The Impact of Macroeconomic Factors on Exports Earnings in Bangladesh: 1971-2018

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Abstract— The purpose of this research is to find out the relationship between export earnings with the macroeconomic factors in Bangladesh for the year of 1971-2018. For achieving paper goals, we have used the exchange rate, inflation rate, interest rate as an independent variable and total export earnings as dependent variables. Data have been collected from different sources like the World Economic indicator, Bangladesh Bureau of Statistics and the central bank of Bangladesh (Bangladesh Bank). For analysis of our macroeconomic data, we have used Eviews 9. To finding out an objective of our paper we have been using different types of test. Augmented Dickey-Fuller (Unit root test) used to shows whether our data are stationary or not. ADF result shows that data is stationary. Johansen tested for cointegration the test helps to find out the cointegration between all those variables. We also used ECM, CUSUM test and CUSUM square test. Our analysis shows that there was a positive relationship between export earnings, real exchange rate, inflation rate, and interest rate. Although there is a strong relationship between the variables, CUSUM and CUSUM square test shows that our model is not stable. Our paper suggests that if the real exchange rate, inflation rate, and interest rate go up then also the export earrings go up for the perspective of the Bangladesh economy.

Keywords— Export earnings, Inflation rate, Exchange rate, Interest rate and Bangladesh Economy.

I. INTRODUCTION

Bangladesh is a developing country with around 17 million populations where the economy is expanding day by day. After independence, the overall economy of Bangladesh is improved to manage it in her way. Bangladesh's export earnings posted a dynamic growth during the first half of the current fiscal year (FY) 2018-19, rising by 14.42% to $20.50 billion during the period, riding mostly on apparel and agricultural products. According to the Treading Economics report, the Gross Domestic Product (GDP) in Bangladesh expanded 7.90 percent in the 2018 fiscal year from the previous year. The Industry grew 12.1 percent (10.2 percent in 2017) with manufacturing surging 13.4 percent (11 percent in 2017).

Currently, Bangladesh is the world's second-biggest apparel exporter after China. Garments including knitwear and hosiery account for 80% of export revenue; others include jute goods, home textile, footwear, and frozen shrimps and fish. The exchange rate instability is one of the features that affect exports mainly. The exchange rate volatility and monetary stability can affect negatively or positively to the exports of the developing countries in the shorter or longer periods.

It's important to identify what factors affect the export performance in the long run as well as the short run. The study aims to help the actual impact of macroeconomic variables on exports earnings in Bangladesh since 1971 to 2018. Our paper tried to explore the actual scenario that the impact of macroeconomic variables on export earnings in Bangladesh.

II. LITARATURE REVIEW

Rahman (2017) defines that the macroeconomic variables have been taken as illustrative variables to examine the impact on export as dependent variable between the periods from July 2011 to June 2016. Exposed by VDC analyses this study implies that many other macroeconomic aspects affect the variation in export performance [1].

Dey (2018) investigates the impact of export revenue on GDP in Bangladesh. They use Granger causality and then co-integration test to investigate the long-run relationship between GDP and export revenue in Bangladesh during the period of 1981-2015. The experiential outcomes suggest that there exists bidirectional causality in the Granger causality test [2].

Serenis & tsounis (2012) found that although exchange rate volatility when calculated as the simple Standard Deviation (SD) of the log effective exchange, has a small consequence on the level of exports for the sample European Union (EU) countries. An overall major statistical relationship that shows

the negative effects of exchange rate volatility and segmental exports also covered this document [3].

Kabaklarli, Duran & Ucler found that the pragmatic effects illustrate that improvement of, foreign investment (direct) and patent applications that play an influential role in raising selected OECD countries high tech exports, while investment and growth rate plays a negative role in improving these countries high tech exports. Belongia (1986) showed that different exchange rate indexes produce large differences in the estimated effects of exchange rates on exports. Moreover, further analysts showed different indexes exhibit substantial differences in their- ability to predict future changes in the volume of exports [4].

Ngondo & Khobai (2018) examine the relationship between exports in South Africa for a particular period and exchange rate using annualized time series data. The current free-floating exchange rate in an inflation target as take-up by the Reserve Bank in a particular month; however, the only cost with that is a very volatile household currency that could obstruct exports also mentions their study [5].

Dincer &Kandil (2009) observes the effects of exchange rate variations on disaggregated data comprising 21 exporting segment in Turkey using monthly data. The analysis occupies segmental data that consist of exporting sectors for intermediate, capital and expenditure goods. The performance of export growth designates vulnerability to external shocks as well as domestic [6].

Mandel (2013) develops a method to fester price allocations into contributions from marginal cost and markups. These results also provide some of the initial proof of the dual nature of international trades pro-competitive effects; exporters respond to tougher opposition along with the two related quality and margins of price [7].

Senadza & Diaba (2017) used exchange rate volatility proxies generated by the GARCH and exponential GARCH models. Their study uncovers no considerable effect of exchange rate volatility on imports. However, In the case of exports, it finds a negative effect of volatility in the short-run, but a positive impact in the long-run [8].

III. OBJECTIVES

The objectives of this paper are the following:
➢ To examine the impact of real exchange rate on Export earnings the economy of Bangladesh.
➢ To find out the impact of Inflation rate on the Export earnings in the economy of Bangladesh.
➢ To analyze the impact of Interest rate on the Export earnings in the Bangladesh economy throughout of 1971-2018.

IV. METHODOLOGY

Sources of Data: This paper fully based on secondary data. All types of data have been collected from different sources like the Bangladesh Bureau of Statistics, Bangladesh Bank report, World Bank Indicator, International Monetary Fund, different journals, etc. Data has been collected from 1971 to 2018.

Tools & Techniques: To find out paper objectives this paper has used the EViews 9. This paper used Descriptive statistics, Visual plot, Augmented Dickey-Fuller test (Unit Root test), Johansen Test for cointegration, Error Correction Model, CUSUM test and CUSUM Square test. Exchange rate (Ex), Inflation rate (Inf) and Interest rate (Int) are representing the macroeconomic variable factor. In this paper Export earnings has been selected as the dependent variable and Exchange rate, Inflation rate and Interest rate as independent variables.

Theory and Model

$Ex_t=\alpha+\beta0+\beta1Rer_t+\beta2Inf_t+\beta3Int_t+\epsilon t$ …………………(1)

In this model Ex_t is representing the Export percentage of GDP, Rer_t is Real exchange rate Inf is the Inflation rate and Int_t is the Interest rate. For examining the short run dynamic in relationship among export earning, Real exchange rate, Inflation rate and Interest rate an ECM model has been developed [9].

$\Delta lnEx_t=\alpha0+\alpha1\Delta lnRer_t-i+\alpha2lnInf_t-i+lnlInt_t-i+\Delta lnInt_t-i+$ $\alpha2Ut-i+\epsilon t$

Where, $U_t-I=lnEx2_t-\beta0-\beta1lnRer_t-\beta1Inf_t-\beta1Int_t$ ……. (2)

Where, α4Ut-1- expresses the error correction term, it is the residual from the co integrating equation, α3indicated the error correction coefficient and αi are the estimated short term coefficients (Jammeh, 2012).

V. RESULTS AND DISCUSSION

Table 1: Descriptive statistics

	EXPORT	RER	INFLATION	INTEREST
Mean	10.32096	44.32292	8.915229	7.568458
Median	9.362000	40.24500	8.691000	5.936500
Maximum	20.16200	83.12000	25.00000	34.75000
Minimum	2.895000	12.04000	1.000000	-11.68000
Std. Dev.	5.254579	23.57260	4.726371	8.379442
Skewness	0.406433	0.192860	0.908957	1.172744
Kurtosis	1.779533	1.668421	4.306676	5.935719
Jarque-Bera	4.300585	3.843766	10.02443	28.23952
Probability	0.116450	0.146331	0.006656	0.000001
Sum	495.4060	2127.500	427.9310	363.2860
Sum Sq. Dev.	1297.698	26116.37	1049.913	3300.108
Observations	48	48	48	48

Sources: Estimated (Export= Export % of GDP, Rer= Real Exchange rate, Inflation= Inflation rate and Interest= Interest Rate.
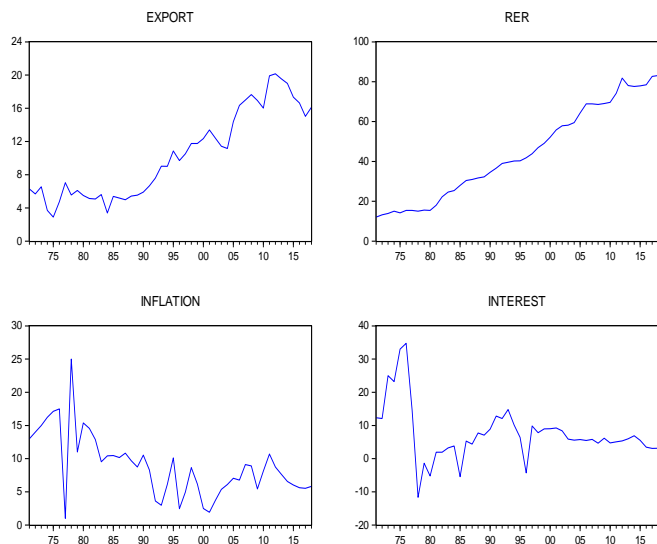
Sources: Estimated (Ex= Export % of GDP, Rer= Real Exchange rate, Inf= Inflation rate and Int= Interest Rate.

Graph 1: Visual Plot

Table 2: Augmented Dickey Fuller (ADF) Unit Root Test

	Augmented Dickey Fuller Test (ADF) Unit Root Test		
Variable	C (constant) and T (trend) in the equation	ADF statistics	Optimum lag
Ex	C and T	-6.872946	0 (1st)
Rer	C and T	-5.562522	1(1st)
Inf	C and T	-8.822267	1(1st)
lnt	C and T	-7.039349	0 (1st)

Sources: Estimated (Ex= Export % of GDP, Rer= Real Exchange rate, Inf= Inflation rate and Int= Interest Rate.

From Table 1, Augmented Dickey Fuller (ADF) unit root test, it can be said that all these variables are stationary at the 1st difference.

Table 3: Johansen Test for Co-Integration

Hypothesized No. of CE(s)	Trace statistic	0.05 Critical Value	Eigen value	Hypothesized No. of CE(s)	Max-Eigen Statistics	0.05 Critical Value
None *	32.454	47.856	0.271	None *	14.595	27.584
At most 1	17.859	29.797	0.209	At most 1	10.796	21.131
At most 2	7.062	15.494	0.138	At most 2	6.867	14.264
At most 3	0.195	3.8414	0.004	At most 3	0.195	3.8414

Sources: Estimated (* denoted significance level.).
By testing the Johansen Test for Con-integrating see table 3 it has been estimated that at least there has 1 cointegration

equation in this model, Trace statistic and Max-Eigen Statistics also support this co-integrating equation.

Table 4: Corresponding Adjustment Coefficients and Normalized Co-integrating Vectors

Normalized co integrating vectors and the corresponding adjustment coefficients				
Variable	β coefficients	α Coefficients	Standard error	t-value
Ex	1.0000	.	.	.
Rer	0.2210	-0.2749	0.0137	16.1087
Inf	0.0826	-0.3874	0.0665	1.2413
Int	0.0145	-0.2898	0.0318	0.4581
Constant	-0.3233	7.5148	1.1578	-0.2793

Sources: Estimated (Ex= Export % of GDP, Rer= Real Exchange rate, Inf= Inflation rate and Int= Interest Rate.

From table 4 it can be said that there have positive relations among the Export earnings percentage of Gross domestic product (GDP), Real exchange rate, Inflation rate, and Interest rate. Here is the retrieved co-integration equation.

$$Ex_t = 1.00 + 0.221038\ Rer_t + 0.082655\ Inf_t + 0.014589\ Int_t - 0.323396\epsilon_t \quad \ldots\ldots\ldots\ldots\ (3)$$

Table: 5 Error Correction Representations

Variable	Coeffcient	Standard Error	t-value	
Constant	-0.0015	0.3278	-0.0047	
D(EXPORT(-1))	0.0046	0.1745	0.0266	
D(EXPORT(-2))	-0.1134	0.2060	-0.5508	
D(RER(-1))	0.1407	0.1254	1.1224	
D(RER(-2))	0.0044	0.1304	0.0343	
D(INFLATION(-1))	0.0029	0.0582	0.0505	
D(INFLATION(-2))	-0.0267	0.0584	-0.4574	
D(INTEREST(-1))	-0.0345	0.0403	-0.8581	
D(INTEREST(-2))	-0.0254	0.0374	-0.6800	
	D (EXPORT)	D (RER)	D (INFLATION)	D (INTEREST)
R-squared	0.1603	0.4864	0.5449	0.4049
Adj. R-squared	-0.0555	0.3543	0.4279	0.2519
Sum sq. resids	68.2735	84.5311	583.749	1179.19
S.E. equation	1.3966	1.5540	4.0839	5.8044
F-statistic	0.7426	3.6834	4.6571	2.6468
Log likelihood	-73.2315	-78.037	-121.515	-137.335
Akaike AIC	3.6991	3.9127	5.8451	6.5482
Schwarz SC	4.1006	4.3142	6.2466	6.9497
Mean dependent	0.2129	1.5382	-0.2041	-0.4861
S.D. dependent	1.3594	1.9341	5.3995	6.7112

Sources: Estimated (Ex= Export % of GDP, Rer= Real Exchange rate, Inf= Inflation rate and Int= Interest Rate.

From table 5, it is very clear that there was a relationship among all those variables. From R-squared value, it is worth saying that the data sets are relatively good for this work. Here Export can be explained properly because F-Statistic is robust enough at 5% significant level. From QUSUM and QUSUM square statistics it can be said that out model was not stable during the period of 1971-2018. Here the blue line is crossed the red line so this model is not stable.
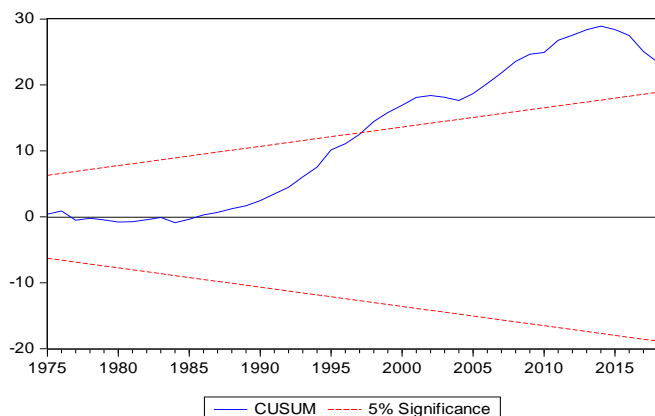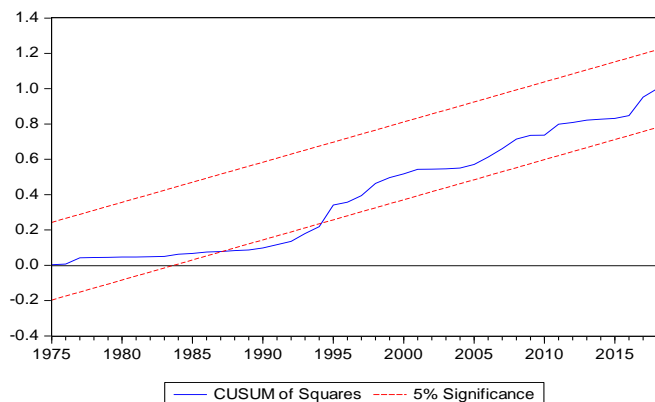

Figure 2: CUSUM Statistics

Figure 3: CUSUM Square Statistics

VI.   FINDINGS

At the end of the study, we have found that there was a relationship between those variables. Here the real exchange rate, inflation rate, and interest rate are positively correlated. As a result, it can conclude that if the real exchange rate, inflation rate, and interest rate increases then the export earnings will increase.

VII.   CONCLUSION

As a developing country, the market-based economy of Bangladesh is expanding significantly. Export earnings percentage of Gross Domestic Product (GDP) influence by different types of factors. So for smooth export earnings, the government of Bangladesh and the economic policymaker of the country should highly concentrate on the factors that highly influence to export.

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