Symbiosis

www.symbiosisonlinepublishing.com
ISSN Online: 2577-7815

Research Article | International Journal of Family Business and Management | Open Access

An Analysis of the Causal Relationship Among Economic Growth, Export and Import in Bangladesh

Afrina Akter Mishu[1], Shanjida Chowdhury[2*], Nurul Mohammad Zayed[3]

[1]*Assistant Professor, Department of Statistics,Comilla University*

[2]*Assistant Professor, Department of General Educational Development,Daffodil International University*

[3]*Assistant Professor& Head, Department of Real Estate,Daffodil International University*

Received: January 27,2020; Accepted: January 29, 2020; Published: March 02, 2020

Corresponding author: *Shanjida Chowdhury,Assistant Professor, Department of General Educational Development,Daffodil International University,Bangladesh. Email: shan_chydiu.ged@daffodilvarsity.edu.bd*

Abstract

This paper analyzed the causal relationship between GDP growth, export and import in Bangladesh using time series data from 1980-2017. To investigate the relationship ADF test, Johansen long run co integration test, ECM (error correction model) and Granger casualty test has been employed. There existed a long run co integration relationship among the variables. Mostly there is a bilateral causality between import and GDP, which basically is quite significant. Specifically, there are a relatively significant unidirectional causal relationship exports to GDP. Therefore, the export sector will be the top of the potential priority of the nation to improve the country's GDP.

Keywords: Export; Import;Economic Growth; Granger Causality test; ECM.

Introduction

The main macroeconomic indicators for a country are the Gross Domestic Product (GDP), Export of Goods and Services (EXPORT) and Import of Goods and Services (IMPORT).Such indicators are an integral part of all economies including Bangladesh's overall development effort and national growth.Higher export rates of goods and services may play a major role in Bangladesh's development plan, where foreign exchange shortage is a key bottleneck. From the data given from IMF, Bangladesh's current economic situation is the second fastest growing major economy in 2016, at a rate of 7.1%.Exports system rebounded in 2018. The total earnings of exports increased by 7.4% in July-February, 2017-2018, compared with 3.2% growth against the corresponding period of 2017. The average value that occurred in Bangladesh during period 1960-2017 was 10.08% with a minimum of 2.9% in 1975 and a maximum of 20.16% percent in 2012.However, to attain the 2018's 8.2% growth target the expert growth is short of track. During the time period of March-June 2018 export will need to grow by 14.9% comparative to the same period in 2017 to achieve the target. This year 11.6% growth in export of knit products that is exports growth this year has so far been driven by Readymade garments (RMG) recording a growth of 8.7% during July-February, 2018. Primarily growth appears to have been volume driven. Non-RMG export earning which the growth derives from was unable to keep pace. In the first eight months exporting to the EU market gained momentum with a growth of 11.7%,which is higher than the growth rate for the corresponding period in 2017. In the US market other prime competitors of Bangladesh experienced significant growth.For import the average value for Bangladesh during 1960-2017 was 15.96% with a minimum of 8.1% in 1975 and a maximum of 27.95% in 2012.

Review of Literature

Hossain and Karuauatne[7] explored growth in export in Bangladesh in short run and in long run as well during 1974-1990. Hosaain and Alauddin[6]examined trade liberalization and its affect on GDP, import and export in Bangladesh. Yusoff[18] explained trends and structure of bilateral import and export their impact on economic growth in Malaysia during 1974-2004. Bamami-Oskoseeand Oyoloa[2] indicated an export-oriented growth in long run in Bangladesh during 1960-2002.Krugman and Obstfeld [13] argued that a high rate in economic growth was achieved in the Asian countries by increasing export rather than import. Jiyang and Wen [10] found causality between economic growth and foreign trade in China during 1990-2007. Mamun and Nath [1] found that exports and industrial production were co-integrated in Bangladesh during 1976-2003. After applying ECM, they suggested that unidirectional causality was caused by exports to growth in the long run in Bangladesh. Usman, Ashfaq and Mushtaq [16] analyzed economic growth and found that economic growth was strongly influenced by real exchange rate, inflation and export in Pakistan during 1980-2009. Chaudhary, Shirazi, and Choudhary [4] studied Bangladesh's trade policy and economic growth for the period of 1973 to 2002, the co-integration and multivariate Granger Causality test was used. The findings for Bangladesh strongly supported a long-run relationship between the three variables.In the study of Yuhong, Li and et. al. [3] co-integration analyzes were performed with import, export and economic growth data, and the results suggest that import growth greatly encouraged China's economic development, while export growth was the opposite.This research will examine the causal relationship between exports, imports and gross domestic product, in order to evaluate the problem of economic growth in Bangladesh.As exports and imports are the most important component of any country's economy due to a large increase in total GDP.It is therefore important to know how these two components will affect GDP, or how GDP will affect

them, the causality issue. In this regards, we will determine the causality between exports and imports.

Methodology

This study using the annual data of export, import and GDP for Bangladesh over the period of 1980-2017 from World Development Indicator (WDI) 2018. To eradicate the problem of heteroscedasticity all data of this study expressed in logarithm and denoted as LnGDP, LnEx and LnIm.

LnGDP=f (LnEx&LnIm)

The following five tests are used in this research: Unit Root Test, Cointegration Test, Error Correction Model, Impulse Response Function, and Causality Test.After compilation of the data, empirical results were obtained by using MS Excel and econometric program Eviews 10.

Results and Discussions

To obtain better insight about the behavior of export, imports and economic growth, the statistical output (Table 1) presents the descriptive statistics. The standard deviation of the export, import and economic growth seems to move closely together.

The specific focus of this study is to investigate the data's stationary properties (exports, imports, and GDP) by using the Augmented Dickey-Fuller (ADF) and Phillips –Perron (PP).

Result in Table 2 indicates that all variables, exports, imports and GDP, is non-stationary in their level. However, in the first difference they became stationary, and are integrated in order one (1). The study's findings also show that exports, imports and GDP have a long-term equilibrium relationship.As variables are integrated of order 1, we can test whether or not they are co-integrated (Engel and Granger, 1987). The number of co-integrating relationships was tested using the method proposed by Johansen (1988) and Johansen and Juselius (1990).Using the Akaike Information Criterion (AIC), Hernan- Quinn criterion (HQ), and Schwartz Criterion (SC), the optimum lag length of the level VAR system is calculated. The number of co-integrating relationships among the variables under consideration is listed below the table.

Table 1: Descriptive Statistics of study variables

	LNGDP	LNEX	LNIM
Mean	2.542245	9.536708	9.797931
Median	2.473586	9.482831	9.670412
Maximum	3.180846	10.5746	10.70427
Minimum	1.968599	8.552475	8.936281
Std. Dev.	0.289265	0.622901	0.511893
Skewness	0.352722	0.176824	0.25032
Kurtosis	2.608483	1.740356	2.044404
Jarque-Bera	1.274749	3.352215	2.279114
Probability	0.528679	0.187101	0.319961
Sum	119.4855	448.2253	460.5028
Sum Sq. Dev.	3.849003	17.84826	12.05358
Observations	47	47	47

Sources: Estimated

Results (in Table 3) show at 5% level of significance, there is at least one co-integrating relationships among the study variables which indicates that under consideration the series is driven by at least one common trend.Residuals from the first three equations of the VAR have been saved to use as the error-correction term in the subsequent tests for Granger causality.

This test of co-integrations is used to explain whether there is a long-run relationship between a set of variables that are non-stationary at their level but stationary after first differentiation. To estimate this type of relationship, the Engle-Granger Cointegration Method (the two-step method) was used. An equation of the form-

$LnGDPt= \alpha + \beta 1\ LnExt+ \beta 2\ LnImt+ et$ ....(4.1)

The result for the first step appears in the following equation with value of t-statistics that are shown in parentheses:

GDPt= -3.043051-0.071322LnExt + 0.639469LnImt (4.2)

(-11.58719) (-.786237) (5.793094)

To confirm the existence of a long-term relationship between LnGDP, LnEm and LnIm, this research would use Johansen's approach to explore the co-integration relationship that allows the estimation of co-integration relationships between non-stationary variables using Trace and Maximum Eigenvalue tests to analyze rank r, where r is the number of co-integrated r variables. Table 4 summarizes the nature of the long-term relationship between GDP, exports and imports-

Max-eigenvalue test indicates 1 co-integrating equation (s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

From table 4 it can be seen that both the Trace and Maximum Eigenvalue tests which is reject the null hypothesis of no co-integrating vector: r=0 is rejected at the 5 % significance level. Nevertheless, the null hypothesis of only one or less co-integrating vector cannot be rejected by either test that is H0: r <=1 and r<=2 are not rejected. Therefore, LnGDP, LnEx, and LnIm are co-integrated, and the relationship between them is long-run. The general form of the ECM with two variables is as follows:

$\Delta yt= \beta 0 + \beta 1\ \Delta xt- \beta 2\ [yt\text{-}1 - \gamma 1 - \gamma 2\ xt\text{-}1] + ut$

We applied the ECM for the three variables LnGDP, LnEx, and LnIm. The result appears in following equation-

Δ LnGDPt= 5.57518+ 0.94995Δ LnExt-1.7524Δ LnImt– 0.051 et-1 (4.3)

As a final approach to the question of whether exports and imports influence economic growth, this study estimates a VAR model and resulting equation is given below-

LnGDPt= -0.09073+ 0.059515LnGDPt-1 -0.78917LnGDPt-2 -0.14803LnExt-1

[-0.11488] [0.16356] [-0.18107] [-0.19675]

+ 0.185781LnExt-2 – 0.279935LnImt-1 – 0.17712LnImt-2 (4.4)

[0.14873] [-0.23473] [-0.18938]

LnExt= .058651 -0.233837 LnGDPt-1 – 0.23398 LnGDPt-2 – 0.508113LnExt-1

[0.12907] [-0.18377] [-.20344] [-0.22106]

+0.081792LnExt-2–0.43077LnImt-1+0.034367LnImt-2 (4.5)

[0.16711] [–0.26373] [0.21278]

LnImt= 0.20621+0.32524 LnGDPt-1 - 0.57627 LnGDPt-2 – 0.14732LnExt-1

[0.09993] [0.14228] [-0.15751] [-0.17115]

Table2: Unit Root Tests (ADF, PP)

Variables	ADF(Constant)		(PP) (Constant)		Order of Integration
	Level	1st Diff.	Level	1st Diff.	
LnGDP(Log of GDP)	0.0089	-7.0828***	1.1869	-11.4669***	I{1}
LnEx(Log of exports)	0.3757	-12.4176***	0.8949	-12.0862***	I{1}
LnIm (Log of imports)	-0.1192	-7.9023**	0.363	-8.3141***	I{1}

Notes: ***, ** and * indicate rejection of the null (variables are unit root/ non stationary) at the 1%, 5% and 10% level respectively.
Sources: Estimated

Table 3: VAR Lag Order Selection Criteria

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	78.916	NA	5.88E-06	-3.53098	-3.4081	-3.48567
1	191.644	204.4804	4.73E-08	-8.35546	-7.86396	-8.17421
2	212.614	35.5957*	2.7e-08*	-8.92388*	-8.06367*	-8.6062*
3	219.7429	10.56226	3.03E-08	-8.82525	-7.59651	-8.37213
4	227.196	10.39958	3.36E-08	-8.7533	-7.15593	-8.16424

(*) indicates lag order selected by the criterion
LR : sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC : Schwarz information criterion, HQ : Hannan-Quinn information criterion Sources: Estimated.
Sources: Estimated.

Table 4: Johansen Co-integration Test ResultUnrestricted Co-integration Rank Test (Trace)

Variable		LnGDP, LnEm, LnIm			
H0	H1	Eigen value	Trace Statistic	Critical Value (at 5% level of significance)	P-value
No. of CE(s)					
r=0	r≥1	0.469698	35.89446**	29.79707	0.0088**
r≤1	r=2	0.143495	7.35057	15.49471	0.5372
r≤2	r=3	0.008415	0.380289	3.841466	0.5374
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)					
Variable		LnGDP, LnEm, LnIm			
H0	H1	Eigen value	Max-Eigen Statistic	Critical Value (at 5% level of significance)	P-value
No. of CE(s)					
r=0	r=1	0.469698	28.54389**	21.13162	0.0038**
r=1	r=2	0.143495	6.970281	14.2646	0.4927
r=2	r=3	0.008415	0.380289	3.841466	0.5374
Sources: Estimated					

Table 5: The Granger Causality Results among GDP, Exports and Imports

Null Hypothesis	Obs	F-Statistic	Prob.	Decision
LnIm does not Granger Cause LnGDP	45	11.2733	0.0001	rejected
LnGDP does not Granger Cause LnIm		12.0256	8.00E-05	rejected

LnEx does not Granger Cause LnGDP	45	10.341	0.0002	rejected
LnGDP does not Granger Cause LnEx		0.65034	0.5273	Can't be rejected
LnEx does not Granger Cause LnIm	45	6.41538	0.0038	rejected
LnIm does not Granger Cause LnEx	45	1.55654	0.2234	Can't be rejected
Sources: Estimated				

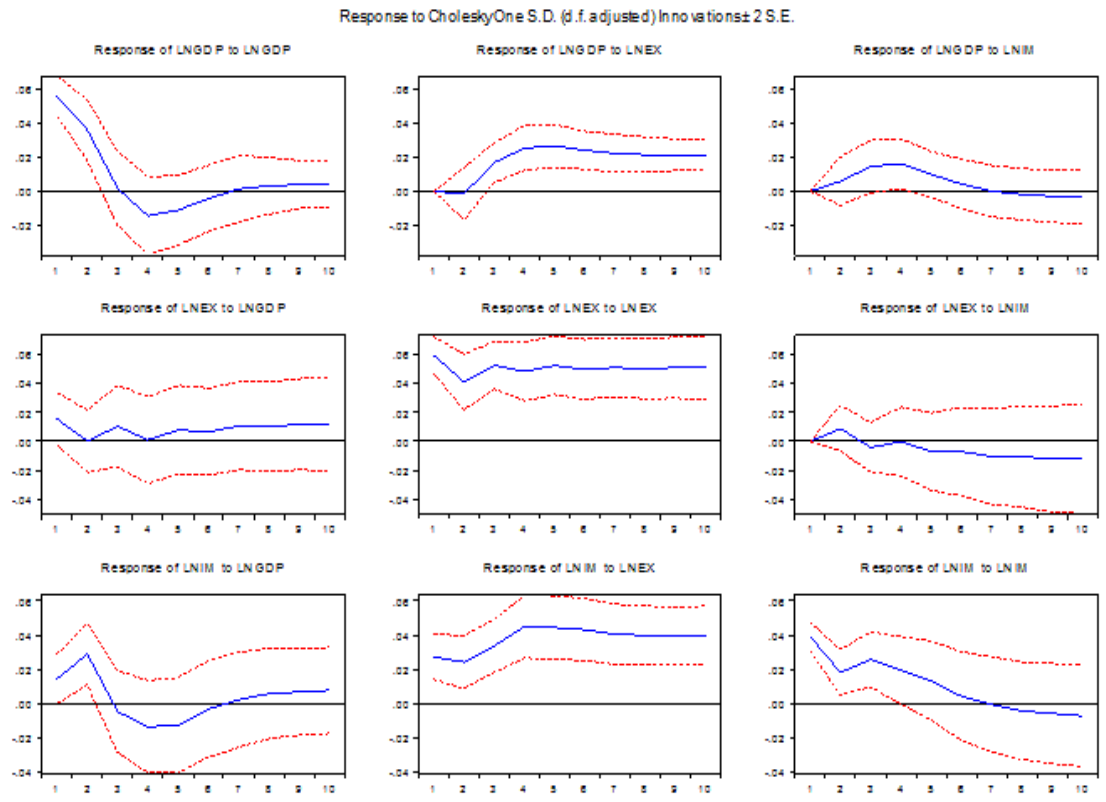

Figure 1: Impulse Response Function (IRF)
Sources: Estimated

Table 6: The direction of Granger Causality Results among GDP, Exports and Imports
LnIm ↔ LnGDP
LnEx → LGDP
LnEx → LnIm
Sources: Estimated

+0.0645LnExt-2+0.08625LnImt-1+0.28475LnImt-2 (4.6)

[0.12938] [0.20419] [0.01169]

VAR model construct the Impulse Response Function (IRF) to get the responses of each variable Figure 1.

To investigate the direction of the causality for the study variables Granger Causality technique has been used-Table 5

From table 6 it can be seen that there is a bilateral causality relationship between import and GDP. There is a unidirectional causal relationship export to GDP. So from this result it can be concluded that if exports sector takes place top of the country future attention to improve the country GDP, needs more proper way of utilizing in this sector. The third causality relationship is between exports and imports in Bangladesh. The finding indicates that there is unidirectional causality between exports and imports as exports because the imports, but an import does not cause the exports.

Conclusions and Policy Implications

Last three years the economy of Bangladesh has been grown rapidly and become a developing country in the world. Its per capita income is increasing year by year. A long run co-integration among GDP, exports and imports existed in Bangladesh during the analyzed period. The ECM showed that imports and exports both affected economic growths positively. The Granger Causality test suggested bilateral connection between economic growth and imports and unidirectional causality between economic growth and exports in Bangladesh.This finding tends to favor the efficacy and validity of theELG theory for Bangladesh.

Nonetheless, the results of this research highlight the importance of the export sector and suggest that exports should be more encouraged to enhance the economic growth in Bangladesh.

The import sector has an important positive effect on economic growth. The Bangladesh government would benefit from changing the composition of its export sector. The government should increase reliance on the export sector in order to reduce reliance on imports.A long term economic plan should be implemented by the policymakers in Bangladesh for the diversification of export sector by focusing RMG export. Non-RMG sectors should be emphasized.This study use only two variables, export and import but there are other variables that determine economic growth. So this is the limitation for this study.

References

1. Al Mamun K.A and Nath H.K. Export-led growth in Bangladesh: a time series analysis. 2005; 12(6): 361-364.doi: 10.1080/13504850500068194
2. Bahmani-Oskooee M and Oyolola M. Export growth and output growth: an application of bounds testing approach. Journal of Economics and Finance. 2007; 31(1): 1-11. doi: 10.1007/BF02751507
3. Bangladesh Economic Review. Annual Report .Ministry of Finance, Bangladesh. 2000-2010.
4. CHAUDHARY M A, SHIRAZI N S, and Choudhary M. A. Trade policy and economic growth in Bangladesh: A revisit. Pakistan Economic and Social Review. 2007; 45(1): 1-26.
5. Granger C. W. Some recent development in a concept of causality. Journal of econometrics.1988; 39(1-2): 199-211.doi: 10.1016/0304-4076(88)90045-0
6. Hossain M A. and Alauddin M. "Trade Liberalization in Bangladesh: The Process and Its Impact on Macro Variables Particularly Export Expansion." Journal of Developing Areas. 2005; 39(1): 127-150.
7. Hossain M.A and Karunaratne N.D. Exports and Economic Growth in Bangladesh: Has Manufacturing Exports Become a New Engine of Export-Led Growth? International Trade Journal. 2004;18(4): 303-334.doi: 10.1080/08853900490518190
8. IMF.2016.
9. Johansen S, and Juselius K. Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. Oxford Bulletin of Economics and statistics. 1990; 52(2):169-210.doi: 10.1111/j.1468-0084.1990.mp52002003.x
10. Jiang, L. F, and Wen L. An Econometric Model of the Relationship between ForeignTrade and Economic Growth in China. Second International Conference on Information and Computing Science. 2009.doi: 10.1109/ICIC.2009.223
11. Johansen S. "Statistical analysis of cointegration vectors," Journal of Economic Dynamics and Control, Elsevier.1988; 12(2-3): 231-254. doi: 10.1016/0165-1889(88)90041-3
12. Kargbo J. M. Forecasting agricultural exports and imports in South Africa. Applied Economics. 2007; 39(16):2069-2084.doi: 10.1080/00036840600707183
13. Krugman P.R and Obstfeld M. Export-oriented Industrialization: The East Asian miracle: International Economics: Theory and Policy, 8th ed., Pearson: Addison Wesley, Boston. 2009.
14. Roy, D. K. Export Performance of Bangladesh: A Constant Market Share Analysis. The Bangladesh Development Studies.1991; 19(3): 63-81
15. Shahabuddin, Omar Haider Chowdhury and Willem van der Geest . Trade and Foreign Direct Investment Performance during Policy Reform in Bangladesh. Economic Reform and Trade Performance in South Asia .The University Press Ltd.2004.
16. Usman M, Ashfaq S, and Mushtaq N. Relationship of export and economic growth; An empirical study of Pakistan. Far East Journal of Psychology and Business.2012; 6(1): 1-10.
17. World Development Indicators. World Bank, Washington D.C. 2018.
18. Yusoff M. B. Malaysia Bilateral Trade Relations and Economics Growth. International Journal of Business and Society. 2005; 6(2): 55-68.