Impact of Foreign Reserve in Economic Growth: An Empirical Study on Bangladesh

Janifar Alam*
Assistant Professor,
Department of Business Studies,
University of Information Technology & Sciences (UITS)
Holding 190, Road 5, Block J, Baridhara, Maddha, Naya Nagar Rd, Dhaka 1212

Md Mehedi Hasan
Department of Business Studies, University of Information Technology & Sciences (UITS)

Md Tanvirul Hoque
AVP and Head of Branch, The Premier Bank Ltd, Pallabi Branch

Abstract
Bangladesh maintained its robust performance in development. There have been upbeat exports and remittances. Overall inflation is slow & the current account deficit was reduced by higher exports and lower import inflation, but the decrease in the financial account surplus diluted the effect of the decline in the current account deficit on the overall balance of payments deficit. In the context of the Error Correction Process, this research studied the impact of economic development on Bangladesh foreign reserve assets using data for the period 1980- 2014. The findings show that economic growth is extremely important. The model's estimate, that economic growth and foreign reserves have a positive long-term relationship. The model checked by error correction estimates for error correction is negative and statistically important. In addition, the model showed that economic growth has short-term relationship too. The adjustment speed is more than 60 percent, suggesting that the term for error correction corrects the imbalance of the previous year. Granger causality test confirm that there is long run & short run causality among the variables. The question is whether the accumulation of foreign currency reserves is a required prerequisite for economic development. The empirical findings in this paper indicate that the rise in foreign exchange reserves induces GDP growth, although causality has not been demonstrated in the opposite direction.
Keywords: Bangladesh; Economic Growth; Foreign Reserve, Error correction model; International reserves.
DOI: 10.7176/EJBM/13-8-09
Publication date: April 30th 2021

1. Introduction

Bangladesh's economic freedom score is 56.4, making its economy the 122nd freest in the 2020 Index. It has increased by 0.8 point overall, led by a higher score for property rights. In the Asia-Pacific region, Bangladesh is ranked 29th out of 42 nations, and its overall score is far below the regional and world averages. During the last five years, Bangladesh has made steady, although incremental, progress towards greater economic independence. Although its economy has remained stuck in the largely unfree category, its GDP growth has been robust over the same period. A welcoming attitude to foreign investment and restraint on government growth can partially explain the discrepancy. Bangladesh is ranked 29th among 42 countries in the Asia–Pacific region, and its overall score is well below the regional and world averages. Bangladesh has made steady albeit incremental progress toward greater economic freedom during the past five years. Although its economy has remained stuck in the mostly unfree category, its GDP growth during the same period has been robust. The difference can be partly explained by a friendly approach towards foreign investment and restriction on government growth. In order to eventually break into the ranks of relatively free Bangladesh, the government will have to make a concerted, multi-year effort to strengthen the three indices of the rule of law and enable more foreign banks and the best practices they will carry with them to join the country. 25 percent is the top federal tax rate, and 45 percent is the top corporate tax rate. A value-added tax is used with some rates. 9.1% of gross domestic revenue is equal to the aggregate tax burden. Over the last three years, government investment has contributed to 13.7 percent of the country's output (GDP) and budget. The combined number of products and services exported and manufactured is equivalent to 38.2 percent of GDP. The total tariff rate added is 10.7 percent. Layers of non-tariff barriers hinder the complex flow of trade. Government tolerance to foreign investment is smaller than the average. The financial market is also underdeveloped and vulnerable to government intervention. The extent of state ownership and banking regulation is considerable, and the deficits have averaged 3.6 percent of GDP. Public debt is equal to 34,8% of GDP.

2. Literature Review

2.1 Review of Foreign Direct Investment and Economic Growth:

Foreign direct investment boosts a country for better economic growth and development. Mawugnon and Fang (2020) found by using the Granger Causality Test FDI exhibited a positive relationship, its contribution to economic growth. Understanding the direction of causality between the two variables is crucial for formulating policies that would encourage more private investors. Afzalur Rahman (2015) argued that growth in FDI has not been associated with positive economic growth, FDI was linked with increases in the inflation rate and a negative trade balance. FDI appears to have a small positive, but not statistically significant, impact on GDP growth.

2.2 Review of Foreign Reserve and Economic Growth:

In recent decades foreign reserve reached an extended level in many developing countries. Fukuda and Yoshifumi (2007) found that, an increase in foreign exchange reserves raises both liquid and total debt, while shortening debt maturity. It also leads to a decline in consumption, although investment and economic growth may improve when the tradable sector is capital intensive. Kashif1 P. Sridharan2 S. Thiyagarajan (2017) argue that, economic growth has positive impact and dynamic relationship between economic growth and international reserves. Their results reveal that, 1 per cent increase in economic growth will lead 0.16 per cent upsurge in international reserves. A statement from Polterovich and Vladimir (2002), The accumulation of foreign exchange reserves is neither a necessary nor a sufficient condition of economic growth. It may well be that countries that do not accumulate reserves grow faster than others because of better investment climate, better institutions, and greater involvement in international trade achieved through greater openness of their economies even though their exchange rate is at equilibrium level.

2.3 Review of Trade Balance and Economic Growth:

To measure a country strength trade balance plays a vital role in economy. Trade balance on economic growth as it is stated that trade is one of the key factors promoting economic growth by facilitating capital accumulation, modernization of industrial structure, technological progress, and institutional progress (Blavasciunaite, Lina Garsviene and Kristina, 2020). Trong, Thu, Van and Thai (2020) evident that, the effect of economic growth on trade balance is negative but insignificant. More specifically, an increase in economic performance will not impact on trade balance.

2.4 Review of Inflation Rate and Economic Growth:

High Inflation indicates a country strong economic growth but too much high inflation may not bring good for economy. Because it always reduces the value of money except interest rate is higher. Shapan Chandra (2016) and Behera (2014) said that, there is positive relationship between inflation and economic growth in long run. Adversely Khayroollo (2015) argued that, when inflation exceeds 4 percent, inflation will start to significantly reduce the economic growth rate. Fikirte Tsegaye (2012) found that Inflation was negatively and significantly related to economic growth. It means that inflation has an adverse effect on economic growth.

3. Methodology

3.1 Sampling Technique

At present, the study allots for intensive review which takes in the area of foreign reserve, economic growth and its impact. Study showcase is chosen for the country of Bangladesh. 29 years' time series data ranging from 1990 to 2019 were collected. There are five variables which have been taken where economic growth is dependent variable and foreign reserve is independent variable proxied Trade balance, FDI and Inflation rate. All the variables are taken in their real value with log transformation.

3.2 Model Specification:

The analysis variables chosen include economic growth, foreign reserve, foreign direct investment, inflation rate, Trade balance. Details notation and variables identification sign are shows in table1.

Table 1: Expectation from those Variables

Variables	Notation	Type of the variables	Expectation
Economic Growth	GDP Growth rate	Dependent	+
Foreign Reserve	Foreign Currency	Independent	+
Foreign Direct Investment	Investment	Independent	+
Inflation Rate	CPI rate	Independent and control	-
Trade Balance	Import and Export	Independent	-

For this study following model has been used. Samantha and Haiyan (2006) have been used partially similar model with some variables.

$$Economic\ Growth = f(Foeign\ Reserve_{+}, Foreign\ direct\ investment_{+}Inflation_{+}, Trade\ Balance)$$

$$GDP\ Growth\ Rate$$
$$= \alpha + \beta_1\ log(Foreign\ Reserve) + \beta_2 log(Foreign\ direct\ investment))$$
$$+ \beta_3 log(Inflation) + \beta_4 log(FoTrade\ Balance) + E_t$$

Where,

Log Economic Growth = GDP

Log Foreign Currency = Foreign Reserve Log FDI

= Investment

Log Inflation = CPI rate

Log Trade Balance = Import and Export

Here, Log economic growth is dependent variable, Foreign Reserve, Foreign direct investment, Inflation and Trade Balance are the independent variables. Foreign currency reserve greatly influences the economic growth. FDI increase which reflect positively towards economic growth. In diagnostic Test the unit root has been demeanor to Test stationarity either data has stationary or nonstationary then followed by those result auto correlation Test will placed and developing a regression model to remove the problem of heteroskedasticity meaning that it would be homoscedastic. If all the variables showed in the same order process, they might be co-integrated then we can apply Johansen Test to check either the model is long run or short run process. In error correction will use the most advantage model which is VECM. This model shows cointegrated VAR and granger's representation and lastly robust Test, which is a kind of regression to detect influential observation & which is reported below.

D(ECONOMIC GROWTH) = C(1)*(ECONOMIC GROWTH(-1) - 0.38*FOREIGN RESERVE(-1) - 0.15*FOREIGN_DIRECT INVESTMENT(-1) + 0.07*INFLATION RATE (-1) - 0.08*TRADE BALANCE(-1) - 4.25) + C(2)*D(ECONOMIC GROWTH(-1)) + C(3)*D(ECONOMIC GROWTH(-2)) + C(4)*D(FOREIGN RESERVE(-1)) + C(5)*D(FOREIGN RESERVE(-2)) + C(6)*D(FOREIGN_DIRECT INVESTMENT(-1)) + C(7)*D(FOREIGN_DIRECT_INVESTMENT(-2)) + C(8)*D(INFLATION RATE (-1)) + C(9)*D(INFLATION RATE (-2)) + C(10)*D(TRADE BALANCE(-1)) + C(11)*D(TRADE BALANCE(-2)) + C(12)

3.3 Data sources

Both primary and secondary data used in this practice is representative sample of Bangladesh. The main source is form world bank website and secondary data are taken from different publications, journals etc.

3.4 Description of the variables:

3.4.1 Dependent Variable

Economic growth: Economic growth is determined by production of economic goods which is increased in extreme manner and supporting by services in a specific time period. The most popular way to measure the economic growth is GDP and entire economic output of a country take into account and in this study it is figure out as dependent variable. GDP Stands with Gross domestic product simply mean GDP, is the total output of a country including goods and other services that produced by a country. Everything around us is part of GDP. It declares as economic indicator which shows the health structure of a country. Most phenomenon way to calculate the GDP = C+G+I+NX (Consumer spending, Government spending, Investments, Net export).

3.4.2 Independent Variables

Foreign reserve: It simply mean to reserve foreign currency includes with banknotes, bonds, T-bill and other government securities. Authority of this reserve is taking by central bank of its country. There are many reasons to reserve foreign currency but mostly uses to manage their currency value. It builds a country confidence and provide necessary support in the national monetary and exchange rate management policies. Foreign reserve has been considered as independent variable.

Foreign Direct Investment: Another factor that influence economic growth which is foreign direct investment. An increasing level of FDI recommended for higher growth of its economy. A country structure can be change vastly by FDI. It influences economic stimulation but mostly deals with development of human capital.

Inflation: When it come on mind, firstly we think it discuss about declining of price level but precisely focus on declining purchase power of individuals. It contrasts between currency and goods while one is falling and another is rising. Higher inflation is good but extensive level of inflation can cause damages and it should be control through its contractionary monetary policy.

Trade Balance: Without considering all financial transfers, investments and other components of goods and difference between the monetary value of a country's imports and exports over a given time period. Trade balance is very import and beneficial for an economy, where it involved trade policy decisions in the time of positive or negative also the size of the trade imbalance. Economists generally agree that neither trade surpluses or trade deficits are inherently "bad" or "good" for the economy.

www.iiste.org

IISTE

Trade Balance is positive (+) > imports and is referred to as a trade surplus. Trade Balance is positive (-) < imports and is referred to as a trade deficit.

4. Experimental Study and discussion:
4.1 Diagnostic Test Results
4.1.1 Unit root Test

Initial process of this analysis to check whether the data series is stationary or non-stationary. To getting this result ADF (Augmented Dicky Fuller) and PP (Phillis and Perron) Test have been done to verify the co-integration and stationarity of those variables which represent in this model. It is important here to determine the stationary property because if the time series has no stationary the regression result will fictious. Here multiple regression process is done and assumption result shows that all the variable has unit root. Tested at level and at 1st difference with constant, with constant and trend lastly without constant and trend to evaluate the EG, FDI, FR, CPI and TB. Below table 2 is representation of ADF & PP Test.

Table 2: Result of Unit root ADF and PP

UNIT ROOT TEST TABLE (PP)						
At Level						
		ECONOMIC_GROWTH	FOREIGN_DIRECT_INVESTMENT	FOREIGN_RESERVE	INFATION_RATE_CPI	TRADE_BALANCE
With Constant	t-Statistic	2.6110	-1.9823	-0.7782	-3.9162	0.6294
	Prob.	**1.0000**	**0.2925**	**0.8104**	**0.0056**	**0.9881**
		n0	n0	n0	***	n0
With Constant and Trend	t-Statistic	-1.1452	-2.0460	-1.7545	-4.0710	-3.4357
	Prob.	**0.9032**	**0.5528**	**0.7003**	**0.0172**	**0.0661**
		n0	n0	n0	**	*
Without Constant and Trend	t-Statistic	9.2100	-2.9884	1.3892	-0.8743	2.5358
	Prob.	**1.0000**	**0.0042**	**0.9552**	**0.3287**	**0.9962**
		n0	***	n0	n0	n0
At First Difference						

		d(ECONOMIC_GROWTH)	d(FOREIGN_DIRECT_INVESTMENT)	d(FOREIGN_RESERVE)	d(INFATION_RATE_CPI)	d(TRADE_BALANCE)
With Constant	t-Statistic	-3.4935	-5.9033	-4.2741	-16.2894	-7.2676
	Prob.	**0.0158**	**0.0000**	**0.0024**	**0.0001**	**0.0000**
		**	***	***	***	***
With Constant and Trend	t-Statistic	-3.7634	-10.1768	-4.2718	-15.9771	-8.4436
	Prob.	**0.0343**	**0.0000**	**0.0113**	**0.0000**	**0.0000**
		**	***	**	***	***
Without Constant and Trend	t-Statistic	-1.3341	-4.7979	-3.8947	-17.1287	-5.5273
	Prob.	**0.1644**	**0.0000**	**0.0004**	**0.0000**	**0.0000**
		n0	***	***	***	***
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant						
UNIT ROOT TEST TABLE (ADF)						
At Level						
		ECONOMIC	FOREIGN_DI	FOREIGN_R	INFATION_R	TRADE_BAL

		GROWTH	RECT_INVES TMENT	ESERVE	ATE_CPI	ANCE
With Constant	t-Statistic	2.8442	-4.1411	-0.6932	-3.8902	0.6355
	Prob.	**1.0000**	**0.0042**	**0.8332**	**0.0060**	**0.9881**
		n0	***	n0	***	n0
With Constant and Trend	t-Statistic	-1.1452	-3.1755	-1.4703	-4.0472	-3.4588
	Prob.	**0.9032**	**0.1096**	**0.8167**	**0.0181**	**0.0632**
		n0	n0	n0	**	*
Without Constant and Trend	t-Statistic	3.5306	-2.1332	1.7809	-0.3600	3.0153
	Prob.	**0.9997**	**0.0337**	**0.9793**	**0.5455**	**0.9988**
		n0	**	n0	n0	n0
		At First Difference				
		d(ECONOMI C_GROWTH)	d(FOREIGN_ DIRECT_INV ESTMENT)	d(FOREIGN_ RESERVE)	d(INFATION _RATE_CPI)	d(TRADE_B ALANCE)
With Constant	t-Statistic	-3.5395	-5.1281	-4.2841	-7.1506	-5.7502
	Prob.	**0.0142**	**0.0003**	**0.0023**	**0.0000**	**0.0001**
		**	***	***	***	***
With Constant and Trend	t-Statistic	-3.8994	-5.2776	-4.2404	-7.0434	-5.8330
	Prob.	**0.0256**	**0.0011**	**0.0121**	**0.0000**	**0.0003**
		**	***	**	***	***
Without Constant and Trend	t-Statistic	-1.3341	-4.8118	-3.8984	-7.2983	-5.5095
	Prob.	**0.1644**	**0.0000**	**0.0004**	**0.0000**	**0.0000**
		n0	***	***	***	***
*MacKinnon (1996) one-sided p-values.						
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant						

4.1.2 Result of Stationary Test

From above Test result there are many ways to check stationarity, here constant at 1st difference which is intercept has been shown. Variable will be rejected if it is null hypothesis and choose the alternative hypothesis because null hypothesis means that, there is no stationarity among those variables. This Tests the null hypothesis that demand follows a unit root process.

Table 3: Stationary Test result

Name of Variable	P value	Statistic Value	Level of Test	Decision
ECONOMIC GROWTH	0.0142	-3.5395	Intercept at 1st difference	P < 5%, Data is stationary
FOREIGN RESERVE	0.0023	-4.2841	Intercept at 1st difference	P < 5%, Data is stationary
FOREIGN_DIRECT INVESTMENT	0.0003	-5.1281	Intercept at 1st difference	P < 5%, Data is stationary
INFATION RATE CPI	0.0000	-7.1506	Intercept at 1st difference	P < 5%, Data is stationary
TRADE BALANCE	0.0001	-5.7502	Intercept at 1st difference	P < 5%, Data is stationary

Here approximate p-value of Economic growth is 0.0142 foreign reserve is 0.0023, foreign direct investment is 0.0003, inflation rate is 0.0000 and trade balance is 0.0001. All the variable shows less than 5%, so reject the null in all these cases and choose the alternative hypothesis. Also, all the observation of Test statistic is smaller

than 10% critical value. This confirms that, all the variables are stationary at 1st difference while doing intercept.

4.1.3 Auto correlation

It suggests when two error terms related to each other meaning that correlation of the same variables between two continuous time intervals. Measurement of this value is determined by lag criteria which is related to time series and observations occur at different points in time. Most phenomenon way to Test autocorrelation is the Durbin-Watson for the 1st order and for higher order correlation LM Test to be shown.

Table 4: Durbin-Watson stat Test

R-squared	-0.003705
Adjusted R-squared	-0.119517
Durbin-Watson stat	0.978659

From the regression model dependent variable is Economic Growth and FG, FDI, CPI and TB is independent. Normally when data is time series, serial correlation is appearing. Here, Durbin-Watson stat value is 0.978659 (table 4) and R-squared value is negative. which is less than 2, according to DW guideline there is positive auto correlation.

Table 5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	4.665893	Prob. F (2,24)	0.0194
Obs*R-squared	8.398997	Prob. Chi-Square (2)	0.0150

Will check it by second confirmation that higher order of Breusch-Godfrey Serial Correlation LM Test suggest auto correlation or not. Here the probability of chi-square value is 0.0150 (table 5) which is less than 5%, it means this model has serial correlation. That is not good for regression. Reject the null and choose the alternative hypothesis. Now, the process is to remove the serial correlation from the model.

Table 6: Durbin-Watson stat Test

R-squared	0.997396
F-statistic	1761.596
Prob(F-statistic)	0.000000
Durbin-Watson stat	1.693761

Here Economic-growth is dependent variable and leg 1 of dependent variable shows (table 6) that it is highly significant because probability value 0 which is less than 0.05 and Durbin- Watson stat value increase. Where R-squared is have 99% meaning that data is nicely fitted because it is more than 60%. Corresponding probability value of f-stat is also highly significant, it is less than 5%. SO, R-squared value is high and probability value is significant concluded that Economic-growth of lag (-1) and other 4 independent variable can explain economic growth jointly because out of these 5 variables 50% of the variables is significant. For good regression model it is required, at least 50% of the independent variable should be significant. This model can be affected by serial correlation and normally heteroscedasticity problem does not appear specially when the time series is natural and it appears when the data is cross sectional.

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.457800	Prob. F (2,21)	0.2554
Obs*R-squared	3.535450	Prob. Chi-Square (2)	0.1707

By creating a new variable and that variable would be lag of dependent variable that is Economic-growth (-1). After having lag of Economic-growth, new model Breusch-Godfrey Serial Correlation LM Test suggest that there is not serial correlation and null hypothesis cannot be rejected according to (table 7). Pro value is 0.1707, meaning that it is more than 5% and this is desirable. Serial correlation or auto correlation now remove from this model.

4.1.4 Heteroskedasticity

Firstly, did the heteroscedasticity Test with absolute value and the estimated variance of the residuals from a regression are dependent on the values of the independent variables that means heteroscedasticity on the model and picture shows that. Heteroskedasticity appears when the error variance has non-constant variance. The variance of the observed value of the economic growth around the regression line is non-constant and now work for removals. Most popular way to remove heteroscedasticity from the model, is to convert all the variables into log, which is known as log transformation and did the transformation in excel from the beginning.

Table 8: Heteroskedasticity Graph result
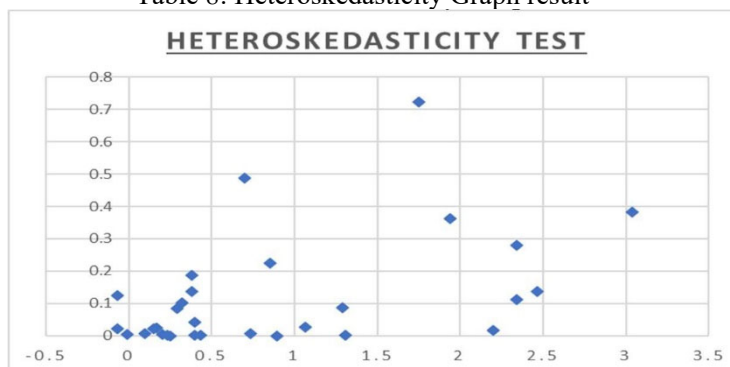
Here probability value of chi square 0.1260 (table 9), which is more than 5% and couldn't be reject the null hypothesis rather accept null. Meaning that residuals are not heteroscedastic & Economic growth is influenced by all the variables. its homoscedastic after converting the variables into log transformation. Now the model if completely free from heteroscedasticity and can use this model for further Test.

Table 9: Heteroskedasticity Test - Breusch-Pagan-Godfrey

F-statistic	1.971221	Prob. F(4,25)	0.1299
Obs*R-squared	7.193168	Prob. Chi-Square(4)	0.1260
Scaled explained SS	3.896443	Prob. Chi-Square(4)	0.4202

1. Lon Run Causality Test

1.1 Johansen Cointegration Test

The series transformed non-stationary to stationary after first difference which is done in unit root process. Now it is same order of integration. Under this continuity, the variables are unpredictable and entirely not useless. To verify further the relevance of the model, there is need to Test for cointegration. Here, the output releases two statistics, Trace Statistic and Max- Eigen Statistic.

Table 10: Johansen Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.814583	93.83199	69.81889	0.0002
At most 1	0.654221	46.64788	47.85613	0.0646
At most 2	0.336497	16.91309	29.79707	0.6465
At most 3	0.170416	5.426867	15.49471	0.7619
At most 4	0.006962	0.195611	3.841466	0.6583
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Decision: Trace Test provides (table 10) the result of the existence of 1 cointegrating equation at the 5% significance level. This cointegrating means that one linear combination exists between the variables that force this model to have a relationship over the entire time period, despite potential deviation from equilibrium levels in the short-term. In order to confirm the results of the Johansen's Trace Test, need to verify it by Maximum Eigenvalue Test.

Table 11: Johansen Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.814583	47.18411	33.87687	0.0008
At most 1 *	0.654221	29.73479	27.58434	0.0261
At most 2	0.336497	11.48622	21.13162	0.5988
At most 3	0.170416	5.231256	14.26460	0.7124
At most 4	0.006962	0.195611	3.841466	0.6583
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

The Maximum Eigen value Test (table 11) suggest two cointegrating equations at the 5% level, which confirming the Trace Test. Therefore, these two Tests confirm a cointegrating relationship over sample period. Hence, it is concluded that a long-run relationship exists among those variables. The long-run relationship means that those variables will move together in the long-run while showing divergence in the short-run. In other words,

those variables are related to each other in some way. Since the Johansen Test shows presence of cointegration can run the VECM in next step.

2. Error Correction Test
2.1 Vector Error correction Model

If a set of variables are found to have one or more cointegrating vectors then a suitable estimation technique is a VECM (Vector Error Correction Model) which adjusts to both short run changes in variables and deviations from equilibrium. From Johansen Cointegration Test the result shows that the variables are cointegrated. So, the VECM model can be run. Lag length criteria also suggest the chosen of one lag for estimating VECM. Coefficient of error correction term is the most typical parameter in the estimation of the VECM, which measures the speed of adjustment of economic growth to its equilibrium level. Thus, the expectation is positive and variables on evolution of FDI, Foreign reserve and Trade balance. From Johannsen Test it shows that variables are cointegrated and main objective would be focus on dependent variable which is economic growth. The vector error correction result with long and short run causality under ordinary least square model is showed below. Here C determine Error correction term mean speed of adjustment towards equilibrium. If C is negative in sign and significant, it means there is a long run causality running from foreign reserve, FDI and trade balance to Economic growth.
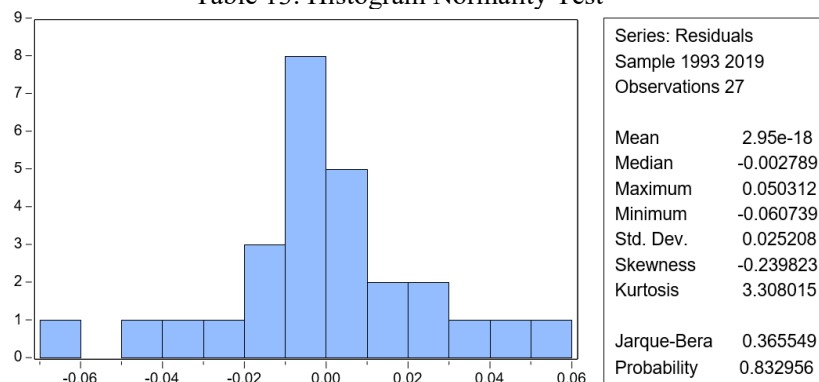
Here the result of C(1) to C(5) and C(8) shows that, Coefficient is not negative and also not significant because probability value is more that 5% meaning that there is no long run causality running form foreign reserve, FDI and trade balance to Economic growth. Alternatively C(6) has negative coefficient and significant where (7) and C(9) also negative but not significant which provides a mixed indication. The negative speed of the adjustment parameter, it shows how fast the variables go to the equilibrium.

Table 12: Least Square Estimates of VECM & WALD Test

Error Correction	Coefficient	Prob.	Terms	Chi-square value
C(1)	0.043755	0.6360	C(2) and C(3)	0.0969
C(2)	0.312132	0.1552	C(4) and C(5)	0.0806
C(3)	0.075013	0.7053	C(6) and C(7)	0.0114*
C(4)	0.100545	0.0605	C(8) and C(9)	0.1933
C(5)	0.032813	0.3873	R-squared	0.732260
C(6)	-0.022942	0.0138	F-statistic	3.729498
C(7)	-0.012399	0.2976	Prob	0.010005
C(8)	0.004979	0.3471		
C(9)	-0.001655	0.6649		

The error correction C (4), C (5), C (8) and C (9) together they become zero by Wald Test and probability of Chi Square value is more than 5%, it means there is no short run causality also which running from foreign reserve to economic growth. The probability of Chi Square value C (6) and C (7) is 0.0114 (table 12) which is less than 5% and that particular variable becomes significant. So, here the error correction term becomes significant. When the ECT is significant and its sign is negative it means that Trade Balance have short-run causality in economic growth. That means Trade Balance causes economic growth rate in the short-run. Short run effects are captured through individual coefficients of the differentiated terms. Rest of the others are more than 5% which means among those variables there are no short run causality. Value of R-squared is 0.732260 (table 12) which is more than 60% and its well fitted model to use. F-stat and probability value is significant which is less than 5%. Finally, Histogram Normality Test declare that. The residual is normally distributed which is tested by Jarque- Bera result. Note that the kurtosis is more than 3, and the Jarque-Bera statistic has a p-value of 0.8329 (table 13), implying that the data are consistent with a Normal distribution (and constant variance)

Table 13: Histogram Normality Test

Series: Residuals	
Sample 1993 2019	
Observations 27	
Mean	2.95e-18
Median	-0.002789
Maximum	0.050312
Minimum	-0.060739
Std. Dev.	0.025208
Skewness	-0.239823
Kurtosis	3.308015
Jarque-Bera	0.365549
Probability	0.832956

3. Granger Causality Test

In stark contrast to the Johannsen test, which is concerned with long-run relationship, the Granger causality test is concerned with short-run relationship between variables. Cointegration and vector error correction have driven both the long and short-term connection of these variables. The path of causality shows whether the FDI influenced the growth of GDP or the FDI affected economic growth, and so on. In the direction of the variable, at least one Granger causality may have occurred.

Table 14: Granger Causality Test Result.

Null Hypothesis:	F-Statistic	Prob.
Foreign Reserve does not Granger Cause Economic Growth	4.11585	0.0296**
FDI does not Granger Cause Economic Growth	3.78102	0.0380**
Economic Growth does not Granger Cause Trade Balance	4.46103	0.0231**
Trade Balance does not Granger Cause Foreign Reserve	4.99350	0.0158**
Foreign Reserve does not Granger Cause Trade Balance	5.45131	0.0115**
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. And (no) Not Significant		

Between Trade Balance and Foreign Reserve, they have advance lag relationship. Granger causality between them implies that Trade Balance can influence the Foreign Reserve in a unidirectional causality movement. There is also unidirectional causality comes from Economic Growth to Trade Balance at 5% level of significance which means Economic growth has a predictive capacity to assess the present value or ranking of the Trade balance. At 5% level of significance Foreign reserve cause the Economic Growth to change based on previous movement in the variable. FDI causes Economic growth that mean FDI can predict the future movement in Economic growth & has short run relationship.

4. Robust standard errors

Robust standard errors or White-Huber standard errors techniques are called (heteroskedasticity) standard errors. This method is accurate but completely empirical. On the heteroskedasticity system, couldn't impose any conclusions. The robust standard errors would

become only traditional OLS standard errors, even though there is no heteroskedasticity. Particularly under homoscedasticity, the robust standard errors are also adequate.

Table 15: Robust Test result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FOREIGN_RESERVE	-0.118281	0.342157	-0.345691	0.7324
FOREIGN_DIRECT_INVESTMENT	-0.333037	0.063260	-5.264574	0.0000
INFATION_RATE_CPI	0.135576	0.059853	2.265148	0.0321
TRADE_BALANCE	2.038283	0.504840	4.037482	0.0004

Here coefficient of foreign reserve is strongly negative. High percentage of foreign reserve, the smaller proportion will be the economic growth. The probability of foreign reserve 0.7324 (table 15) which is more than 5% and suggested Foreign reserve is negative impact on Economic growth. FDI seems negative also but its marginal & highly significant. Prediction was negative for Inflation & Trade Balance but the of Robust test shows the positivity of these two variables toward Economic Growth significantly.

5. Findings and Conclusion

The effect of foreign reserves on economic development has been the subject of relatively few researches. In the case of a particular area in Asia, this research is intended to add to this methodological analysis. Usage of sample data from Bangladesh during the period 1990 - 2019. Statistical results revealed an insignificant high positive correlation with economic growth and the Foreign Reserve, a marginal positive correlation with economic growth and inflation and a modest correlation with FDI. The study found there is no negative correlation among them. Therefore, the results obtained in this research suggest that growth in all are the variables have been associated with positive economic growth in Bangladesh. FDI was rarely linked with increases in the inflation rate and a positive trade balance. A higher rate of inflation lowers people's buying power and has been blamed for economic deflation. Additionally, when a country's imports are larger than exports, a negative trade balance exists and this creates a resource deficit for developing nations. FDI, on the other hand, tends to have a strong positive and statistically effect on economic development. Therefore, in order to inspire a trade surplus, Bangladesh should concentrate on exports and exchange rate devaluation policies. Another purpose of this paper was to econometrically analyses and examined the causal relationship among certain economic indicators in Bangladesh by using VECM model. Which contributes to making understood cointegrating and causal relationship between foreign direct investment, economic growth, FDI & Inflation in Bangladesh case. Which is the Johansen approach to cointegration and the procedure for Granger non-causality test. VECM was used for regression model and run

it in order to test for the presence of a long-run relationship between variables. Form Johansen Test it is found that all the variables are cointegrated & there is no long run & short run causality running form foreign reserve, FDI and trade balance to Economic growth While, in the case of economic growth by Granger Causality Test, there is unidirectional linkage running from economic growth to trade balance with positive sign, which means that economic growth positively affected by trade balance. In comparison, a higher level of trade balance can definitely be reached by a nation with higher levels of domestic income. The accumulation of foreign reserves is neither an imperative nor an adequate condition for economic development. It may well be that countries that do not accumulate reserves grow faster than others because of better investment climate, better institutions, and greater involvement in international trade achieved through greater openness of their economies even though their exchange rate is at equilibrium level. It could also be the case that countries accumulating reserves are not able to increase their investment/GDP ratios since the export externality is not strong enough or due to poor investment climate. A significant macroeconomic mechanism for rising long-term economic growth rates is the accumulation of foreign exchange reserves. This would lead to a reduction of the exchange rate, a rise in export sector revenues and profits, an increase in investment and economic activity dependent on higher exports. Other macroeconomic indicators (such as unemployment rate, gross national product, parity of purchasing power, poverty level, and foreign exchange rate) are recommended for future analysis, which can help to better understand the effects of foreign reserves on Bangladesh's economic development.

Reference

Assiobo Komlan Mawugnon, Fang Qiang, (2020), The Relationship Between Foreign Direct Investment and Economic Growth in Togo [1991-2009].

Afzalur Rahman1, (2015), Impact of Foreign Direct Investment on Economic Growth: Empirical Evidence from Bangladesh.

Fukuda and Yoshifumi, (2010), Macroeconomic Impacts of Foreign Exchange Reserve Accumulation: Theory and International Evidence.

Kashif1 P. Sridharan2 S. Thiyagarajan, (2017), Impact of economic growth on international reserve holdings in Brazil.

Polterovich, Victor & Popov, Vladimir, (2003). Accumulation of Foreign Exchange Reserves and Long Term Growth

Deimante Blavasciunaite, Lina Garsviene and Kristina Matuzeviciute, (2020), Trade Balance Effects on Economic Growth: Evidence from European Union Countries

Kristina Matuzeviciute, (2020), Trade Balance E_ects on Economic Growth: Evidence from European Union Countries

Shapan Chandra Majumder1, 2, (2016), Inflation and Its Impacts on Economic Growth of Bangladesh

Jaganath Behera, (2014), Inflation and its Impact on Economic Growth: Evidence from Six South Asian Countries

Fikirte Tsegaye, (2012), Economic Growth and Inflation A panel data analysis Alberola,E.,&Serena,J.M.(2007). Global Financial Integration, Monetary Policy and Reserve Accumulation. Assessing the Limits in Emerging Economies. Banco de Espana,Documento de Trabajo.

Barbosa-Filho, N.H. (2008). Inflation Targeting and Monetary Policy in Brazil. International Review of Applied Economics.

Benigno, J.,&Fornaro, L. (2012). Reserve accumulation, growth and financial crises. CEPR Discussion Papers,Centre for Economic Performance, LSE.

Chang,R. (2007). Inflation Targeting, Reserves Accumulation and Exchange Rate Management in Latin America. Department of Economics, Rutgers University, New Brunswick.

Cheng, G. (2013). A Growth Perspective of Foreign Reserve Accumulation, Banque de France, Working Paper, 443.

Dominguez, K.M.E., Yuko, H.,&Takatoshi, I. (2012). International Reserves and the Global Financial Crisis, NBER Working Papers.