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RESEARCH ARTICLE

THE EFFECT OF GLOBALIZATION ON ECONOMIC GROWTH OF BANGLADESH.

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Abstract

This study investigates the relationship between globalization (trade openness) and economic growth (GDP per capita) in Bangladesh. This study adopted a co-integration and vector error correction modeling techniques on an annual time series data within the periods of 1980-2014. The time series properties of the considered variables have been examined by applying Augmented Dickey Fuller and Philips-Perron tests. The Cointegration test and Vector Error Correction model were applied to investigate the long run and short run relationship among variables. The Cointegration test results show that all variables are cointegrated indicating that there is a stable long term relationship among them. The vector error correction model confirms a positive and significant effect of trade openness and gross fixed capital formation on GDP per capita in Bangladesh in the long-run.

Introduction:-

Globalization is a broad concept, merely used to depict a variety of phenomena that reflect the increasing economic interdependence of countries. Such phenomena include flows of goods and services across borders, reductions in policy and transport barriers to trade, international capital flows, multinational activity, foreign direct investment, outsourcing, and migration. These circulations of goods, services, capital, firms, and people are believed to contribute to the diffusion of technology, knowledge, culture, and information across borders. The researchers have often used Trade and foreign direct investment (FDI) openness as measures of globalization. A commonly used measure of the structural dimension of globalization is the degree of openness. In fact, the degree of openness of an economy is a concept that has received only scant attention from economic theorists. The relevant question in the case of this indicator is not only what a country exports or imports but also how much it exports and imports in relation to its GDP. Throughout this paper the ratio $(Exports+Imports)/GDP$ will be used as an initial proxy for the openness of Bangladesh economy. Another measure of globalization is used which is financial openness by considering gross or net inflows of FDI over GDP ratios.

Trade liberalization policies pursued by Bangladesh have passed through three phases. The first phase (1982-86) was undertaken as Bangladesh came under the purview of the policy based lending of the World Bank; the second phase (1987-91) began with the initiation of the three- year IMF structural adjustment facility (SAF) in1986; and finally, the third phase since 1992, was preceded by the IMF sponsored Enhanced Structural Adjustment Facility (ESAF). These reform measures led to a significant decline in quantitative restrictions, opening up of trade in many restricted items, rationalization and diminution of import tariffs, and liberalization of foreign exchange regime.

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This paper aims at investigating empirically the impact of economic globalization on economic growth in Bangladesh using the co-integration and vector error correction (VEC) modeling technique. This paper is organized into five sections, immediately after introduction comes section one, the review of related literature while section two covers data and methodology, section three contains the presentation of result and the empirical analysis and the last section concludes the study.

1. LITERATURE REVIEW

The relationship between globalization and growth is a heated and highly debated topic on the growth and development literature. Yet, this issue is far from being resolved. Theoretical growth studies report at best a contradictory and inconclusive discussion on the relationship between globalization and growth. Some of the studies found positive effect of globalization on growth through effective allocation of domestic resources, diffusion of technology, improvement in factor productivity and augmentation of capital (Grossman and Helpman, 1991). In contrast, others argued that globalization has harmful effect on growth in countries with weak institutions and political instability and in countries, which specialized in ineffective activities in the process of globalization (Berg and Krueger, 2003). Given the conflicting theoretical views, many studies have been empirically examined the impact of the globalization on economic growth in developed and developing countries. Generally, the literature on the globalization-economic growth nexus provides at least three schools of thought.

First, many studies support the idea that globalization accentuates economic growth. Pioneering early studies include Dollar (1992), Sachs et al. (1995) and Edwards (1998), who examined the impact of trade openness by using different index on economic growth. The findings of these studies implied that openness is associated with more rapid growth.

The second school of thought, which supported by some scholars such as Alesina et al. (1994), Rodrik (1998)] and Rodriguez and Rodrik (2000), has been more reserve in supporting the globalization-led growth nexus. Rodriguez and Rodrik (2000) challenged the robustness of Dollar (1992), Sachs, Warner et al. (1995) and Edwards (1998) studies. They believed that weak evidence support the idea of positive relationship between openness and growth. They mentioned the lack of control for some prominent growth indicators as well as using incomprehensive trade openness index as shortcomings of these works.

The third school of thoughts covers the studies that found nonlinear relationship between globalization and growth with emphasis on the effect of complementary policies. Borensztein, De Gregorio et al. (1998) investigated the impact of FDI on economic growth in a cross-country framework by developing a model of endogenous growth to examine the role of FDI in the economic growth in developing countries. They found that FDI, which is measured by the fraction of products produced by foreign firms in the total number of products, reduces the costs of introducing new varieties of capital goods, thus increasing the rate at which new capital goods are introduced. The results showed a strong complementary effect between stock of human capital and FDI to enhance economic growth. They interpreted this finding with the observation that the advanced technology, brought by FDI, increases the growth rate of host economy when the country has sufficient level of human capital. In this situation, the FDI is more productive than domestic investment.

However, the review of the empirical literature indicates that the impact of the economic globalization on economic growth is influenced by sample, econometric techniques, period specifications, observed and unobserved country-specific effects.

2. Data and Methodology

This analysis has been done based on annual time series data on GDP per capita, Foreign direct investment as a percentage of GDP, Gross fixed capital formation over GDP, Trade over GDP or Trade openness are obtained from the World Development Indicators (WDI) 2015, for the period from 1980 to 2014 and STATA software has been used to find out the findings.

To determine the impact of globalization on growth, GDP per capita is used as a proxy for growth. GDP per capita is a measure that results from GDP divided by the size of the nation's overall population. So in essence, it is theoretically the amount of money that each individual gets in that particular country. The GDP per capita provides a much better determination of living standards as compared to GDP alone.

To investigate the impact of globalization on economic growth, we specify the following regression model:

$LnGDPPCt = \alpha + \beta 1 LnFDIGt + \beta 2\ LnGFCGt + \beta 3 LnTGDPt + Ut$

Where,
$GDPPC$ = GDP per capita as a proxy for growth;
α = Intercept;
$\beta's$ = Coefficients of the explanatory variables;
$FDIG$ = Foreign direct investment as a percentage of GDP;
$GFCG$ = Gross fixed capital formation over GDP;
$TGDP$ = Trade over GDP or Trade openness;
U = Error term/stochastic term;
t = Time.

There are two reasons why variables are converted into natural logs. First, the coefficients of the co-integrating vector can be interpreted as long-term elasticities if the variables are in logs. Second, if the variables are in logs, the first difference can be interpreted as growth rates.

2.1. Unit Root or Stationary Tests:

To test the causality and co-integration between the economic growth and trade openness, at first, the stationary properties of the time series is to be checked by unit root test. This can be done in various ways: Dickey Fuller test, Augmented Dickey Fuller test, Phillips - Perron test with trend and without trend. This study uses Augmented Dickey Fuller (ADF) test, which is based on the following regression equation with a constant and a trend in the form as follows:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \sum_{j=1}^{k} \rho_j\ \Delta Y_{t-j} + u_t$$

Where Δ is the first difference operator and u_t is the stochastic error term and k is the number of lags in the dependent variable. The null hypothesis (H_0) of a unit root indicates that the coefficient of Y_{t-1} zero while alternative hypothesis (H_1) implies Y_t is stationary. If the null hypothesis is rejected then the series is stationary and no differencing in the series is essential to establish stationarity.

2.2. Testing for Co-integration:

The second step to examine the causality and co-integration involves searching for common stochastic trend between the concerned variables. Empirically this can be examined either Engle- Granger two step co-integration procedures or by Johansen co-integration techniques. Johansen co-integration technique has been used in this study. In this technique two test statistics known as the trace statistic and the maximum eigenvalue are used to identify the number of co-integrating vectors.

2.3. Vector Error Correction Model

The cointegration among variables solely shows a long run equilibrium relationship. In fact, there may be disequilibrium in the short run. To investigate the short run dynamics among the concerned time series variables, Vector Error Correction Model (VECM) has been developed in this study. Error Correction Models (ECMs) are a category of multiple time series models that directly estimate the speed at which a dependent variable Y returns to equilibrium after a change in an independent variable X. ECMs are a theoretically-driven approach useful for estimating both short-term and long-term effects of one time series on another.

3. Empirical Results

To evaluate the long run relationship between trade openness and economic growth, the stationarity properties of the data are checked using the Augmented Dickey - Fuller (ADF) test and Phillips-Perron (PP) test.

Table 1:- Test for stationarity

Augmented Dickey-Fuller (ADF) unit root test for stationarity

	Level		Fist Difference	
	Constant	Constant and trend	Constant	Constant and Trend
LnGDPPC	2.147	-0.938	-4.320**	-5.257**
LnFDIG	-1.745	-3.175	-6.552**	-6.350**
LnGFCG	-0.244	-1.549	-7.033**	-7.030**
LnTGDP	-0.179	-2.843	-6.850**	-6.801**

** denotes rejection of the null hypothesis at 5% level.

Phillips- Perron (PP) unit -root test for stationarity

	Level		Fist Difference	
	Constant	Constant and trend	Constant	Constant and Trend
LnGDPPC	2.461	-0.885	-4.326**	-5.251**
LnFDIG	-1.738	-3.199	-7.098**	-6.861**
LnGFCG	-0.881	-1.964	-6.422**	-6.434**
LnTGDP	-0.036	-3.960	-6.993**	-7.000**

** denotes rejection of the null hypothesis at 5% level.

All the variables under ADF and PP tests are found non stationary in levels. This is ensured by comparing the calculated ADF and PP statistics at 5 per cent significance levels with their respective critical values. As a result, all the variables have been differenced once to check their stationarity. At first differencing, the calculated ADF and PP tests statistics clearly reject the null hypothesis of unit root both at 5 per cent significance levels when compared with their corresponding critical values. Clearly, the ADF and PP tests decisively confirm stationarity of each variable at first differencing under both constant and constant plus trend level, and depict the same order of integration, i.e. I (1) behavior. The results provide the basis for the test of long run relationship among the variables.

The following table presents the result of Johansen co-integration test both at the trace and maximum eigenvalue levels.

Table 2:- Johansen co-integration test

Johansen tests for cointegration

Trend: constant — Number of obs = 24
Sample: 1991 - 2014 — Lags = 4

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	52	127.71605	.	57.4532	47.21
1	59	144.95982	0.76234	22.9653*	29.68
2	64	150.43843	0.36654	12.0081	15.41
3	67	154.70682	0.29932	3.4713	3.76
4	68	156.44247	0.13466		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	52	127.71605	.	34.4859	27.07
1	59	144.95982	0.76234	10.9572	20.97
2	64	150.43843	0.36654	8.5368	14.07
3	67	154.70682	0.29932	3.4713	3.76
4	68	156.44247	0.13466		

Johannes co-integration test both at the trace and maximum eigenvalue levels detect one co-integrating relationship at 5% level. In other words, these tests indicate the presence of long-run equilibrium relationship among the variables. As a result, the vector error correction model is estimated.

3.1. Estimation of Vector error correction model (VECM):-

A vector error correction model is estimated to model the long run causality and short run dynamics. The purpose of VECM model is to indicate the speed of adjustment (L1) from the short-run equilibrium to the long –run equilibrium state. The greater the coefficients of the parameter, the higher the adjustment of the model from the short run to the

long run. In this model the variables are co-integrated if the error correction term (L1) is negative and statistically significant in terms of its associated- t value. When we run a VECM model using STATA, it gives us two tables. The main estimation table contains the error correction term which is also called the speed of adjustment (L1) and the estimates of the short-run parameters, along with their standard errors and confidence intervals. The second estimation table reports estimates of the parameters in the co-integrating equation.

In order to run a vector error correct model at first we need to select the optimum number of lags.

Lag selection

Table 3:- Lag selection

Selection-order criteria

Sample: 1990 - 2014 Number of obs = 25

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	15.4117				4.7e-06	-.912937	-.858847	-.717917
1	120.661	210.5	16	0.000	3.8e-09*	-8.05289	-7.78244	-7.07779*
2	136.318	31.313	16	0.012	4.4e-09	-8.0254	-7.53859	-6.27822
3	143.566	14.497	16	0.562	1.2e-08	-7.32528	-6.62211	-4.79902
4	181.432	75.732*	16	0.000	4.4e-09	-9.07457*	-8.15503*	-5.75922

Endogenous: lnGDPPC lnFDIG lnGFCG lnTGDP

Exogenous: _cons

From the above table we can see that most of the criteria (LR, AIC, HQIC) select lag four. So, the optimum number of lags in our model will be four.

Now the explanatory power of our model is determined from the following STATA output.

Vector error-correction model

Sample: 1990 - 2014 No. of obs = 25

AIC = -8.18588

Log likelihood = 161.8135 HQIC = -7.387248

Det(Sigma_ml) = 2.92e-11 SBIC = -5.388533

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lnGDPPC	14	.035449	0.9062	106.3086	0.0000

From above table, we can see that the value of R^2 is 0.9062 which means that 90.62% variability of the dependent variable can be explained by our independent variables. This shows a very high explanatory power of our model.

After determining the number of lags and running the vector error correction model we get the following table.

Table 4:- Table contains the error correction term (L1) and the estimates of the short-run parameters, along with their standard errors and confidence intervals.

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_lnGDPPC						
_ce1						
L1.	-.0938872	.0395434	-2.37	0.018	-.1713907	-.0163836
lnGDPPC						
LD.	.396527	.2196864	1.80	0.071	-.0340586	.8271045
L2D.	-.1246313	.2599899	-0.48	0.632	-.6342021	.3849394
L3D.	.0787589	.201557	0.39	0.696	-.3162856	.4738034
lnFDIG						
LD.	.0147669	.0163749	0.90	0.367	-.0173274	.0468612
L2D.	.034471	.0137909	2.50	0.012	.0074414	.0615007
L3D.	.0210902	.0107675	1.96	0.050	-.0000138	.0421941
lnGFCG						
LD.	-.5048054	.5726312	-1.02	0.307	-1.707142	.5375311
L2D.	-.3847388	.6917969	-0.56	0.578	-1.740636	.9711582
L3D.	-.9654982	.5374752	-1.80	0.072	-2.01893	.0879338
lnTGDP						
LD.	-.0584592	.0935048	-0.63	0.532	-.2417252	.1248068
L2D.	.1746557	.0969828	1.80	0.072	-.0154271	.3647386
L3D.	.3097904	.104923	2.95	0.003	.1041451	.5154357
_cons	.0492827	.0204736	2.40	0.016	.0090751	.0893303

The vector error correction model confirms a long-run equilibrium relationship among the variables where a unidirectional long-term causal flow runs from changes in FDIG, capital formation and trade openness to the GDP per capita growth rates of Bangladesh. This is revealed by the estimated coefficient of the error correction term L1 which is negative, as expected and statistically significant in terms of its associated t-value. The estimated coefficient -0.09388 indicates that the model adjust about 9.388 per cent of the short-run disequilibrium per period. In the above table, the lag values of each independent variable show the short run causality. We can check whether all the lags of independent variables can cause dependent variable in the short run.

In this case the null hypothesis is defined as follows:
Ho: All the lags of independent variables are jointly zero to explain the dependent variable.

```
( 1)  [D_lnGDPPC]LD.lnFDIG = 0
( 2)  [D_lnGDPPC]L2D.lnFDIG = 0
( 3)  [D_lnGDPPC]L3D.lnFDIG = 0
( 4)  [D_lnGDPPC]LD.lnGFCG = 0
( 5)  [D_lnGDPPC]L2D.lnGFCG = 0
( 6)  [D_lnGDPPC]L2D.lnGFCG = 0
( 7)  [D_lnGDPPC]LD.lnTGDP = 0
( 8)  [D_lnGDPPC]L2D.lnTGDP = 0
( 9)  [D_lnGDPPC]L3D.lnTGDP = 0
      Constraint 6 dropped

          chi2(  8) =   24.56
        Prob > chi2 =    0.0018
```

Here, we can reject the null hypothesis at 5 percent significance level because p-value (0.0018) < 0.05 (5% significance level). So all the lags of independent variables can cause dependent variable in the short run.

The following STATA output gives the estimates of the parameters in the co-integrating equation.

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	3	259.2449	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
lnGDPPC	1	.	.	.	.	.
lnFDIG	.4553799	.0907242	5.02	0.000	.2775637	.6331961
lnGFCG	-6.154915	1.094968	-5.62	0.000	-8.301012	-4.008817
lnTGDP	-.8175842	.4191865	-1.95	0.051	-1.639175	.0040062
_cons	16.70716	.	.	.	.	.

The results indicate strong support for a co-integrating equation such that

$$LnGDPPC + 0.455\ LnFDIG - 6.155\ LnGFCG - 0.818\ LnTGDP + 16.707 = Error$$

Taking the dependent variable on the left hand side and the constant and independent variables on the right hand side we can write the co-integration equation as follows:

$$LnGDPPC = -16.707 - \underset{(0.000)}{0.455\ LnFDIG} + \underset{(0.000)}{6.155\ LnGFCG} + \underset{(0.051)}{0.818\ LnTGDP}$$

The values in first bracket indicate the corresponding p-value.

Here the coefficient of the variable $LnGFCG$ is positive and significant at 5% level and the coefficient of $LnTGDP$ is also positive but significant at 10% level. This shows that in the long run, gross fixed capital formation and trade over GDP (trade openness) have positive and significant effect on GDP per capita. The coefficient of $LnTGDP$ states that one percent increases in trade openness contributes 0.82% increase in GDP per capita ceteris paribus in the long run. This indicates that globalization has positive and significant effect on economic growth. But $LnFDIG$ has negative but significant effect on GDP per capita in the long run.

Conclusion:-

The purpose of this study to investigate the relationship between globalization (trade openness) and economic growth (GDP per capita) in Bangladesh. The result showed that in the long run trade over GDP (trade openness) has positive and significant effect on GDP per capita. In other words globalization has positive and significant effect on economic growth in Bangladesh. Our finding is supported by the studies of Dollar (1992), Sachs et al. (1995) and Edwards (1998) that globalization accentuates economic growth.

In Bangladesh the negative association between foreign direct investment and GDP per capita supports the dependency theory. According to this theory dependence on foreign investment tends to create a negative impact on economic growth and income distribution. The underlying assumption behind the dependency theory is that an economy controlled by foreigners does not develop organically rather grows in a disarticulated manner (Amin 1974). In Bangladesh FDI influence negatively the balance-of-payment position because most of the case she needs to import the inputs of production (Musila and Sigue, 2006).

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