The Impact of Exchange Rates, Inflation, and Commodity Prices on Bangladesh's RMG Export Earnings: A Long-Term Perspective

Prof. Nausheen Rahman
Professor, Department of Finance, Faculty of Business Studies, University of Dhaka
nausheen.rahman@du.ac.bd
Mobile: 01814210595

Limuja Binth Halim
Graduating Student, Department of Finance, Faculty of Business Studies, University of Dhaka
limuja-208827327@fin.du.ac.bd
Mobile: 01881177128

Abstract

In Bangladesh's economic growth, the ready-made garments (RMG) sector stands out as a vital catalyst. However, recent global crises including the COVID-19 pandemic, the Russia-Ukraine war, and the Red Sea conflict, have introduced significant volatility and vulnerability into the global economy. The vulnerability of Bangladesh's RMG sector is more pronounced, as it is mostly dependent on imported raw material and its primary export destinations are some of the most severely affected by these crises. These events have ultimately led to sharp increases in global fuel and cotton prices, heightened exchange rate volatility, and persistent inflation. Given the critical importance of this sector for Bangladesh, this study aims to investigate the long-run relationships between RMG earnings and key macroeconomic variables: exchange rates, inflation, global fuel prices, and cotton prices. To achieve this, the study analyzed a monthly dataset covering the period from July 2016 to December 2023, and employed the Johansen cointegration test followed by the Vector Error Correction Model (VECM). The results reveal that, in the long run, exchange rates, inflation, and the global fuel price index have positive association with RMG earnings, while the global cotton price shows a negative relationship. However, the coefficients for exchange rates and inflation are relatively low, suggesting a limited influence on RMG earnings.

Key Words: Exchange Rate, Inflation, RMG earnings

1. Introduction

The Ready Made Garment (RMG) industry has been instrumental in propelling Bangladesh's economic growth, contributing significantly to GDP, generating more than 80% of export revenues, and providing employment for millions, particularly women. This sector has not only dominated the country's export landscape but has also positioned Bangladesh among the top apparel exporters globally. However, as this sector has grown, it has faced numerous challenges, each testing its resilience and adaptability. These challenges highlight the urgent need for resilience and strategic responses to sustain growth and competitiveness of this industry in an increasingly uncertain environment. In the recent past global crises such as the COVID-19 pandemic, the Russia-Ukraine war, and geopolitical tensions like the Red Sea conflict have exacerbated the pressure on this vital sector. These events have caused sharp increases in global fuel and cotton prices, heightened exchange rate volatility, and persistent inflation, which collectively threaten the stability and growth of the RMG industry. RMG sector's reliance on imported raw materials and its integration into global supply chains make it highly vulnerable to shifts in these macroeconomic variables, which can significantly affect its production costs and export revenues.

While the effects of exchange rate and inflation on export performance of our country in general have been widely studied, the impact of recent spikes in fuel and cotton prices, coupled with volatile exchange rates and rising inflation on the RMG sector's export earning, call for a more in-depth exploration. This study aims to examine the long-term relationship between Bangladesh's RMG export earnings and key macroeconomic variables such as the exchange rate, inflation, global fuel prices, and the global cotton price index. Through the application of the Johansen cointegration test and the Vector Error Correction Model (VECM), the research seeks to determine whether these factors are cointegrated and how they influence the sector's performance over time. By providing empirical insights into the dynamics of these relationships, this study offers critical evidence and policy recommendations to assist the RMG sector better withstand future global economic shocks and sustain its growth trajectory.

2. Objective of the Study

Given the volatile state of the global economy, triggered by successive crises commencing with the COVID-19 pandemic, the sustainability of Bangladesh's primary foreign earnings sector, RMG, has become a pressing concern. With this in mind, the primary objective of this study is-

- To examine the long-run relationship between RMG earnings and exchange rates, inflation, fuel price, and cotton price.
- To signify the importance of these relationship and on the basis of that suggest some policy implications.

3. Literature Review

From time to time a considerable number of researches have been carried out on Ready-made garment industry of our country as it is considered to be the main engine of growth. However, the literature that has been investigated here encompasses only those studies, that focuses on the impact of the variables we have selected for our study, on our export and import sector in general and on the RMG sector in particular. Few of literature highlighting the RMG sector's dependence on imported raw material is also covered here with the aim to signify why the spike in the cotton price should be a concern for our RMG sector.

Bilquees et al. (2010) have conducted a study to examine the effects of exchange rate volatility on the exports of three South Asian countries: India, Pakistan, and Sri Lanka. They have examined the data spanning from 1960 to 2007. The results of their study have revealed that volatility in the exchange rate negatively affects exports in both the short and long run. However, improvements in the terms of trade, signaled by a decrease in the real exchange rate, alongside growth in real foreign income will contribute positively to export activity. Their findings are consistent with the theoretical belief. The impact of currency depreciation on the trade balances of South Asian countries have been examined by Raza, Larik, and Tariq (2013). Their study suggests that currency devaluation makes exports cheaper and imports more expensive but they have concluded that devaluation does not always lead to an improvement in trade balance. Mukit and Shafiullah (2014) have explored the relationship between inflation, import volume, and export volume in Bangladesh using monthly time series data spanning from January 1994 to December 2011. Their analysis has revealed that a 3.21% rise in inflation leads to 1% increase in import volume, whereas to a 1.91% decrease in inflation leads to a 1% increase in export volume. So the impact of inflation on export in more pronounced than import. Their study has also identified bidirectional causality between inflation and export

volume, alongside a unidirectional causality from import volume to inflation. Hooy and Baharumshah (2015) have conducted a panel data analysis to examine the effect of real exchange volatility on the trade performance of six East Asian countries, using monthly data spanning from January 1990 to December 2008. The results indicated that FOREX volatility negatively impacted exports in the short run for four of the countries examined, though the effect was relatively minor. Overall, their study has found limited support for the hypothesis that exchange rate volatility significantly disrupts trade flows in East Asian economies. Hasan et al. (2015) investigate the impact of exchange rate volatility on Bangladesh's export volume to the US market, utilizing monthly time series data from 1991 to 2012. Their study identifies a stable and significant long-term relationship between the exchange rate and export volume. Using the cointegration technique, the analysis reveals that a 1% depreciation of the Taka against the US dollar leads to a 2.32% increase in export volume. This finding is consistent with the findings of Mukit and Shafiullah (2014).

Hossain and Islam (2015) have investigated the relationship between the growth of the garment industry and various macroeconomic variables. The regression analysis revealed that growth rates of interest rates, exchange rates, stock market capitalization, and unemployment rates negatively influence the growth rate of garment exports. Conversely, the growth rates of inflation, GDP, and credit provided to the public sector show a positive relationship with garment exports. The beta concept analysis further demonstrated that no single variable has a significant effect on garment export growth. However, when considered collectively, these macroeconomic factors have the potential to influence the growth rate of garment exports. Sarker and Alam (2016) have examined the efficiency and economics of cotton production in Bangladesh, highlighting that domestic cotton output falls significantly short of the needs of the textile and garment industries. This shortfall leads to weak backward linkages in the thriving garments sector and results in a substantial import bill. Their study has aimed to assess the technical, allocative, and cost efficiencies of cotton farmers in Bangladesh. The findings revealed that 75% of cotton farms demonstrated increasing returns to scale, while only 10% and 14% exhibited decreasing and constant returns to scale, respectively.

Rahman (2017) explored the short- and long-term dynamics of Bangladesh's export performance in relation to key macroeconomic variables, including interest rates, inflation, broad money supply (M2), exchange rates, and the quantum index of industrial production. The study utilized monthly data from July 2011 to June 2016 and applied various econometric

methods. Their study has revealed a significant long-term relationship, indicating that inflation and exchange rates negatively affect exports in the long run, while the other variables have a positive association. However, the error correction model found no evidence of short-term dynamics. The influence of various macroeconomic factors on the growth of RMG exports in Bangladesh have been examined by Shimu and Islam (2018). Using secondary data spanning from 1995 to 2014, they employed a multiple linear regression model to analyze the effects of key macroeconomic variables on the growth of RMG exports. Their findings indicate that a one-unit increase in the growth rates of the official exchange rate, inflation rate, real interest rate, and female unemployment rate leads to a decrease in RMG export growth by 1.159, 0.055, 0.034, and 0.068 units, respectively. Subanti et al. (2019) conducted a panel data analysis on five ASEAN countries, covering the period from 2000 to 2016. Their results indicate that exchange rate volatility has a negative effect on exports across these countries. Rahman et al. (2020) have examined the influence of exchange rate volatility on trade in Bangladesh, with a particular emphasis on export and import risks, as well as leverage effects. Utilizing monthly time-series data from January 2013 to June 2019. Their findings align with economic theory and imply that Bangladesh's trade volume is likely to increase over time, provided that key macroeconomic variables remain stable. Sayeda (2020) has aimed to examine the relationship between a free-floating exchange rate and the export performance of Bangladesh. Their study has analyzed monthly data on exchange rates and export values from 2000 to 2017. However, the findings indicate that the study could not establish any long-term trends or short-term dynamics between the exchange rate and export performance.

In the year 2022 and 2024 a number of studies have been conducted which highlighted the problems of our RMG industry’s over dependence on imported raw material mainly cotton and fuel, and how the increase in the cost of these affects our production cost. Emran and Schmitz (2022) have investigated the effects of decreasing garment demand, along with rising production costs resulting from the pandemic, on the welfare of producers in Bangladesh's textile and garment export sector. Their study employed both theoretical and graphical analyses. They highlighted that, given Bangladesh's reliance on imports for approximately 98% of its cotton used in fabric and yarn production (USDA 2020), the disruptions in supply chains caused by the pandemic had a detrimental impact on the industry.

Mirdha (2022) has highlighted in his article a significant increase in Bangladesh's imports of apparel raw materials, with cotton imports reaching $2.26 billion in the first half of 2022, compared to $3.8 billion for the entire previous year. Local growers supply less than 2% of the

9 million bales of cotton consumed annually, necessitating nearly $3 billion in imports for the apparel sector. Additionally, a 51% rise in cotton prices from last year has further squeezed profit margins and threatened the competitiveness of heavily import reliant the RMG sector. This surge, driven by robust export demand and global price hikes due to supply chain disruptions from the Russia-Ukraine conflict, has strained foreign reserves and increased dollar shortages. Abdullah (2022), has stated in *Textile Today* that the decline in apparel value addition in Bangladesh is primarily due to rising raw material prices and an ongoing energy crisis. Typically, value addition percentages fall between 35% and 40%, with raw material costs accounting for about 60% of expenses. However, the recent surge in import costs has outpaced RMG value addition. Mustafa and Hosen (2022) have pointed out that the sharp increase in fuel prices has drastically raised utility and transportation costs, further inflating production expenses amid existing disruptions. Moreover, actual inflation, which is not accurately reflected in Bangladesh Bureau of Statistics (BBS) data, has surged even more due to the fuel price hikes. Munni (2024), has noted that in 2023, Bangladesh's export-oriented ready-made garment (RMG) industry experienced a significant decline in raw material imports, even as export revenue increased by 3.67% to reach $47.38 billion. This decline included a 24.85% drop in cotton imports, which fell to 1.35 million tons and a 10.11% decrease in yarn imports, totaling 0.92 million tons. Factors contributing to this trend included a dollar crisis, limited production capacity due to reduced gas supply, and sluggish global demand. Conversely, the industry observed an uptick in the use of domestically produced yarn and fabric, which aided in export growth. Additionally, imports of non-cotton or man-made fibres (MMF) increased by 13.39%. Despite these positive developments, some industry leaders expressed concerns that the reduction in raw material imports might result in lower export orders in the future. Khan and Ahmed (2024), have aimed to explore how fluctuations in exchange rates affect Bangladesh's export performance. Their analysis covers the period from 1981 to 2022. The findings indicate that exchange rates negatively affect Bangladesh's exports in both the long and short terms. However, the negative impact is significantly greater in the long run. Additionally, gross capital formation and the real interest rate negatively influence exports with a one-period lag. While inflation has a positive effect on exports, it is not statistically significant.

From the above literature it is evident that most of the studies we have covered have concluded that increase in the exchange volatility, inflation, interest rate and currency devaluation negatively affects the export earning RMG sector, tough the impact is not found to be

significant. However, though in few of the papers that we have investigated have highlighted RMG sector's increased dependence on imported raw material and how the rising cost of such will adversely affect the RMG sectors export revenue, but so far no econometric analysis has been carried out to find out the nature of such association. So, in this paper an attempt has been made to investigate the association among imported cotton price, fuel price and RMG earning. A further attempt has been made to again revisit the relationship among inflation, exchange rate volatility and RMG earning to find the existence of any long run relationship.

4. Data and Methodology

4.1 Rationale for Variable Selection

Bangladesh's RMG industry has long encountered numerous challenges, each marked by fluctuations in various factors. The influence of exchange rate and inflation on export performance has been widely studied in the literature, for instance, Aziz (2008) found a causal relationship between the exchange rate and the trade balance of Bangladesh using Engle-Granger and Johansen techniques. Sultana (2015) on the other hand proposed that currency devaluation could be advantageous during economic recessions, helping to minimize their impact. Employing the beta concept, Hossain and Islam (2015), identified that five macroeconomic variables including exchange rates, inflation rates, and interest rates, impacting the growth of RMG sector, but they observed the impact was not significant. Rahman (2017) through utilizing the error correction model and Variance Decomposition (VDC) tests concluded a weak long-run relationship between export performance and various macroeconomic variables, including exchange rates and inflation rates. Furthermore, according to Gokal & Hanif (2004) higher inflation reduces a country's competitiveness by making export expensive thereby reducing export volume. However, these recent disruptions necessitate the inclusion of additional variables in the analysis.

Given that the RMG sector relies heavily on imported raw materials, like cotton and fuel, the recent surge in their prices, driven by global crises, calls for their inclusion in this study. Thus, alongside exchange rate and inflation, cotton and fuel prices are considered as key explanatory variables. RMG export earnings are used as the dependent variable to evaluate the industry's performance during these challenging times. Data for these variables were sourced from reputable secondary sources such as the Export Promotion Bureau (EPB) of Bangladesh, Bangladesh Garment Manufacturers and Exporters Association (BGMEA), Bangladesh Bank

monthly publications, Statista, and FRED economic data. The collected data were subsequently analyzed using STATA version 15.0.

4.2 Methodology

In line with the research objectives, a quantitative approach was utilized. Given that recent global crises have been marked by surges in fuel and cotton prices, exchange rate fluctuations, and inflation, the study sought to determine whether these factors have a long-term relationship with RMG export earnings. To examine this, the Johansen cointegration test was used, followed by the vector error correction model (VECM). The choice of this model was informed by the results of the Augmented Dickey-Fuller (ADF) test, which was conducted to assess the stationary status of the variables due to their time series nature (refer to Table 2 in the Appendix). The ADF test results indicated that all variables were first difference stationary (denoted as I(1)), suggesting the possibility of cointegration and a potential long-term relationship among them. Monthly data spanning from July 2016 to December 2023 were utilized for analysis. To mitigate issues of heteroscedasticity, natural logarithms of all variables were employed. The specified VECM for the study is outlined as follows:

$$ECT_{t-1} = 1.00\ln EERMG_{t-1} + \beta_1 \ln EXR_{t-1} + \beta_2 INF_{t-1} + \beta_3 \ln GFP_{t-1} + \beta_4 \ln GCP_{t-1} + \beta_{0;}$$

where, β_0 = Constant; ECT= Error correction term or adjustment coefficient; lnEERMG= Natural logarithms of RMG earnings; lnEXR=Natural logarithms of exchange rates; lnINF=Natural logarithms of inflation rates; lnGFPI=Natural logarithms of global fuel price index; lnGCPI=Natural logarithms of global cotton price index. Diagnosis tests to assess the model's stability and presence of autocorrelation were conducted, confirming the model is stable and free from the first order autocorrelation.

This study focuses on examining associations rather than causal relationships among the variables, given the inherent complexity and interconnectedness of macroeconomic factors. These variables are shaped by external shocks and domestic dynamics, making it difficult to establish definitive causality. Additionally, unobserved factors that may simultaneously influence both the dependent and independent variables could lead to endogeneity issues. Time-series methods such as the Johansen cointegration test and VECM are well-suited for exploring long-term associations. By prioritizing these associations, the study seeks to

highlight significant interconnections that provide valuable insights into the sector's dynamics and can aid in formulating pertinent policies.

5. Analysis and Findings

5.1 Descriptive Statistics

The following table (Table 1) summarizes the descriptive statistics, providing insights into key variables potentially impacting the resilience of Bangladesh's RMG sector, with a focus on earnings, domestic economic conditions, and global market dynamics.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
EERMG	90	2929.883	814.799	374.66	4665.41
EXR	90	87.897	9.34	78.4	110.86
INF	90	6.383	1.507	5.02	9.94
GFPI	90	163.681	67.136	55.89	376.41
GCP	90	92.107	20.08	63.53	163.98

Source: Authors Calculation Using STATA

RMG earnings (EERMG) show considerable variability across the 90 observations, with a mean of 2929.88 million USD and a standard deviation of 814.80 million USD, indicating fluctuations in the sector's performance during the study period. The minimum earnings recorded were 374.66 million USD while maximum reached 4665.41 million USD, highlighting the sectors ability to navigate both challenging and prosperous times. The exchange rate (EXR) between Bangladeshi Taka (TK) and US Dollar, a key determinant of export competitiveness, averaged 87.897 TK per Dollar with a standard deviation of 9.34. The exchange rate varied from 78.4TK to 110.86TK per Dollar, reflecting a moderate level of volatility. Such fluctuations could have potential impacts on pricing and cost structure of RMG export, consequently affecting financial stability and competitiveness of this sector.

Inflation rate (INF) showed relative stability, averaging 6.383% with a standard deviation of 1.507%. The rate varied between 5.02% (low) to 9.94% (high), suggesting that while the inflationary pressures exist, they have not been overwhelmingly disruptive to the sector. Global commodity prices, such as the global fuel price index (GFPI) and global cotton price (GCP),

demonstrate significant variability and can therefore impose external shocks on the sector. The GFPI averages 163.681, with a standard deviation of 67.136, ranging from 55.89 to 376.41, highlighting the volatility of fuel prices and their direct impact on operational costs. In a similar vein, the GCP has a mean of 92.107 and a standard deviation of 20.08, fluctuating between 63.53 and 163.98, emphasizing the instability in raw material costs that affects the industry.

5.2 Econometric Analysis and Findings

We used monthly data spanning from July 2016 to December 2023 for running the VECM. To avoid the problem of heteroscedasticity, natural logarithms of RMG earnings (lnEERMG), exchange rates (lnEXR), inflation (lnINF), fuel price (lnGFPI), and cotton prices (lnGCPI) are used (Table 1 in Appendix). As the variables are of time series nature, Augmented Dickey-Fuller (ADF) test was run to check the stationary status (Table 2 in Appendix). ADF test results show that all the variables are first difference stationary, denoted as I(1). In such a case, it is often suspected that such variables are cointegrated and might have a long-term relationship.

Table 2: Selection-order criteria

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	254.555				2.1e-09	-5.804	-5.746	-5.661
1	697.42	885.73	25	0.000	1.3e-13	-15.521	-15.177	-14.665*
2	744.301	93.763	25	0.000	7.6e-14*	-16.030*	-15.399*	-14.461
3	764.803	41.004	25	0.023	8.5e-14	-15.926	-15.007	-13.643
4	786.306	43.005*	25	0.014	9.5e-14	-15.844	-14.638	-12.848

Source: Authors calculation using STATA

Table 3: Johansen tests for cointegration

maximum rank	parms	LL	Eigenvalue	trace statistic	critical value
0	30	700.3101	.	127.0966	68.52
1	39	734.6827	0.54214	58.3514	47.21
2	46	748.7028	0.27286	30.3112	29.68
3	51	758.9132	0.2071	9.8905*	15.41
4	54	763.8556	0.10625	0.0057	3.76
5	55	763.8584	0.00006		

Source: Authors calculation using STATA

The Johansen cointegration test clarified the existence of such a relationship using an optimal lag of two (Table 2). This selection was guided by AIC (Akaike information criterion), HQIC (Hannan–Quinn information criterion), and FPE criteria. Table 3 reports the results of the Johansen cointegration test, where the rank 3 trace statistic (9.8905) is less than 5% critical value 15.41. Thus, the null hypothesis stating the existence of three cointegrating relationship cannot be rejected. Hence, the variables considered by this research have a long-run relationship. According to time series econometrics, when there is cointegration, the vector error correction model (VECM) should be implemented. As a result, the study has run this model with a maximum of two lags, and three cointegrating equations. The model produces estimates of both short-run and long-run parameters. Table 4 shows results when lnEERMG is the target variable.

Table 4: Vector Error Correction Model

	(1)	(2)	(3)	(4)	(5)
VARIABLES	D_lnEERMG	D_lnEXR	D_lnINF	D_lnGFPI	D_lnGCP
L._ce1	-0.992***	-0.00358	0.0136	-0.0928**	-0.00957
	(0.107)	(0.00290)	(0.0252)	(0.0421)	(0.0196)
L._ce2	-0.249	-0.0696***	-0.0721	0.291	-0.114
	(0.559)	(0.0151)	(0.131)	(0.220)	(0.102)
L._ce3	0.597**	0.0355***	0.0424	-0.0559	0.0567
	(0.275)	(0.00745)	(0.0646)	(0.108)	(0.0504)
LD.lnEERMG	0.400***	0.000906	-0.0125	0.00420	-0.0104
	(0.0976)	(0.00264)	(0.0229)	(0.0384)	(0.0179)
LD.lnEXR	-4.578	0.197*	-0.0818	-1.736	-2.811***
	(3.732)	(0.101)	(0.876)	(1.467)	(0.684)
LD.lnINF	-1.084**	0.0403***	-0.338***	-0.147	-0.173*
	(0.531)	(0.0144)	(0.125)	(0.209)	(0.0974)
LD.lnGFPI	0.275	-0.00553	0.0337	0.374***	0.126**
	(0.315)	(0.00854)	(0.0741)	(0.124)	(0.0578)
LD.lnGCP	1.255**	0.0152	-0.113	-0.145	0.159
	(0.626)	(0.0169)	(0.147)	(0.246)	(0.115)
Constant	-0.000284	-0.00107	-0.00341	0.00176	0.00796

	(0.0339)	(0.000917)	(0.00796)	(0.0133)	(0.00621)
Observations	88	88	88	88	88

Source: Authors calculation using STATA

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

_ce1, _ce2, and _ce3 are speed of adjustments. The rest are short term associations. To identify the long-term relationship between lnEERMG and lnEXR, lnINF, lnGFPI and lnGCP, the adjustment coefficients have to show a negative sign and a significant p-value. The speed of adjustment or error correction term (_ce1) here is -.9924, and has a p-value of 0.000, which is significant at the 1% level. This suggests that previous years deviations from long-run equilibrium are corrected within the current year at an adjustment speed of 99.24%. In other words, 99.42% of the adjustment takes place in a given period. As two conditions are satisfied, the study can conclude that VECM shows long-term relationship between RMG earnings and the other four variables. The normalized cointegrating coefficients were estimated and are presented in Table 5.

Table 5: Johansen Normalization Restrictions Imposed

Variables	lnEERMG	lnEXP	lnINF	lnGFPI	lnGCP	Constant
Coefficients	1	-8.88e-16	-4.44e-16	-3.455348	6.447968	-19.31828
P>|z	-	-	-	0.000	0.000	-

Source: STATA Output

The long term relationship among the variables can be presented as follows, ECT_{t-1}= 1.00$lnEERMG_{t-1}$-8.88e-16$lnEXR_{t-1}$- 4.44e-16$lnINF_{t-1}$-3.455348$lnGFP_{t-1}$+6.447968$lnGCP_{t-1}$ -19.31828 (due to the normalization process signs are reversed for interpreting). In the long term, RMG earnings are positively associated with the exchange rate, inflation, and the global fuel price index, while a negative relationship is observed with the global cotton price index.

The cotton price globally showed an upward trend since 2020, it surged in May 22 but the price reverted in May 24. This fall can be attributed mainly due to the looming threat of global recession. Very recently there is again an upward pressure in cotton prices reflecting a modest recovery of demand. So we can see that the global cotton prices are fluctuating from time to time. Our RMG industry is dependent on external market for 98% of cotton and as there is a

negative relationship between global cotton price and RMG earning our RMG industry should be continuously watchful about global cotton price. However, the coefficients for exchange rate and inflation are relatively low, suggesting a low influence. For instance, 1% rise in exchange rate contributes to 8.88e-16% increase in RMG earnings in the long run, signifying an extremely low impact. Despite some studies suggesting a negative relationship between inflation and exports, given that the demand for apparel is less volatile, high inflation may only lead to a temporary reduction in clothing purchases. Thus, inflation's impact might not be all together negative in the long run. Furthermore, an increase in fuel prices was anticipated to have a negative impact on RMG earnings in the long run, primarily due to heightened production costs. During the considered period, there was a historically high surge in fuel prices, leading to fluctuations in monthly RMG earnings. However, on a yearly basis, the earnings showed an increase. This suggests that despite the rise in fuel prices, earnings did not experience a significant decline rather overall showed an increase. This observation may also indicate the sector's efficiency in utilizing fuel resources during the crisis period to produce the maximum output.

6. Conclusion and the Way Ahead

This study examines the long-term relationship between Bangladesh's RMG export earnings and key macroeconomic variables such as exchange rates, inflation, global fuel prices, and cotton prices. The results indicate that while these factors influence RMG earnings, their individual impacts are relatively modest. The exchange rate, inflation, and global fuel prices all show positive associations with RMG export earnings, although their coefficients are low, suggesting a limited influence. In contrast, global cotton prices exhibit a negative relationship with RMG export earnings, highlighting the vulnerability of the sector to fluctuations in raw material costs.

Despite the ongoing global inflationary pressures and significant fluctuations in global fuel and cotton prices, the RMG sector's earnings have increased during the period under study. This suggests that no single variable has a dominant effect on the sector’s long-term earnings. Rather, the resilience of the sector can be attributed to a range of factors, such as continuous government policy support, efficient power utilization, and the sector’s ability to maintain competitive pricing.

However, in the short term, both exchange rates and inflation have a negative impact on RMG export earnings, with inflation and global cotton prices showing statistically significant effects.

This underscores the need for targeted domestic support, as external factors like global inflation and imported fuel prices are beyond Bangladesh's control.

Looking ahead, it is clear that the sustainability and growth of Bangladesh’s RMG industry will depend on a holistic approach that addresses both macroeconomic variables and key policy interventions. While factors like global fuel and cotton prices will continue to affect the sector, the focus should shift toward improving the stability of domestic conditions. Creating a stable political environment, ensuring uninterrupted power and gas supplies, and addressing labor unrest are critical to maintaining uninterrupted production and shipment. Additionally, investing in strong backward and forward linkages within the textile industry will help build resilience against global pressures. This includes improving the spinning industry, which, despite significant investments since 2021, still falls short of meeting industry demand.

The upcoming graduation of Bangladesh from Least Developed Country (LDC) status in 2026 further necessitates market and product diversification. Bangladesh has already made strides in diversifying its markets, with a notable increase in exports to non-traditional markets in 2023. However, labor unrest remains a challenge that needs careful attention, as rising wages amid inflation add to production costs. To counteract this, investing in workers' skill development will be key to enhancing productivity and reducing operational costs.

Thus, achieving a sustainable and resilient RMG industry will require balancing domestic and global challenges. A comprehensive strategy that addresses both the opportunities and challenges within the sector is crucial for ensuring its long-term success in an evolving global market.

Research Implications and Future Research Directions

The findings of this study provide valuable insights into the long-term dynamics between macroeconomic variables and Bangladesh's RMG export earnings. While these variables have a discernible impact, their relatively limited influence suggests that the sector’s resilience relies on factors beyond just macroeconomic stability. Policymakers can leverage these insights to prioritize areas such as enhancing supply chain efficiency, increasing production capacity, and diversifying export markets and products. The negative relationship between global cotton prices and RMG earnings highlights the importance of reducing dependency on imported raw materials. Strengthening domestic supply chains and fostering backward linkages within the textile industry are essential for improving the sector's sustainability. Furthermore, the positive

but limited influence of global fuel prices and inflation underscores the need for efficiency in resource utilization and maintaining price competitiveness to sustain growth amidst volatility.

Future research could focus on establishing causal relationships among macroeconomic variables using advanced econometric techniques. Expanding the analysis to include factors like labor productivity, policy reforms, and sustainability would offer a more holistic view of the RMG sector. Additionally, firm-level performance analysis, comparative studies with other apparel-exporting countries, and the use of forecasting models like ARIMA could provide valuable insights into future trends. Investigating the influence of global sustainability trends on the sector's growth will also be critical for its long-term resilience.

7. References

Abdullah, S. (2022, August 8). *Apparel value-addition depreciated due to high raw material price, energy crisis*. Textile News, Apparel News, RMG News, Fashion Trends. https://www.textiletoday.com.bd/bangladesh-apparel-value-addition-depreciated-high-raw-material-price-energy-crisis

Aziz, N. (2008). The role of exchange rate in trade balance: Empirics from Bangladesh. University of Birmingham, UK, 1-25.

Bangladesh Bank. (n.d.-a). https://www.bb.org.bd/en/index.php/publication/publictn/2/59

Bangladesh Bank. (n.d.-b). https://www.bb.org.bd/en/index.php/publication/publictn/3/11

BGMEA | Export Performance. (n.d.). https://www.bgmea.com.bd/page/Export_Performance

Bilquees, F., Mukhtar, T., & Saqib, J. M. (2010, November 1). *Exchange Rate Volatility and Export Growth: Evidence from Selected South Asian Countries*. https://hrcak.srce.hr/clanak/116981

Chattogram, S. C. . . (2023, January 22). RMG industry's production costs rising due to fuel crisis. *The Business Post*. https://businesspostbd.com/front/rmg-industrys-production-costs-rising-due-to-fuel-crisis-2023-01-23

Engle, R. F., & Granger, C. W. J. (1987a). Econometrica : Co-integration and Error Correction: Representation, Estimation, and Testing.

Emran, S. J., & Schmitz, A. (2022). Impact of COVID-19 (2020–2022) on cotton and Garments market of Bangladesh: a small country case. *Journal of Agricultural & Food Industrial Organization*, *21*(1), 89–98. https://doi.org/10.1515/jafio-2022-0027

Global monthly energy price index 2023 | Statista. (2024a, January 17). Statista. https://www.statista.com/statistics/1302801/monthly-fuel-energy-price-index-worldwide/

Global price of Cotton. (2024, January 24). https://fred.stlouisfed.org/series/PCOTTINDUSDM

Gokal, V., & Hanif, S. (2004). Relationship between inflation and economic growth: Economics Department, Reserve Bank of Fiji

Hasan, J., Muktadir, D., & Islam, F. (2015). Impact of exchange rate volatility on the export performance of developing country: Evidence from bilateral trade between Bangladesh and the us. *Journal of International Business and Economy*, *16*(2), 21-39.

Hooy, C. W., & Baharumshah, A. Z. (2015). Impact of exchange rate volatility on trade: Empirical evidence for the East Asian economics. *Malaysian Journal of Economic Studies*, *52*(1), 75-95.

Hossain, S. A., & Islam, K. M. A. (2015). The Relationship of the Macroeconomic Variables with the Growth of Garment Industry in Bangladesh. *Global Disclosure of Economics and Business*, *4*(1), 63–78. https://doi.org/10.18034/gdeb.v4i1.153

https://epb.gov.bd/site/view/epb_export_data/2016-2017

https://epb.gov.bd/site/view/epb_export_data/2017-2018

https://epb.gov.bd/site/view/epb_export_data/2018-2019

https://epb.gov.bd/site/view/epb_export_data/2019-2020

https://epb.gov.bd/site/view/epb_export_data/2020-2021

Khan, M. M., & Ahmed, A. (2024). The effects of exchange rate fluctuation on Bangladeshi exports: An ARDL bound testing technique. *International Journal of Economics and Financial Issues*, *14*(3), 125–131. https://doi.org/10.32479/ijefi.15735

Mirdha, R. U. (2022a, March 24). Surge in cotton price to weigh on RMG exports. *The Daily Star*. https://www.thedailystar.net/business/economy/news/surge-cotton-price-weigh-rmg-exports-2989461

Mirdha, R. U. (2022b, July 31). Import of apparel raw materials surges. *The Daily Star*. https://www.thedailystar.net/business/economy/news/import-apparel-raw-materials-surges-3083766

Muktadir-Al-Mukit, D., & Shafiullah, A. Z. M. (2014). Export, import and inflation: A study on Bangladesh. Amity Global Business Review, 9(1), 46-55.

Munni, M. (2024, January 8). *Garment exports up, but imports of inputs slump*. The Financial Express. https://thefinancialexpress.com.bd/economy/garment-exports-up-but-imports-of-inputs-slump

Mustafa, Z., & Hosen, S. (2022, September 17). *Impacts of fuel price hike on the lower-income segment in Bangladesh*. Youth Policy Forum. https://ypfbd.org/impacts-of-fuel-price-hike-on-the-lower-income-segment-in-bangladesh/#:~:text=price%2Dcut%2D3095246-,Fuel%20price%20hike%20will%20negatively%20impact%20RMG%20export%20growth%3A%20BGMEA,%2C%20T.%20D.%2C%20%26%20Noyon%2C%20A.%20U.

Rahman, F. (2017). Impact of selected Macro-Economic variables on the export performance of Bangladesh. *IOSR Journal of Economics and Finance*, *08*(02), 21–27. https://doi.org/10.9790/5933-0802032127

Rahman, M. H., Majumder, S. C., & Hossain, M. N. (2020). The impact of exchange rate volatility on export and import in Bangladesh. European Online Journal of Natural and Social Sciences, 9(2), pp-411.

Raza, D. A., Larik, D. A., & Tariq, M. M. (2013). Effects of currency depreciation on trade balances of developing economies: A Comprehensive Study on South Asian countries. *IOSR Journal of Humanities and Social Science*, *14*(6), 101–106. https://doi.org/10.9790/0837-146101106

Sarker, J. R., & Alam, F. (2016). Efficiency and economics in cotton production of Bangladesh. *DOAJ (DOAJ: Directory of Open Access Journals)*. https://doi.org/10.12895/jaeid.2016110.494

Sayeda, T. (2020). The Impact of exchange rate on Bangladesh's export: A cointegration approach. *Journal of Economics Management and Trade*, 22–30. https://doi.org/10.9734/jemt/2020/v26i730271

Shimu, A. A., & Islam, M. S. (2018). Impacts of macro economic variables on the RMG export growth of Bangladesh. *Economics and Business*, *32*(1), 112–125. https://doi.org/10.2478/eb-2018-0009

Subanti, S., Hakim, A. R., Riani, A. L., Hakim, I. M., & Nasir, M. S. (2019). Exchange rate volatility and exports: a panel data analysis for 5 ASEAN countries. *Journal of Physics Conference Series*, *1217*(1), 012089. https://doi.org/10.1088/1742-6596/1217/1/012089

Sultana, M. (2015). Economic Recession and Its Impact on the Bangladesh's Economy with A Special References of RMG and Remittance Sectors. Nub. https://www.academia.edu/10500644/Economic_Recession_and_Its_Impact_on_the_Bangladesh_s_Economy_with_A_Special_References_of_RMG_and_Remittance_Sectors

The Daily Star. (2022, August 7). Fuel price hike to have a negative impact on economy: Dhaka chamber. *The Daily Star*. https://www.thedailystar.net/business/news/fuel-price-hike-have-negative-impact-economy-dhaka-chamber-3089801

Unb. (2022, August 6). RMG export growth to be affected by fuel price hike: BGMEA president. *The Business Standard*. https://www.tbsnews.net/economy/rmg/rmg-export-growth-be-affected-fuel-price-hike-bgmea-president-472646

USDA, United State Department of Agriculture. 2020. *Cotton and Products Update. Bangladesh*. Also available at https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Cotton%20and%20Products%20Update_Dhaka_Bangladesh_11-30-2020.

8. Appendix

Table 1: Description of the variables used in the analysis

Variable Name	Description	Natural logarithms of variables	Sources
EERMG	RMG Export Earnings	lnEERMG	Bangladesh Export Promotion Bureau (EPB), Bangladesh Bank monthly publications, Bangladesh Bank quarterly review on RMG
INF	Inflation Rate	lnINF	Bangladesh Bank monthly publications
EXR	Exchange Rate	lnEXR	Bangladesh Bank monthly publications
GFPI	Global Fuel Price Index	lnGFPI	Fred Economic Data
GCP	Global Cotton Price Index	lnGCP	Fred Economic Data

Table 2: Augmented Dickey-Fuller (ADF) test results

	At Level			First Difference		
Variables	Test Statistics	P-value	Stationary Status	Test Statistics	P-value	Stationary Status
lnEERMG	-2.262	0.1845	Not I(0)	-6.598	0.0000	I(1)
lnINF	-0.125	0.9469	Not I(0)	-4.356	0.0004	I(1)
lnEXR	-0.838	0.8077	Not I(0)	-4.308	0.0004	I(1)
lnGFPI	-1.671	0.4461	Not I(0)	-3.408	0.0107	I(1)
lnGCP	-1.966	0.3017	Not I(0)	-3.802	0.0029	I(1)

Table 3: VECM

Optimal Lag Seletion

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	254.555				2.1e-09	-5.80361	-5.74618	-5.66091
1	697.42	885.73	25	0.000	1.3e-13	-15.5214	-15.1768	-14.6652*
2	744.301	93.763	25	0.000	7.6e-14*	-16.0303*	-15.3985*	-14.4606
3	764.803	41.004	25	0.023	8.5e-14	-15.9257	-15.0068	-13.6425
4	786.306	43.005*	25	0.014	9.5e-14	-15.8443	-14.6383	-12.8477

Johansen tests for cointegration results

VECM estimation

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	30	700.31009	.	127.0966	68.52
1	39	734.68273	0.54214	58.3514	47.21
2	46	748.70281	0.27286	30.3112	29.68
3	51	758.91318	0.20710	9.8905*	15.41
4	54	763.85557	0.10625	0.0057	3.76
5	55	763.85841	0.00006		

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_lnEERMG						
_ce1						
L1.	-.9924731	.1071496	-9.26	0.000	-1.202483	-.7824637
_ce2						
L1.	-.2491404	.558778	-0.45	0.656	-1.344325	.8460443
_ce3						
L1.	.5969949	.2751746	2.17	0.030	.0576627	1.136327
lnEERMG						
LD.	.4000128	.0976467	4.10	0.000	.2086288	.5913969
lnEXR						
LD.	-4.577765	3.732372	-1.23	0.220	-11.89308	2.737549
lnINF						
LD.	-1.084391	.5311667	-2.04	0.041	-2.125458	-.0433231
lnGFPI						
LD.	.2749276	.3153849	0.87	0.383	-.3432155	.8930707
lnGCP						
LD.	1.255422	.6259398	2.01	0.045	.0286025	2.482242
_cons	-.0002843	.0338813	-0.01	0.993	-.0666904	.0661218

Johansen normalization restrictions imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
lnEERMG	1	.	.	.	.	.
lnEXR	-8.88e-16	.	.	.	.	.
lnINF	-4.44e-16	.	.	.	.	.
lnGFPI	-3.455348	.6584598	-5.25	0.000	-4.745906	-2.164791
lnGCP	6.447968	1.283156	5.03	0.000	3.933029	8.962907
_cons	-19.31828	.	.	.	.	.
_ce2						
lnEERMG	0	(omitted)				
lnEXR	1	.	.	.	.	.
lnINF	-4.44e-16	.	.	.	.	.
lnGFPI	-2.846336	.5971654	-4.77	0.000	-4.016758	-1.675913
lnGCP	6.033393	1.16371	5.18	0.000	3.752563	8.314222
_cons	-17.09659	.	.	.	.	.
_ce3						
lnEERMG	0	(omitted)				
lnEXR	0	(omitted)				
lnINF	1	.	.	.	.	.
lnGFPI	-5.616238	1.274408	-4.41	0.000	-8.114033	-3.118444
lnGCP	12.42985	2.483469	5.01	0.000	7.562344	17.29736
_cons	-28.97222	.	.	.	.	.

Diagnosis tests

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	31.0423	25	0.18762
2	39.5113	25	0.03272

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
.835603 + .09538582*i*	.84103
.835603 - .09538582*i*	.84103
.2645191 + .6070017*i*	.662134
.2645191 - .6070017*i*	.662134
.2468685 + .3505785*i*	.428777
.2468685 - .3505785*i*	.428777
-.3185202	.31852
.1617793	.161779

The VECM specification imposes 2 unit moduli.