the influence of inflation, interest rate, exchange rate, and foreign direct investment (FDI) on GDP growth [5]. Through multiple regression analysis, they found that GDP growth of Pakistan was significantly affected by inflation, interest rate, exchange rate and FDI. Their study also showed that except FDI all the variables have negative coefficients with GDP growth. In the same year, by studying the GDP and household consumption expenditure data of EA-18 countries for 2000-2012, Tapsin and Hepsag found that GDP and household consumption expenditure are positively correlated [6]. Samuel and Nurina studied the impact of inflation, interest rate, and exchange rate on GDP in Indonesia for June 2005 to December 2013 and concluded that inflation was significantly and exchange rate was insignificantly related with GDP [1]. Mofrad examined the relationship between GDP, export, and investment in Iran for 1991-2008 and found that investment and export were significantly positive with GDP growth in the long-term [13].

In perspective of Bangladesh, Ahmed and Mortaza studied the inflation and economic growth relationship for 1980 to 2005 [14]. They used real GDP for representing economic growth and consumer price index (CPI) to denote inflation. Their study concluded, in Bangladesh context, that inflation and economic growth were negatively related in the long-term. Rahman examined the inflation and economic growth relationship in Bangladesh during 1976 to 2011 [15]. Employing vector auto-regression (VAR), a statistically significant negative relationship between inflation and economic growth was found by him. But, a study covering the period of 2000-2012 concluded that inflation rate and GDP growth were positively correlated in Bangladesh [16]. From the above discussion on related literatures, it can be understood that the study on macroeconomic variables and economic growth has received enormous attention from various researchers. But, no research can be taken as conclusive in defining this relationship. So, there are ample opportunities to explore this relationship comprehensively. And, this study aims to harness this opportunity by studying the impact of macroeconomic variables on economic growth in Bangladesh.

4. METHODOLOGY OF THE STUDY

This study is highly reliant on secondary data. The data on Gross Domestic Product growth, inflation (consumer price index), real interest rate, exchange rate (Taka per USD), and household consumption expenditures growth of Bangladesh have been taken from the World Bank DataBank (<http://databank.worldbank.org>) for 29 years i.e. 1987-2015. Correlation and multiple regression are conducted to analyze these data. Through correlation analysis, the strength and direction of association between the variables is checked. To identify the impact of macroeconomic variables on economic growth multiple regression analysis is done where GDP growth (GDP) served as dependent variable and inflation (INF), real interest rate (INT), exchange rate (EXR), and household consumption expenditures growth (HCE) served as the independent variables. Durbin-Watson or DW test is done to identify the autocorrelation of the variables where tolerance value and variance inflation factor (VIF) are assessed to recognize the multicollinearity problem. The statistical software used for this study are SPSS 16 and Microsoft Excel 2013.

5. HYPOTHESIS AND MODEL FOR THE STUDY

To identify the impact of macroeconomic variables on economic growth in Bangladesh following hypothesis are considered.

H_0 : Macroeconomic variables don't have significant impact on the economic growth of Bangladesh.

H_1 : Macroeconomic variables have significant impact on the economic growth of Bangladesh.

The model used for testing the hypothesis is

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_t$$

Where, Y represents the dependent variable i.e. GDP; β_0 is the intercept; $\beta_1, \beta_2, \beta_3$, and β_4 are the study's regression coefficients; X_1, X_2, X_3 , and X_4 are taken as independent variables i.e. INF, INT, EXR, HCE respectively; and e_t is the estimation error.

6. RESULT AND ANALYSIS

6.1 Descriptive Statistics

Table 1 shows the descriptive statistics of the variables. It can be observed that average GDP growth (GDP) is 5.13% with standard deviation of 1.17% and maximum of 7.06%. Besides, inflation (INF), real interest rate (INT), exchange rate (EXR), and household consumption expenditures growth (HCE) have mean value of 6.35%, 7.12%, Tk. 54.81 and 3.93%. Among all the variables, the lowest standard deviation is observed for GDP and the highest for EXR. Except EXR all the variables are negatively skewed where all the variables also have negative kurtosis value except INT.

Table 1: Descriptive Statistics of the Variables

	Mean	Standard Deviation	Kurtosis	Skewness	Range	Minimum	Maximum
GDP	5.13	1.17	-0.20	-0.48	4.64	2.42	7.06
INF	6.35	2.37	-0.45	-0.17	8.70	2.01	10.70
INT	7.12	3.40	4.16	-0.71	19.14	-4.32	14.82
EXR	54.81	16.37	-1.41	0.09	50.91	30.95	81.86
HCE	3.93	2.16	-0.46	-0.21	7.96	-0.32	7.64

6.2 Correlation Analysis

Table 2 presents the result of correlation analysis between the variables. From the table, it can be seen that EXR has a strong positive correlation coefficient of 0.77 with GDP followed by HCE of 0.70. INT has a weak negative correlation coefficient of 0.25 with GDP where INF has a weak positive of 0.24. Among the independent variables, INF and INT, INT and EXR, and INT and HCE have weak negative correlation coefficients where others have weak positive correlation coefficients.

Table 2: Correlation Matrix

	GDP	INF	INT	EXR	HCE
GDP	1.00				
INF	0.24	1.00			
INT	-0.25	-0.26	1.00		
EXR	0.77	0.21	-0.34	1.00	
HCE	0.70	0.32	-0.05	0.45	1.00

6.3 Regression Analysis

To fulfill the research objective a multiple regression is conducted by considering GDP as dependent variable and INF, INT, EXR, and HCE as independent variables. Summary statistics of the regression result is shown in table 3. The correlation coefficient, R, is +0.869 which indicates a strong positive correlation between dependent and independent variables. Coefficient of determination, R Square, is 0.756 which indicates that 75.60% of the variability of GDP can be explained by the variance of INF, INT, EXR, and HCE. And, remaining 24.4% of the change in GDP is due to the variables external to this model. The Durbin-Watson (DW) value is 1.312 which is higher than 1.12 (D_L at $k = 4, n = 29$) but lower than 1.74 (D_U at $k = 4, n = 29$), so, no conclusive decision can be made on the presence of autocorrelation.

Table 3: Summary Statistics of Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.869 ^a	.756	.715	.6262703	1.312

a. Predictors: (Constant), HCE, INT, INF, EXR

b. Dependent Variable: GDP

Table 4 depicts the results of analysis of variance (ANOVA). F statistics of this model is 18.564 and significance of F is 0.000 which is lower than 0.05. So, it can be expressed that the relationship between independent and dependent variables as modeled in this study is statistically significant.

Table 4: Results of Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.124	4	7.281	18.564	.000 ^a
	Residual	9.413	24	.392		
	Total	38.538	28			

a. Predictors: (Constant), HCE, INT, INF, EXR

b. Dependent Variable: GDP

It is observed from table 5 that, among the independent variables, EXR and HCE have positive coefficients with GDP and INF and INT has negative coefficients. It implies that GDP of Bangladesh will grow for the unitary increase of exchange rate and household consumption expenditure growth where GDP will decline for the increase in inflation and real interest rate. Among four independent variables, GDP will change the highest for the change in HCE and the lowest for the change in INF. However, only EXR and HCE are found significant at 95% confidence level. In this model, the tolerance value of the independent variables are higher than 0.1 and variance inflation factors (VIF) values are lower than 10, so, this model is free of multicollinearity problem.

Table 5: Coefficients of the Variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.165	.675		3.209	.004		
	INF	-.013	.055	-.026	-.240	.812	.841	1.188
	INT	-.016	.038	-.046	-.410	.685	.822	1.216
	EXR	.040	.009	.558	4.610	.000	.695	1.439
	HCE	.247	.065	.454	3.811	.001	.716	1.396

a. Dependent Variable: GDP

6.4 Hypothesis Testing

The null hypothesis of this study was macroeconomic variables don't have significant impact on economic growth of Bangladesh where alternative hypothesis assumed a significant impact. In the above analysis, it is observed that 75.60% variation of economic growth as represented by GDP growth can be captured by the macroeconomic variables as characterized by inflation, real interest rate, exchange rate, and household consumption expenditure growth. This relationship is found statistically significant at 95% confidence level. Therefore, here, null hypothesis should be rejected and the outcome here is that macroeconomic variables have significant impact on economic growth of Bangladesh.

Table 6: Result of Hypothesis Testing

H ₀	:	Macroeconomic variables don't have significant impact on economic growth of Bangladesh.	Rejected
H ₁	:	Macroeconomic variables have significant impact on economic growth of Bangladesh.	Accepted

7. CONCLUSION

In pursuit of exploring the impact of macroeconomic variables on economic growth of Bangladesh, the GDP growth, inflation, real interest rate, exchange rate, and household consumption expenditures growth data for 29 years are analyzed by this study and it has found the existence of significant impact of macroeconomic variables on economic growth. Further, inflation has shown a negative coefficient with GDP growth which aligns with the findings of Ayyoub, Chaudhry and Farooq [7], Faria and Carneiro [8], Mamo [2], Inyama [11], and Rahman [15]. In addition, negative relation with GDP is also observed for real interest rate. On the other hand, exchange rate has shown a positive coefficient with GDP which is opposite to the findings of some studies i.e. [3] [5], and [10]. But, the positive coefficient of household consumption expenditures growth with GDP is in agreement with the work of Tapsin and Hepsag [6]. However, these findings are not the last words regarding the impact of macroeconomic variables on economic growth of Bangladesh rather these may serve as a cornerstone in conducting more comprehensive study in this area. Therefore, further studies on this phenomenon by eliminating the limitations of this work are highly encouraged.

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