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DOES GLOBALIZATION AFFECT THE ECONOMIC GROWTH OF BANGLADESH? - AN ECONOMETRIC ANALYSIS

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ABSTRACT

The progressive integration of economies and communities all over the world has been the most spoken of concept in open economics for the last few decades. Globalization has manifold multi-dimensional conjugations on the society, politics, and economics. The paper estimates a model to determine the impacts of globalization on economic growth in Bangladesh. The results, using yearly data from 1986 to 2016, assure long-run relationships among the variables. The study uses the Augmented Dicky-Fuller (ADF) test to check whether a considered data undergoes a unit root problem and it provides a foundation for the long run relationship using the stationary series. Johansen cointegration technique finds a long-run equilibrium relationship between gross domestic product (a proxy of economic growth) and the economic globalization variables. The study also uses the Vector Error Correction Model (VECM) to identify the long run as well as the short run relationships among the considered variables. The paper finds a positive effect of human resource development and trade openness on the economic growth in Bangladesh which is statistically significant in the long run. The paper also finds a negative effect of financial integration and gross fixed capital formation in the long run. The structural stability of the considered model is tested using the CUSUM and CUSUM-SQ test and the findings confirm a long run relationship between the considered variables and the model is structurally stable. Findings do not support the negative effects of globalization on economic growth.

Contribution/ Originality: This study is one of the very few studies which have examined the impact of globalization on the economic growth in the case of Bangladesh using Cointegration and Vector Error Correction model (VECM).

1. INTRODUCTION

Nowadays globalization is a center of the circle for those who stand against trade liberalization, those who conceive a homogeneous world by international trade, foreign investment, communication, technological progress, infrastructure development (Johnson, 2002). Globalization is generally considered as a scheme of amalgamation of capital markets and goods markets across the borders by what means the barriers of the international investment, and international trade are consolidated (Gurgul and Lach, 2014).

For the last three decades, Globalization is proved as a magical phrase in which the world becomes as a global village. Globalization is a multidimensional subject. There is no single sector which is not affected by globalization. A magical touch of the globalization rises the life expectancy. The small number of people think that life expectancy at birth could not overcome 35 years during three centuries ago (Bogue, 1969). Contrariwise the expectancy rate is closely doubled as 67 years. Economic globalization multiplies the integration of the world economy by the free movement of goods, services, people (labor), knowledge and capital across the borders. The globalization not only makes the free-trade opportunities across the borders but also grows the financial flows, foreign direct investment (FDI), foreign aid, remittance and broadens the people's working choice. Economic globalization enhances the production, distribution and easy marketing of goods and services.

The positive impact of economic globalization in Bangladesh refers to rise capital flows, migration, build a strong communication system, clear infrastructure development, and minimize the communication and transportation costs, technological progress as well as trade barriers. Economic globalization motivates the people of Bangladesh increasing the modernity of the society as well as it increases the living standard of the people in Bangladesh.

D'Onofrio and Rousseau (2018) find that both trade and growth are accelerated by the financial development but trade is more responsive. Majeed (2018) investigates the aggregate globalization effect on quality of life using a panel data of 44 Muslim economies from 1970 to 2010. The findings suggest an interesting result in which economic globalization rises the quality of life whereas social globalization does not. Majidi (2017) uses panel data to find the globalization effect on economic growth in 100 developing economies and finds an insignificant effect of social and economic globalization on economic growth in middle income and lower middle income countries. Morita et al. (2015) find a U-shaped acceleration rate. Egbetunde and Akinlo (2015) find a long run positive impact of financial globalization on growth in Sub-Sahara Africa.

Kilic (2015) investigates the globalization effects on the progress of developing countries and finds that economic and political globalization play a positive role to forward the growth whereas social globalization plays a negative impact. The author also finds a two-way causality relationship between social and political globalization and one way causal relationship between social globalization and economic growth of considered countries. Pegkas and Tsamadias (2014) uses cointegration approach and error correction model to investigate the higher education effect on aggregate growth. The authors find a long run cointegration as the growth elasticity is .52 percent regarding higher education.

Samimi and Jenatabadi (2014) study on OIC countries to investigate the globalization effect on growth. The authors find that economic globalization is also accelerated by a country's income level globalization grants more convenience to middle and high income countries whereas low-income countries are deprived. Truly, the countries should ensure the utile income level to get more advantage concerning globalization.

Gurgul and Lach (2014) examines economic growth in ten CEE economies for different apparent of globalization. The findings suggest a positive result for the economic development in ten CEE economies as increasing in financial flows, growth of international investment, growth of international trade, diminishing of input barriers. Meraj (2013) studies the globalization and trade openness effect on the economic growth of Bangladesh. The author uses the 'autoregressive distributed lag' (ARDL) and the Granger causality approach and findings suggest a bidirectional causality relationship between exports and economic growth whereas imports do not. Hye (2012) uses the JJ cointegration, autoregressive distributed lag (ARDL) approach ton cointegration, OLS to investigate the long run effect of trade openness. The author finds a negative but significant relationship between trade openness and economic growth.

Afzal et al. (2011) investigates the causality connection between education and growth in Pakistan and the authors find that higher education accelerates the economic growth. Fukase (2010) uses the Generalized Method of Moment (GMM) approach to investigate the kinship between education, trade openness, and economic progress in

106 countries over 1969 to 2004. The author finds that trade openness is positively correlated with economic growth and the GMM estimator increases the actual impact of education on growth.

World Bank (2002) concentrates on the poor living in developing countries because of economic integration and finds three outcomes. First, Bangladesh, China, India, and Vietnam are the poor countries those who succeed to reduce their poverty, have joined in the universal market for the manufacturing and services. Second, Afghanistan, and Congo, significantly enhance their effectiveness to include in the international economy. Third, there arise great integration of cultural and institutional homogenization. Khan and Riskin (2001) also support these results by other works. Finally, to get the proper advantage of globalization, The World Bank Development Research Group proposes seven plans for developing countries.

However, the major shortcoming of these studies is that most of these studies are based on a particular effect. Finally, none of the studies examine the aggregate globalization effect on economic growth. This study aims to estimate the aggregate globalization effect on economic growth by applying time series analysis in Bangladesh.

2. DATA SPECIFICATION

All data are collected from the World Development Indicators. The study uses the annual data from 1986 to 2016 because monthly data of the variables are not available. The dependent variable for this paper is Gross Domestic Variable (GDP) and the independent variables are the Financial Integration, Gross Fixed Capital Formation, Human Resource Development, Trade openness.

3. VARIABLES

Gross Domestic Product (GDP) is used as the proxy for economic growth. Financial integration is the combination of capital inflow and capital outflow. Foreign direct investment and portfolio investment are used for capital inflow and debt servicing for capital outflow. Gross fixed capital formation is used as the proxy for the capital stock. Education is used for the Human Resource Development (HRD). Finally, Trade openness is defined as follow,

$$\text{Trade Openness} = \frac{\text{Export of goods and services} + \text{Import of goods and services}}{\text{Gross Domestic Product}}$$

4. MODEL SPECIFICATION

The econometric model is based on the following functional form:

$$Y = F(X_1, X_2, X_3, X_4) \tag{1}$$

This can be narrated as follows:

$$\text{GDP} = F(\text{FININT, GFCF, HRD, TOPEN}) \tag{2}$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + u_t \tag{3}$$

This can be econometrically narrated as follows:

$$GDP_t = \beta_0 + \beta_1 FININT_t + \beta_2 GFCF_t + \beta_3 HRD_t + \beta_4 TOPEN_t + u_t \tag{4}$$

Where,
GDP is the Gross Domestic Product
FININT is the Financial Integration
GFCF is the Gross fixed capital formation.
HRD is the Human Resource Development.
TOPEN is the trade openness.

To get the stationary of the data, all the variables are used in logarithms (Hondroyiannis and Papapetrou, 2001; Maysami *et al.*, 2005).

$$\text{LNGDP} = \beta_0 + \beta_1 \text{LNFININT} + \beta_2 \text{LNGFCF} + \beta_3 \text{LNHRD} + \beta_4 \text{LNTOPEN} + u_t \qquad (5)$$

It is expected that financial integration can be positive/negative effect, gross fixed capital formation can be positive/negative effect, human resource development can be positive effect and trade openness can be positive/negative effect on economic growth in Bangladesh.
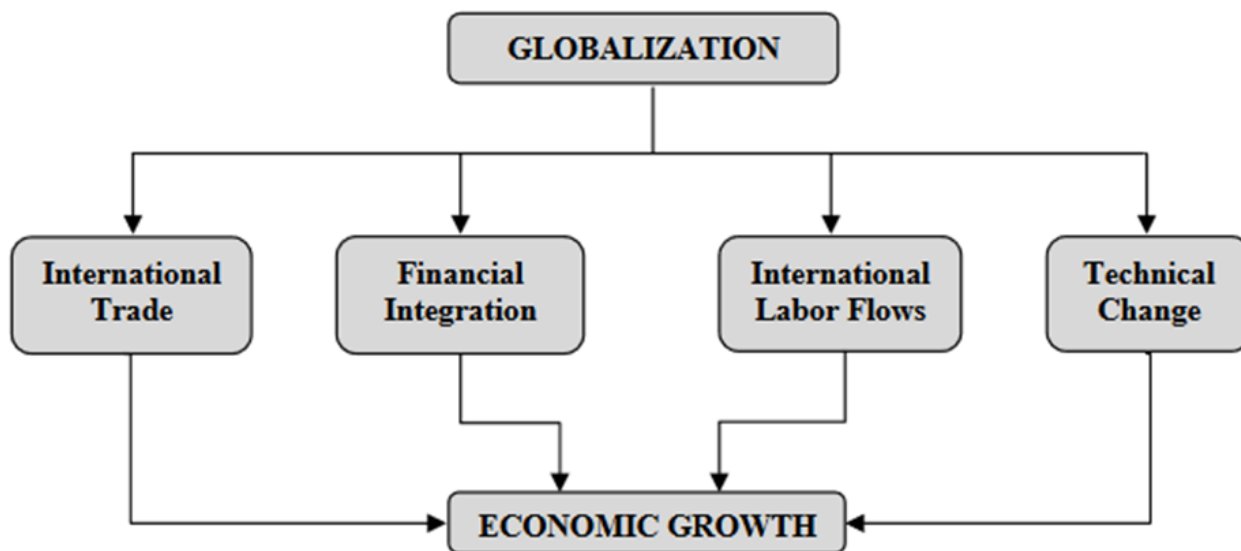

Figure-1. Relationship between globalization and economic growth.
Source: The author uses the channels from Husain (2000).

5. METHODS OF ESTIMATION

5.1. Unit Autoregressive Root Test

Non-stationary value diverges the model from the long run equilibrium. To check the short run dynamics and the long run stability among the variables, the Unit Autoregressive Root test estimates the times series properties of the variables. In this paper, the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981) is employed to detect a unit autoregressive root.

5.1.1. Augmented Dickey-Fuller (ADF)

The Augmented Dickey-Fuller (ADF) test forms of calculating the following regression:

$$\Delta y_t = \mu + \gamma \, y_{t-1} + \sum_{j=1}^{\rho} \gamma_j \, \Delta y_{t-j} + \varepsilon_t \qquad (6)$$

Where Δ and ε_t use as the first difference operator and the white noise error term and ρ represents as the number of lags in the dependent variable. This equation defines ADF tests without trend, respectively.

$$\Delta y_t = \mu + \beta_t + \gamma \, y_{t-1} + \sum_{j=1}^{\rho} \gamma_j \, \Delta y_{t-j} + \varepsilon_t \qquad (7)$$

This equation shows ADF tests with the trend, respectively. In this scheme, the ADF unit root test makes a null hypothesis $H_0 : \gamma = 0$ as well as an alternative hypothesis $H_A : \gamma < 0$.

5.2. Johansen Cointegration Test

Johansen (1988) maximum likelihood approach identifies whether a long run equilibrium relationship exists among the variables. Cointegration means that instead of being individually non-stationary, a linear association between two or more time series can be stationary. Cointegration of two or more time series indicates that a long run cointegrated relationship is available among the considered variables.

The cointegration test follows the Vector Auto regression (VAR) model:

$$LNFININT_{i,t} = \prod_{11} LNFININT_{i,t-1} + \prod_{12} LNGFCF_{i,t-1} + \prod_{13} LNHRD_{i,t-1} + \prod_{14} LNTOPEN_{i,t-1} + \prod_{15} LNGDP_{i,t-1} + \varepsilon_{S_{i,t}}$$

$$\text{(7)}$$

$$LNGFCF_{i,t} = \prod_{21} LNFININT_{i,t-1} + \prod_{22} LNGFCF_{i,t-1} + \prod_{23} LNHRD_{i,t-1} + \prod_{24} LNTOPEN_{i,t-1} + \prod_{25} LNGDP_{i,t-1} + \varepsilon_{Y_{i,t}}$$

$$\text{(8)}$$

$$LNHRD_{i,t} = \prod_{31} LNFININT_{i,t-1} + \prod_{32} LNGFCF_{i,t-1} + \prod_{33} LNHRD_{i,t-1} + \prod_{34} LNTOPEN_{i,t-1} + \prod_{35} LNGDP_{i,t-1} + \varepsilon_{I_{i,t}}$$

$$\text{(9)}$$

$$LNTOPEN_{i,t} = \prod_{41} LNFININT_{i,t-1} + \prod_{42} LNGFCF_{i,t-1} + \prod_{43} LNHRD_{i,t-1} + \prod_{44} LNTOPEN_{i,t-1} + \prod_{45} LNGDP_{i,t-1} + \varepsilon_{\pi_{i,t}}$$

$$\text{(10)}$$

$$LNGDP_{i,t} = \prod_{51} LNFININT_{i,t-1} + \prod_{52} LNGFCF_{i,t-1} + \prod_{53} LNHRD_{i,t-1} + \prod_{54} LNTOPEN_{i,t-1} + \prod_{55} LNGDP_{i,t-1} + \varepsilon_{S_{i,t}}$$

$$\text{(11)}$$

Matrix notation can be constructed:

$$\begin{pmatrix} LNFININT_{i,t} \\ LNGFCF_{i,t} \\ LNHRD_{i,t} \\ LNTOPEN_{i,t} \\ LNGDP_{i,t} \end{pmatrix} = \begin{pmatrix} \prod_{11} & \prod_{12} & \prod_{13} & \prod_{14} & \prod_{15} \\ \prod_{21} & \prod_{22} & \prod_{23} & \prod_{24} & \prod_{25} \\ \prod_{31} & \prod_{32} & \prod_{33} & \prod_{34} & \prod_{35} \\ \prod_{41} & \prod_{42} & \prod_{43} & \prod_{44} & \prod_{45} \\ \prod_{51} & \prod_{52} & \prod_{53} & \prod_{54} & \prod_{55} \end{pmatrix} \begin{pmatrix} LNFININT_{i,t} \\ LNGFCF_{i,t} \\ LNHRD_{i,t} \\ LNTOPEN_{i,t} \\ LNGDP_{i,t} \end{pmatrix} + \begin{pmatrix} \varepsilon_{S_{i,t}} \\ \varepsilon_{Y_{i,t}} \\ \varepsilon_{I_{i,t}} \\ \varepsilon_{\pi_{i,t}} \\ \varepsilon_{S_{i,t}} \end{pmatrix} \qquad \text{(12)}$$

Johansen consults two different likelihood ratio tests of the significance of the canonical correlations and thereby the waned rank of the matrix: the trace test and Maximum Eigen Value Test i.e.

$$\lambda_{trace(r)} = -T \sum_{i=r+1}^{k} \ln(1 - \hat{\lambda}_i) \qquad \text{(13)}$$

$$\lambda_{max(r,r+1)} = -T \ln(1 - \widehat{\lambda_{r+1}}) \qquad \text{(14)}$$

Here, T and $\hat{\lambda}_i$ are is the sample size and the ith largest canonical correlation. The trace examines the null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors. The maximum eigenvalue test, in contrast, tests the null hypothesis of r cointegrating vectors contrary to the alternative

hypothesis of r+1 cointegrating vectors. Asymptotic critical values can be obtained from Johansen and Juselius (1990). Similarly, the time series variables of Bangladesh are tested to examine the long run equilibrium relationship among the variables.

5.3. Vector Error Correction Model (VECM)

The cointegration among variables exclusively indicates a long run equilibrium relationship. In point of fact, there may be imbalance in the short run. To examine the short run kinematics among the concerned time series variables, Vector Error Correction Model (VECM) should be promoted.

VECM considers,

$$\Delta LNGDP_t = \beta_0 + \sum_{j=1}^{m} \theta_k \, \Delta LNGDP_{t-j} + \sum_{j=1}^{m} \gamma_k \, \Delta LNFININT_{t-j} + \sum_{j=1}^{m} \tau_k \, \Delta LNGFCF_{t-j} + \sum_{j=1}^{m} \varphi_k \, \Delta LNHRD_{t-j}$$

$$+ \sum_{j=1}^{m} \sigma_k \Delta LNTOPEN_{t-j} + \lambda \left[LNGDP_{t-1} - \widehat{\alpha_0} - \widehat{\alpha_1} LNFININT_{t-1} - \widehat{\alpha_2} LNGFCF_{t-1} \right.$$

$$\left. - \widehat{\alpha_3} LNHRD_{t-1} - \widehat{\alpha_4} LNTOPEN_{t-1} \right] + \varepsilon_t$$

Where Δ uses as the first difference operator, λ depicts the speed of adjustment from short run to the long run equilibrium as well as ε_t represents as a purely white noise term.

6. RESULT AND DISCUSSION

6.1. Augmented Dickey-Fuller (ADF) Unit Root Test

Table-1. Augmented Dickey-Fuller (ADF) Unit Root test

Variable	Without trend		With trend	
	Value	**1st difference**	**Value**	**1st difference**
LNGDP	3.488*** (1)	-2.209** (2)	-1.221 (1)	-3.842** (2)
LNFININT	-1.509* (1)	-2.22** (4)	-2.653 (1)	-4.696*** (0)
LNGFCF	1.902** (1)	-4.408*** (0)	-5.779*** (4)	-5.150*** (0)
LNHRD	-.151 (2)	-5.012*** (1)	-2.518 (1)	-4.937*** (1)
LNTOPEN	-1.107 (1)	-4.197*** (0)	-2.011 (2)	-4.159** (0)

Source: Authors calculation from STATA 12 software.
Notes: (1) figures within parentheses show lag lengths selected by the Akaike Information Criterion (AIC) (2) ***, **, * denote the rejection of the null hypothesis of unit root at 1%, 5%, and 10% significance level respectively.

Table 1 shows that some of the variables are non-stationary in case of without trend as well as with trend. In order to get stationary series, the study uses the 1st difference process. Finally, ADF unit root test reject the null hypothesis for all variables in 1st difference at 1% and 5% significance levels for without and with trend. The results of the ADF unit root test provide the foundation for long run relationship test among the variables.

6.2. Cointegration Analysis:

6.2.1. Johansen Cointegration Test

Table-2. Johansen Cointegration Test

Null H0	λ (Trace)	5% critical value	λ (Max)	5% critical value
r=0	86.07*	68.52	36.32*	33.46
r≤1	49.75*	47.21	24.41	27.07
r≤2	26.34	29.68	15.77	20.97
r≤3	9.57	15.41	5.08	14.07
r≤4	4.49	3.76	4.49	3.76

Source: Authors calculation from STATA 12 software.
Notes: (1) r denotes the number of cointegrating equation. (2) The lag order for each VAR is chosen by AIC. (3) '*' denotes the rejection of the null hypothesis of unit root at 5% significance level respectively.

Table 2 shows that the null hypothesis of no cointegrating equation, i.e., r=0 and r≤1, is rejected for the trace statistics and r=0, is rejected for the max statistics. This is because λ_{trace} and λ_{max} are greater than the critical values at the 5% level of significance. The result provides evidence that there is at least one cointegrating equation in each case. In some cases, there is even more than one equation. The results represent long run relations between economic growth and the economic globalization factors.

6.2.2. Johansen Normalized Cointegrating Equation (Vector Error Correction Model)

Table-3. Johansen Normalized Cointegrating Equation (Vector Error Correction Model)

Variable	Long run relationship			
	Coefficient	Standard Error	Z–value	P>|Z|
LNGDP	1	-	-	-
LNFININT	4.686	.697	6.73	.000
LNGFCF	1.970	.703	2.80	.005
LNHRD	-7.646	1.34	-.5.70	.000
LNTOPEN	-1.01	.55	-1.82	.069
CONSTANT	-12.69	-	-	-

Source: Authors calculation from STATA 12 software.

The long run equation:

$$\widehat{LNGDP} = 12.69 - 4.686\ \widehat{LNFININT} - 1.970\ \widehat{LNGFCF} + 7.646\ \widehat{LNHRD} + 1.01\ \widehat{LNTOPEN}$$

S. E.	=	(.697)	(.703)	(1.34)	(.55)
P-value =		(.000)	(.005)	(.000)	(.069)

Table 3 shows the long run Vector error correction model test results. Here, all coefficients are significant at 1% significance level. Concerning the considered variables, the estimated coefficient signs of the financial integration and gross fixed capital formation show a negative impact of the economic globalization on the economic growth of Bangladesh. Because the long-term burden of debt servicing in Bangladesh is a huge amount. At the moment of a newborn baby, the per capita debt on her/his head is near to TK. 60 thousand and it will be greater over time. A high price level increases the consumption which hinders the saving mentality and finally, investment falls badly. The coefficients of the human resource development and trade openness show a positive impact on the economic growth of Bangladesh due to the globalization. The literacy rate of Bangladesh is jumping greatly due to the proper education budget. At the moment it is upper 72 percent. Human resource development is a new blast of globalization for the economic growth of Bangladesh because people are able to take proper education (knowledge,

technology, skill, training, and motivation for building their career). Trade openness generates a positive impact due to the great export and import motives (i.e., Garments sector is the world second largest exporter). Similar result is found i.e. Trade openness and education have a positive impact in Fukase (2010); Trejos and Barboza (2015) and financial integration has a negative impact on economic growth in Ray (2012). There need to more work on financial integration and gross fixed capital formation in Bangladesh.

Table-4. Vector error correction model

Variable	Short run relationship			
	Coefficient	**Standard Error**	**Z-value**	**P>│Z│**
_ce1 L1.	–.0060234	.0033201	–1.81	0.070
LNGDP LD.	.7013064	.1762123	3.98	0.000
LNFININT LD.	.0113516	.0113201	1.00	0.316
LNGFCF LD.	–.1053746	.0918861	–1.15	0.251
LNHRD LD.	–.0372767	.0239516	–1.56	0.120
LNTOPEN LD.	–.0014917	.0139424	–0.11	0.915
Constant	.0168549	.0090352	1.87	0.062

Source: Authors calculation from STATA 12 software.

Table 4 shows the short run vector error correction model test results. Here, the explanatory variables such as financial integration show a positive impact on economic growth and gross fixed capital formation, human resource development as well as trade openness show a negative impact on the economic growth of Bangladesh. The findings show that financial integration, gross fixed capital formation, human resource development and trade openness play a significant role to the economic growth in Bangladesh. Trade openness reports a high insignificant relationship to the economic growth in Bangladesh.

6.2.3. CUSUM and CUSUM-SQ Tests (5% Significance Level)

The stability test is completed by using the CUSUM and CUSUM-SQ statistics. The statistic shows a structural equilibrium of the short run and long-run elasticities. CUSUM statistic is stated recursively as well as decorated in opposition to the breakpoints. The null hypothesis cannot be rejected that means all the coefficients of the considered variables in the model is static if the portion of CUSUM statistic remains inside the critical points of the 5 percent significance level. The statistical result of CUSUM and CUSUM-SQ statistics are well behaved inside the upper and lower limit, meaning that all coefficients are significantly stable.

7. CONCLUSIONS AND RECOMMENDATION

The study examined the effect of economic globalization on the economic growth in Bangladesh between 1986 and 2016. The study finds that a long run equilibrium relationship exists on economic growth by the human resource development and trade openness. Because globalization helps to make a better human resource by sharing knowledge, plans, technology, skill, training and to develop productivity of labor, production choice. Similar findings are found in Dreher (2006); Shahbaz (2012) that trade openness, education are the prime conductors of economic growth. The study also examined that the economy of Bangladesh is yet to obtain from positive the effect of financial integration and gross fixed capital formation.

The paper suggests some policy recommendation, i.e. the government should increase the deposit interest rate to encourage the people for more savings that will convert into investment; the government should ensure a relax investment environment as improving energy facilities, infrastructure development, profit transfer safety that will

encourage the international investors; the government should give more attention on higher education, in particular to higher education. More funds need be assigned in education sector like other sectors, especially in research programs, so that the economy can get more policy recommendation for the development; the government should apply dynamic export promotion strategies in Bangladesh, i.e. lower the tariff and trade barriers.

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