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INVESTIGATING THE DYNAMIC CAUSAL RELATIONSHIP AMONG FDI, EXPORT AND ECONOMIC GROWTH IN BANGLADESH

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ABSTRACT

Modeling of causal relationships between foreign direct investment (FDI), export and economic growth for Bangladesh is the main purpose of this study and in this context time series data of these variables are taken over the period of 1975 to 2016 from World Development Indicator 2018. Time series analysis like unit root test, Johansen cointegration test, vector error correction model (VECM) and Granger causality test based on VECM have been employed for empirical analysis in this study. Empirical results reveal that a unidirectional causality running from export to economic growth in the context of Bangladesh but no causal relationship exists between FDI and economic growth, and export and FDI.

Keywords: *Foreign direct investment (FDI), Exports, Economic growth, VECM Granger causality, Bangladesh*.

I. INTRODUCTION

The positive impact of foreign direct investment (FDI) on economic growth of the country is a commonly accepted claim. The main purpose of this study is to examine the relationship between export, FDI and economic growth in Bangladesh. FDI, with other benefits, brings also many advantages such as new technologies, manufacturing processes, know-how and others. Despite this positive feedback, the theme of FDI and its impact on the economy is being discussed at many levels. There are several theories and approaches to this problem that, on the one hand, support the claims about the positive effects of FDI on the economy but on the other hand, they also counter these arguments. The topic that is addressed often is a causal relationship between economic growth and exports. Not only economic theory, but also empirical studies are trying to prove this relationship. As an example we may use studies Dritsaki et al., (2004), Pacheco—Lopez, (2004), or Feridun and Sissoko (2006). Bangladesh as a country with a small own market is heavily dependent on foreign trade and especially on export. Foreign direct investments have ability to contribute directly to the country‘s export capacity. Foreign companies are financially stronger, larger on scale and in particular are more export oriented than domestic firms. But Bangladesh is the second fastest growing major economy in 2016 according to International Monetary Funds and can experience a growth rate of 7.00 per year now. So the main purpose of this study is to investigate the core determinants of economic growth by examining whether the causal relationship among economic growth, FDI and exports is true in terms of economy in Bangladesh or not. In this context, this paper aims to analyses the dynamic causal relationship between FDI, export and economic growth in Bangladesh.

II. LITERATURE REVIEW

Although FDI is considered an important element to foster economic growth, empirical studies can be categorizes into two contradictory position. At the one hand some adds to the existing literature by finding FDI led economic growth, on the other hand some gets no such relationships between FDI and economic growth. For example Hansen & Rand (2006) examined the Granger causal relationships between foreign direct investment (FDI) and GDP in a sample of 31 developing countries covering 31 years by using estimators for heterogeneous panel data and found bi-directional causality between the FDI-to-GDP ratio and the level of GDP. FDI has a lasting impact on GDP, while GDP has no long-run impact on the FDI-to-GDP ratio. In that sense FDI causes growth. Chakraborty &

Nunnenkamp (2008) argued that booming foreign direct investment (FDI) in post-reform India is widely believed to promote economic growth. They assess this proposition by subjecting industry-specific FDI and output data to Granger causality tests within a panel cointegration framework. It turns out that the growth effects of FDI vary widely across sectors. FDI stocks and output are mutually reinforcing in the manufacturing sector, whereas any causal relationship is absent in the primary sector. Most strikingly, we find only transitory effects of FDI on output in the services sector. However, FDI in the services sector appears to have promoted growth in the manufacturing sector through cross-sector spillovers.Pegkas (2015) analyzes the relationship between the foreign direct investments and economic growth in the Eurozone countries over the period of 2002–2012 by employing panel data estimations and their analysis reveals that there is a positive long-run cointegrating relationship between FDI stock and economic growth. By using the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) methods he finds that the elasticity of GDP with respect to FDI is 0.054% and 0.147%, respectively. The results also indicate that the stock of foreign direct investment is a significant factor that positively affects economic growth in the Eurozone countries.

Some also gets that FDI increases firms productivity, for example, Buckley et al. (2002) using detailed cross-section data for 1995, non-Chinese MNEs are found to generate technological and international market access spillover benefits for Chinese firms, while overseas Chinese investors confer only market access benefits. State-owned enterprises reap no benefits, and indeed receive negative spillovers from overseas investors, in marked contrast to the positive spillovers gained by collectively-owned firms. These findings underline the importance of reform in state-owned enterprises to raise the absorptive capacity of the Chinese domestically-owned sector.

Moreover some studies gets various mixed results like Alfaro et al. (2004) examined the various links among foreign direct investment (FDI), financial markets, and economic growth to explore whether countries with better financial systems can exploit FDI more efficiently. Their analysis, using cross-country data between 1975 and 1995, shows that FDI alone plays an ambiguous role in contributing to economic growth. However, countries with well-developed financial markets gain significantly from FDI. The results are robust to different measures of financial market development, the inclusion of other determinants of economic growth, and consideration of endogeneity.Beugelsdijk et al. (2008) investigated the impact of FDI on host country economic growth by distinguishing between the growth effects of horizontal (market seeking) FDI and vertical (efficiency seeking) FDI. Using a new database, they estimate the growth effects of vertical and horizontal US MNE activity into 44 host countries over the period 1983–2003, also using traditional total FDI figures as a benchmark. Controlling for endogeneity and absorptive capacity effects, they found that horizontal and vertical FDI have positive and significant growth effects in developed countries. Moreover, their results indicate a superior growth effect of horizontal FDI over vertical FDI. In line with existing literature, they found no significant effects of horizontal or vertical FDI in developing countries.Azman-Saini et al. (2010) used a threshold regression model and found new evidence that the positive impact of FDI on growth "kicks in" only after financial market development exceeds a threshold level. Until then, the benefit of FDI is non-existent.

Empirically there are some strong evidence of export led economic growth. For example Balassa (1978) investigated the relationship between exports and economic growth in a group of eleven developing countries that have already established an industrial base. Separate consideration is given to manufacture and to total exports; in the case of the latter, adjustment is made for domestic and foreign investment and for increases in the labor force.Kavoussi (1984) examined the relationship between export expansion and economic growth in a sample of seventy-three developing countries by using data for the period 1960–1978. It shows that in both groups of low- and middle-income countries, export expansion is associated with better economic performance and that an important cause of this association is the favorable impact of exports on total factor productivity. His results also reveal that the effect of commodity composition of exports on the relationship between export expansion and economic growth is substantial in more advanced developing economies.Fosu (1990) by employing an augmented production-function framework found that export growth exerts a positive impact on GDP growth in less developed countries (LDCs), even when capital and labor are controlled for.Ghatak & Price (1997) also get the evidence of export led growth performance for India.

Some studies are conducted by amalgamating the FDI and export to explain economic growth. For example, Liu et al. (2002) investigates the causal links between trade, economic growth and inward foreign direct investment (FDI)

in China at the aggregate level. The integration and cointegration properties of quarterly data are analysed. Long-run relationships between growth, exports, imports and FDI are identified in a cointegration framework, in which they finds bi-directional causality between economic growth, FDI and exports. Economic development, exports and FDI appear to be mutually reinforcing under the open-door policy.Ahmad et al. (2003) analyses the relationship between foreign direct investment, trade, and domestic output by employing the Granger non-causality, recently developed by Toda and Yamamoto, over the period 1972 to 2001. The results show the long-run relationship among the variables. The results support the export-led growth hypothesis. The finding indicates the FDI-domestic output nexus. This suggests that domestic firms, through the spillover effect mechanism, have benefitted from FDI. The findings do not show the FDI-export growth nexus. The results indicate that the integration of Pakistan economy with the world economy should be enhanced with such policies as will attract more FDI in order to gain the spillover effects of FDI for output, and particularly for FDI-led export growth.Kimura & Kiyota (2006) examined the relationship between exports, foreign direct investment, and firm productivity. Using longitudinal panel data on Japanese firms, they found that the most productive firms engage in exports and foreign direct investment, medium productive firms engage in either exports or foreign direct investment, and the least productive firms focus only on the domestic market. Moreover, exports and foreign direct investment appear to improve firm productivity once the productivity convergence effect is controlled for. Firms that retain a presence in foreign markets, either by exports or foreign direct investment, show the highest productivity growth, which contributes to improvements in national productivity.

Hsiao & Hsiao (2006) by using time-series and panel data from 1986 to 2004 examined the Granger causality relations between GDP, exports, and FDI among China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Philippines, and Thailand, the eight rapidly developing East and Southeast Asian economies. Their results reveal that FDI has unidirectional effects on GDP directly and also indirectly through exports, and there also exists bidirectional causality between exports and GDP for the group. Yao (2006) focuses on the effect of exports and foreign direct investments (FDI) on economic performance, using a large panel data set encompassing 28 Chinese provinces over the period 1978–2000. Adopting Pedroni's panel unit root test and Arellano and Bond's dynamic panel data estimating technique, they found that both exports and FDI have a strong and positive effect on economic growth. Their results suggest that two development policies adopted in China are useful for other developing and transitional economies: export promotion and adoption of world technology and business practices.Tiwari & Mutascu (2011) examined the impact of foreign direct investment on economic growth in Asian countries by using the panel framework for the period 1986 to 2008 and found that both foreign direct investment and exports enhance economic growth. They suggest that an export-led growth path particularly at the initial stage of growth and in the later period, dependence on FDI might be a feasible option.Tekin (2012) investigates potential Granger causality among the real GDP, real exports and inward FDI in Least Developed Countries for the period between 1970 and 2009. His results indicate direct, one-period-ahead, unidirectional causality from exports to GDP in Haiti, Rwanda and Sierra Leone, and from GDP to exports in Angola, Chad and Zambia. Considering the FDI–Growth nexus, there is evidence of FDI Granger-causing GDP in Benin and Togo, and GDP Granger-causing FDI in Burkina Faso, Gambia, Madagascar and Malawi. While studying EXP–FDI relations, he finds that the causality is from FDI to real exports in Benin, Chad, Haiti, Mauritania, Niger, Togo and Yemen, and from real exports to FDI in Haiti, Madagascar, Mauritania, Malawi, Rwanda, Senegal and Zambia.

Belloumi (2014) investigate the relationship between foreign direct investment (FDI), trade openness and economic growth in host countries which remains one of the most important issues in the economic literature and met with renewed interest in recent years mainly for countries suffering from unemployment problems and lack of technological progress. They examine this issue for Tunisia by applying the bounds testing (ARDL) approach to cointegration for the period from 1970 to 2008. The bounds tests suggest that the variables of interest are bound together in the long run when foreign direct investment is the dependent variable. The associated equilibrium correction is also significant, confirming the existence of a long-run relationship. The results also indicate that there is no significant Granger causality from FDI to economic growth, from economic growth to FDI, from trade to economic growth and from economic growth to trade in the short run. Even though there is a widespread belief that FDI can generate positive spillover externalities for the host country, their empirical results fail to confirm this belief for the case of Tunisia. They go against the generally accepted idea considering the positive impact of FDI on

economic growth to be automatic. The results found for Tunisia can be generalized and compared to other developing countries which share a common experience in attracting FDI and trade liberalization.
In this context we try to modeling the causal relationship between FDI, export and economic growth in the for Bangladesh.

III. METHODOLOGY OF THIS STUDY

3.1 Source and Description of Data

Time series data of GDP per capita at constant dollar, net FDI inflows and export earnings at constant prices over the periods of 1975 to 2016 are collected from World Development Indicator 2018. Natural logarithm of the variables are taken to get the elasticitices. Notations and expected sign of the variables are presented in Table-1. It is expected that both FDI and exports have positive impacts on economic growth in the context of Bangladesh.

Table-1: Variables, Descriptions and Expected sign

Variables	Descriptions	Expected Sign
LNPRGDP	Natural log of GDP per capita (Constant dollar 2010)	(Dependent Variable)
LNFDI	Natural log of net FDI inflows	(+)
LNEXP	Natural log of export earnings (constant dollar 2010)	(+)

3.2 Test for Unit root

At first, it is important to check whether the series are stationary or not because Nelson and Ploser (1982) mention that unit root problems exist in most of the time series which may produce spurious results. The series which is stationary at level form is called I(0) and which becomes stationary after first difference is called I(1). There exists several test to check for unit root but among them Augmented Dickey Fuller (ADF) test, which is developed by Dickey and Fuller (1979), has been employed to test each series in this study. The possible equation of ADF are as follows**:**

$$\Delta Y_t = \alpha + \beta t + \delta Y_{t-1} + \lambda_i \sum_{i=1}^{n} \Delta Y_{t-i} + u_t \ldots(1)$$

Here the null hypothesis is that the data is non-stationary; which can be rejected if the computed δ is statistically significantly different from zero. We can conclude then the data is stationary. But if the computed δ is not statistically significantly different from zero then null hypothesis is not rejected which indicates that data is non-stationary. If a series is nonstationary at level form then we take the first difference of that series to check the stationarity and a I(1) series becomes stationary after first difference is taken.

3.3 Johansen cointegration test

We can check the cointegration between the two series by using Johansen cointegration test, which is developed by Johansen (1988, 1991) and Johansen and Juselius (1990), if both series are integrated of order one. The following equation is estimated in Johansen multivariate framework:

$$\Delta X_t = \mu + \tau_1 \Delta X_{t-1} + \ldots + \tau_{k-1} \tau \Delta X_{t-k+1} + \pi X_{t-1} + \nu_t \ldots(2)$$

Where Δ is the first difference operator, X is the vector of variables, μ is a drift parameter and $\tau_1 \ldots \tau_{k-1}$ are the coefficient matrices. To determine the rank (r) of the matrix π is an important task in Johansen cointegration test. Two statistics, a trace test and a maximum Eigen-value test, are being produced in Johansen test to estimate the cointegrating vectors. The trace test is computed as:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{g} \ln(1 - \hat{\lambda}_i) \ldots(3)$$

And the maximum Eigen value test is computed as:

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$$\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{t+1}) \quad \ldots(4)$$

Where λ_i's are the ordered Eigen values of the matrix π and T is the available observations. Both procedures test the null hypothesis of at most r cointegrating vectors against an unspecified or general alternative hypothesis of having more than one cointegrating vectors.

IV. RESULTS AND DISCUSSION

At first it is important to check whether the data are stationary or not. To check the order of integration is of a series we use ADF test and the results of ADF unit root test are tabulated into Table-2. From Table-2, we see that all the series are nonstationary at their level form but become stationary at their first difference form. So, they are integrated of order one that means they are I(1) in nature.

Table-2: Results of Unit root test

variables	H_0 = Time series is non-stationary					
	Variables in level form			Variables in first difference form		
	Test Statistic	Prob*	Result	Test statistic	Prob*	Result
LNPGDP	1.325055	0.9999	Do not reject	-10.26642	0.0000	Reject
LNFDI	-2.624907	0.2719	Do not reject	-7.412415	0.0000	Reject
LNEXP	-2.178878	0.4888	Do not reject	-5.704725	0.0001	Reject
Decision	Nonstationary			Stationary		

As both series are I(1) in nature so that we can now check that whether they are cointegrated or not that means whether they have a long-run equilibrium relationship or not.

Table-3: Johansen Cointegration Rank Test

Maximum rank	Trace Statistic	5% Critical Value	Prob.**	Max-Eigen Statistic	5% Critical Value	Prob.**
None*	56.58158	42.91525	0.0013	36.71504	25.82321	0.0013
At most 1	19.86655	25.87211	0.2327	16.54255	19.38704	0.1235
At most 2	3.323993	12.51798	0.8360	3.323993	12.51798	0.8360

*denotes the rejection of hypothesis at 5% critical value
**Mackinnon-Haug-Michelis (1999) p-values

The results of Johansen cointegration test are given in Table-3, where trend assumption is the linear deterministic trend.From the results of Johansen cointegration test we see that both Trace statistic and Max-Eigen statistic confirm that there is at least one cointegrating vector among LNPRGDP, LNFDI and LNEXP that means LNPRGDP, LNFDI and LNEXP are cointegrated, which means they have long-run equilibrium relationships so that in the long-run they will move together. As the variables under consideration are cointegrated so that we can express them by

error correction representation, which shows the speed of adjustment from short-run deviations to long-run equilibrium path each year. The cointegrating equations are presented in Table-4.

Table-4: Vector error correction estimates of LNPRGDP, LNFDI and LNEXP for Bangladesh

Co-integrating Equation			
Series	LNFDI(-1)	LNEXP(-1)	C
Estimates	0.048712	-0.047310	-6.052562
Standard Errors	0.05538	0.18761	
t-statistic	0.87964	-0.25217	
Error Correction	D(LNPRGDP)	D(LNFDI)	D(LNEXP)
Speed of adjustment	0.0567644	-0.125282	-0.014650
Standard Errors	0.00812	0.51477	0.07211
t-statistic	6.98744	-2.24337	-0.20317

VECM estimates are presented in Table-4 for LNPRGDP, LNFDI and LNEXP for Bangladesh.
The speed of adjustment of FDI is 12.5282 percent and the speed of adjustment of export is only 1.4 percent per year. Table-5 shows the short-run Granger Causality test results which is based on VECM. The respective p-value of the z-statistic are presented in the table.

Table-5: Granger Causality test based on VECM (P-value of z statistic)

Dependent Variable	D(LNPRGDP)	D(LNFDI)	D(LNEXP)
D(LNPRGDP)		0.3381	0.0599*
D(LNFDI)	0.7867		0.3802
D(LNEXP)	0.5075	0.4155	

* indicates significant at 10 percent level of significance

From table-5, we see that there is a unidirectional short-run causality running from export to economic growth in case Bangladesh but there is no Granger causality running from FDI to economic growth and FDI to exports.

V. CONCLUSION

Exports play the central role to foster economic growth in Bangladesh now. Empirical results of this study find the validity of export-led economic growth in Bangladesh and export Granger causes economic growth, where FDI does not Granger causes economic growth. The amount of FDI inflows percentage of GDP are not sufficient to foster robust economic growth for Bangladesh and basically most of the FDI were coming into the energy sector. So, government should have to establish business friendly environment that will attract huge foreign investment into the productive sector and if that happens then FDI can accelerate higheconomic growth in the future. Moreover, government should maintain export friendly environment to maintain economic growth in the future.

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