

Economics School of Louvain - ESL

**Economic Metamorphosis: Unraveling the
Threads of Trade Liberalization in Bangladesh's
GDP Evolution**

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Abstract

This paper aims to examine the effects of trade liberalization on the GDP growth of Bangladesh through exports. Using descriptive analysis of the Economic Complexity Index (ECI) of Bangladesh from the years 2002-2022, we find that the country ranks low in terms of export product sophistication and has a huge dependency on textile and garments exports with very little diversification. The gravity model with multilateral resistance terms analysis using high-dimensional fixed effects regression and Poisson Pseudo Maximum Likelihood (PPML) for the period 1980-2022 suggests that there is a statistically significant positive impact of shared colonial history, negative impact of distance and borders, mixed effects of common language and favorable results for the interaction between economic complexity and GDP per capita. It also indicates that Bangladesh mostly exports to larger economies despite huge geographical distances. The OLS regressions using data from time 2000-2022 show that although there is a positive relationship among economic complexity, exports, and GDP growth, the results are not statistically significant, implying that there could be other macroeconomic factors working as a driving force for economic growth in Bangladesh. Since the findings indicate that countries with higher economic complexity gain more from trade, policy recommendations include diversifying exports and increasing economic complexity to foster sustainable economic growth and resilience in Bangladesh.

Keywords: Trade, GDP growth, Exports, Economic Complexity Index, Gravity Model.

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1. Introduction

As globalization continues to shape the world economy, trade liberalization has become a prominent topic of discussion among policymakers and economists. Globalization encompasses various economic, cultural, and political processes, including the liberalization of trade policies and the expansion of foreign direct investment (O'Brien & Leichenko, 2003). These processes have the potential to both positively and negatively impact countries' GDP growth. Trade liberalization refers to the removal or reduction of barriers to international trade, such as tariffs, quotas, and regulations as well as trade facilitation measures that ease the path of both imports and exports. The effects of trade liberalization on the GDP growth of a country like Bangladesh are of particular interest due to its position as a developing economy heavily reliant on export-oriented industries. Trade liberalization, while viewed by some as a pathway to economic growth and development, has been met with skepticism by others. One perspective argues that trade liberalization can lead to increased economic growth by providing opportunities for firms to access larger markets, attract foreign investment, and stimulate productive activities. However, there are also concerns that trade liberalization may have adverse effects on certain industries and segments of the population, leading to income inequality and economic disruption. In the context of Bangladesh, where industries such as textiles and garments play a significant role in the economy, it is important to examine the specific effects of trade liberalization, export-oriented specialization, and exports extensively on the progress of the economy.

Understanding the complexity of exported goods has become increasingly important for policymakers, researchers, and businesses alike. The composition of a country's exports is a key determinant of its economic growth and development (Blanchard & Olney, 2017). This is where the Economic Complexity Index (ECI) comes to play a significant part. The ECI provides insight into the sophistication and diversification of a country's export portfolio. Through this index, we can get an idea of the productive capabilities residing in the export production of an economy. Incorporating this index into The Gravity Model, a widely used method to analyze trade patterns, can provide insights into the contributing factors and the magnitude of their effects in promoting trade flows among nations. Ultimately, sketching a picture of how a better economic complexity drives exports of an economy higher leading to economic growth.

In view of the above, the main research question in this paper is to identify how the economic complexity of Bangladesh has changed after its reform in trade liberalization policies, and whether it has led to GDP growth through exports. For this we employed descriptive analysis of Bangladesh's current stance in the ECI index, then included the index data in a gravity model analysis consisting of 243 countries and

multilateral resistance terms to see its effect on trade flows and at the end, through an OLS regression analysis check whether the years Bangladesh had a GDP growth associated to a rise in exports was because of an higher economic complexity or not. Section 2 provides the background of the study. Section 3 shows the trend of various economic factors in Bangladesh related to international trade for the period 1980-2022. Section 4 presents the literature review on past research done on the relevant topics. Section 5 describes the data and methodology employed in the study. Section 6 depicts the findings of the analyses. Sections 7 and 8 include implications and conclusions for the paper.

2. Background of the Study

Bangladesh is a South Asian country, with over 160 million people in population. After gaining independence from Pakistan in 1971, Bangladesh faced numerous challenges in building its economy. The country heavily relied on agriculture, with jute being the main export commodity. However, over the years, Bangladesh has made significant progress in diversifying its economy and expanding its trade and export sectors. Efforts have been made to improve infrastructure, promote industrialization, and attract foreign direct investment. These efforts have led to the emergence of new sectors such as garments and textiles, pharmaceuticals, and IT services, which have become major contributors to Bangladesh's economy. Furthermore, Bangladesh has benefited from its strategic location, with access to major global markets.

Bangladesh's trade liberalization policies have been implemented in three phases. The first phase (1982-86) began as Bangladesh entered the World Bank's policy-based lending program; the second phase (1987-91) began with the initiation of the three-year IMF structural adjustment facility (SAF) in 1986; and ultimately, the third phase, which began in 1992, was preceded by the IMF-sponsored Enhanced Structural Adjustment Facility (ESAF) (BIDS, 2003). These reform initiatives resulted in a major reduction in quantitative limits, the opening of trade in numerous banned commodities, the rationalization and reduction of import duties, and the liberalization of the foreign exchange regime.

Additionally, Bangladesh has actively participated in international trade agreements and organizations, such as the World Trade Organization, to promote its export capabilities. The economy of Bangladesh is primarily dependent on the manufacturing and financial sectors, with the garment industry being a major contributor to export earnings. The performance of Bangladesh as a supplier of ready-made garments to international markets has seen some diversification in recent years. However, the country's product upgrading and competitiveness in the United States market have not shown significant improvements.

Despite these challenges, the export-oriented industrialization strategy adopted by Bangladesh in the 1990s has brought about notable changes in its economy. The country has shown resilience and determination in overcoming obstacles and achieving economic growth.

Bangladesh has shown commendable growth in trade-led dynamics. Between 2021 and 2022, exports, imports, and overall trade tripled compared to the levels in 1999-2000. In 2022, Bangladesh ranked as the 34th largest economy globally based on GDP (current US\$). It was 52nd in total exports, 47th in total imports, 136th in GDP per capita (current US\$), and 101st in economic complexity (The OEC, 2024). The trade has experienced an average annual growth rate of 12%. The apparel trade contributed significantly to Bangladesh's remarkable industrial performance in the 2010s, setting new records. The industry, especially manufacturing, drove GDP growth rates of 6-7% during the decade, while agriculture's growth rates averaged 3%. The industry's share of the economy increased from 25% in 1999–2000 to 37% in 2021–2022, almost reaching the policy target of 40% by 2041 (Sattar 2023). Bangladesh's economy passed the World Bank's threshold (per capita income) in 2015, making it a lower-middle-income country. The UN Committee for Development Policy determined that Bangladesh met all requirements to leave the least developed country (LDC) classification. According to UN guidelines, Bangladesh must graduate to developing country status by 2026 (Sattar 2023).

3. Macroeconomic Factors, Trade and GDP Growth in Bangladesh

Trade liberalization is the process of reducing or eliminating trade barriers, such as tariffs and quotas, to facilitate freer exchange of goods and services between countries. When countries engage in trade liberalization, several key effects can be observed on various economic indicators. Firstly, trade liberalization typically leads to an increase in exports. This is because when trade barriers are reduced, it becomes easier for domestic firms to sell their goods and services in foreign markets. As a result, exports tend to increase as more goods and services can be sold abroad. This increase in exports can have a positive impact on GDP growth. Secondly, trade liberalization also affects imports. With trade barriers removed or reduced, imports become more accessible and affordable for domestic consumers. This leads to an increase in the variety and availability of imported goods and services, which can contribute to consumer welfare. However, an increase in imports can also have some potential negative effects. For example, it can lead to a displacement of domestic industries that are unable to compete with cheaper imported goods. This displacement can result in job losses and economic disruptions in certain sectors. In terms of exchange rates, trade liberalization can have varying effects. FDI typically increases as investors are drawn by the

prospects of easier market access, improved efficiencies, and a favorable regulatory environment. Trade liberalization tends to reduce inflationary pressures by lowering consumer prices and input costs, and increasing competitive pressures. Finally, it accelerates GDP growth by enhancing productivity, increasing exports and FDI, lowering inflation, and improving overall economic efficiency and consumer welfare.

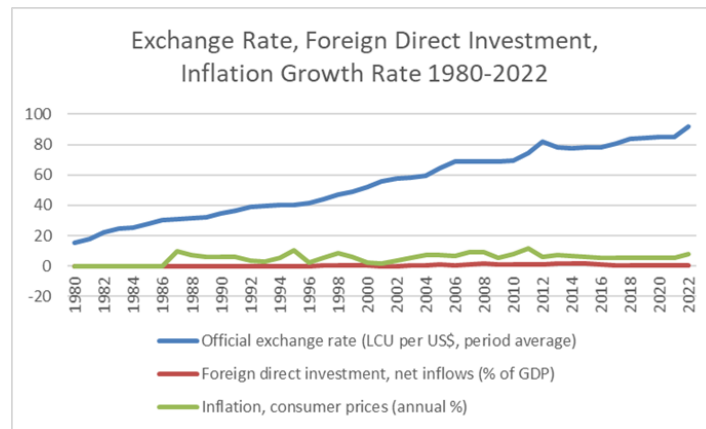


Figure 1: Exchange Rate, FDI and Inflation Rate Trend for 1980-2022
 Source: Author (Data collected from World Bank)

According to Figure 1, for the period 1980-2022, Bangladesh’s exchange rate has consistently increased, reflecting a continuous depreciation of the local currency BDT (Bangladesh Taka) against the US dollar. FDI net inflows have remained relatively stable with minor fluctuations, indicating periods of varying foreign investment activity but no major long-term changes. In Bangladesh, inflation has shown high volatility in the earlier years, stabilizing somewhat in recent decades, although with slight increases in recent years.

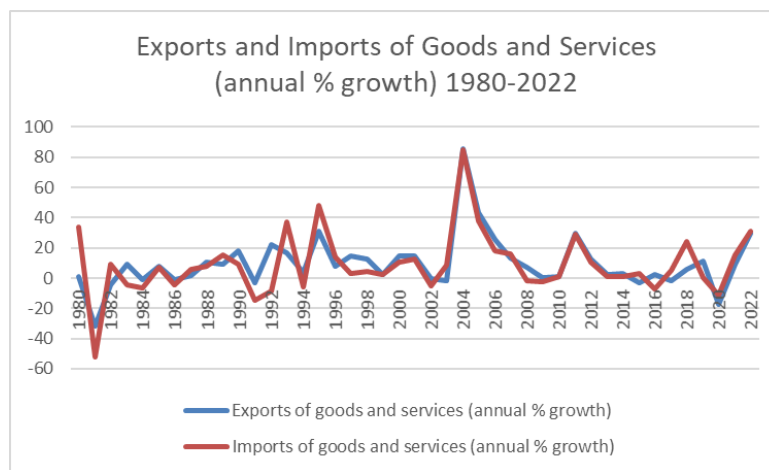


Figure 2: Exports and Imports Growth (% annual) of Good and Services
 Source: Author (Data collected from World Bank)

According to Figure 2, considerable volatility in the annual growth rates of both exports and imports is seen, reflecting periods of economic turbulence and stability in Bangladesh. Several peaks and troughs are visible, indicating cycles of rapid growth followed by declines. Notable peaks are around 1994, 2004, and 2010. The most recent data from 2020 to 2022 indicate an upward trend in both exports and import growth rates, suggesting a positive economic trend for the country.

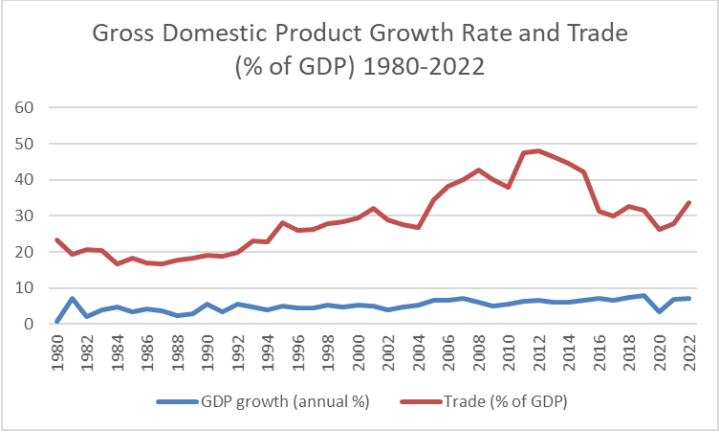


Figure 3: GDP Growth Rate and Trade as a Percentage of GDP
 Source: Author (Data collected from World Bank)

According to Figure 3, the annual GDP growth rate shows periods of stability interspersed with minor fluctuations in the country for the period 1980-2022. Major dips coincide with global or regional economic downturns, while peaks indicate periods of economic expansion. Trade as a percentage of GDP shows a clear upward trend from the early 1990s to the late 2000s, reflecting increasing globalization and economic integration for Bangladesh, that is when the country entered its third phase of trade liberalization. Post-2008, trade stabilizes at a high level, indicating sustained engagement in international trade. Both GDP growth rate and trade as a percentage of GDP show slight increases in the most recent years, indicating potential economic recovery and growth in trade activities. During periods of significant trade growth (e.g., the 1990s and early 2000s), there are corresponding periods of increased GDP growth in the economy. This suggests that increased trade activities, likely driven by greater integration into the global economy of Bangladesh, have a positive effect on economic growth. For instance, the rapid increase in trade as a percentage of GDP from the mid-1990s to 2008 correlates with a general trend of stable or slightly increasing GDP growth rates. Significant economic downturns, such as the global financial crisis of 2008-2009, show both a decline in trade as a percentage of GDP and a noticeable dip in the GDP growth rate. This indicates that trade disruptions are closely associated with declines in economic growth. In the most recent period (2020-2022), Bangladesh has experienced an increase in trade as a percentage of GDP

coinciding with a slight increase in GDP growth rate. Similarly, the dip around 2020 reflects both a reduction in trade and a corresponding decline in GDP growth, likely due to the global economic challenge of the COVID-19 pandemic and the effects of the prolonged nationwide lockdown starting from March 2020.

4. Literature Review

Krugman (1990) explained why trade liberalization helps poor countries grow. Initially, developing countries focus on labor-intensive services, agriculture, and manufacturing. People have low annual incomes, and markets are small. The industrial development that protects local industries uses capital-intensive production methods. However, open trade allows countries to benefit from increasing returns to scale across a broader range of products. Import substitution policies give officials significant control over which industries to support and how to allocate limited foreign exchange, leading to inefficiency. A liberalized trade policy allows low-cost manufacturers to increase their production beyond local market needs. An investigation by Mamun and Nath (2004) on the connection between exports and economic growth in Bangladesh concluded that exports contribute to increased GDP growth. Additional research conducted by Edwards (1998), Romer (1989), Dollar (1992), Gould and Ruffin (1995), Sachs and Warner (1995), and Ghatak et al. (1995), supported Krueger's (1978) findings that trade liberalization indirectly boosts GDP by increasing exports. Manni and Afzal (2012) studied the impact of trade liberalization on Bangladesh's economy from 1980 to 2010 using the OLS approach and found that GDP growth increased after trade liberalization. Meraj (2013) used an autoregressive distributed lag (ARDL) model and the Granger causality test to show a causal relationship between GDP and exports and imports in Bangladesh. Exports had a bidirectional causal relationship with economic growth, but imports did not affect GDP and exports. This suggests that globalization positively impacts trade and economic growth. Quah and Rauch (1990) argued that a closed economy producing many intermediate goods faces bottlenecks. Under a free trade framework, the country can avoid these issues and grow faster than under autarky. David et al. (2017) conducted a randomized experiment showing that exports positively impact the productivity and quality of firms through the learning-by-exports technique. Firms specializing in specific export commodities reported 16-26% higher profits. Feyrer (2019) discovered that trade has a substantial effect on income, with income varying by approximately half the percentage change observed in trade. Cardinale and Scazzieri (2019) noted that since the early 17th century, issues of market regulation, industrial development, and foreign trade have been considered in terms of national welfare, meaning international trade benefits a country's people.

Hidalgo et al. (2007) and Hidalgo and Hausmann (2009) reintroduced the idea that economic progress is about learning how to make and trade more complex products. They used network theory to show that a country's growth depends on its ability to develop the skills needed to produce various goods, especially complex ones. Therefore, the complexity of a country's production system is crucial for its growth and development. This means that the ability of different countries to acquire skills explains differences in their economic performance. According to Felipe et al. (2012), the complexity of a product depends on the skills required to make it, while a country's complexity is determined by the number of skills available locally. These particular skills are typically present in countries that have a comparative advantage in manufacturing specific goods. Hausmann et al. (2014) and Hidalgo and Hausmann (2009) found that a country's Economic Complexity Index (ECI) is closely linked to its GDP per capita, especially when adjusting for natural resource wealth. Furthermore, disparities in national ECI and GDP per capita at a particular point in time can forecast future growth, suggesting that economies tend to converge towards income levels determined by ECI. Mao and An (2021) conducted a qualitative analysis of the relationship between ECI and economic development in middle- and high-income countries from 1995 to 2010. They found that a 1% increase in ECI could lead to up to 30% economic progress in these countries. Additionally, Nguyen and Dinh (2020) studied export diversification, economic complexity, and economic growth using panel data from 70 economies between 1996 and 2014. Their findings showed three key results: initially, there is a bidirectional causal relationship between economic complexity and export diversification and a unidirectional causal relationship with economic growth. Additionally, there exists a substantial correlation between economic complexity and the diversification of exports. Finally, the positive interaction between economic complexity and export diversification is consistent across different income levels and periods.

The gravity model is widely used to explain international trade and is based on Newton's gravitational equation. There are three main theoretical models in international trade: Ricardian, Heckscher-Ohlin (H-O), and intra-industry trade. Research shows that the gravity model aligns with several theoretical concepts (Evenett and Keller, 2002). Other scholars have recently explored the theoretical aspects of the gravity model (Anderson, 1979; Anderson, 2011; Shahriar, Qian, Kea, and Abdullahi, 2019). Tinbergen (1962) proposed the fundamental gravity model, which posits that the trade volume between two countries is directly related to their national incomes and inversely related to the distance separating them. This means that larger economies trade more in absolute terms, while greater distances (which represent higher transportation costs) reduce trade (Dell'Ariceia, 1999). Rahman and Ara (2010) used a dynamic gravity model with panel data for Bangladesh and found that the country trades more with larger economies and imports mainly from developing economies. One major barrier to Bangladesh's trade potential is the increasing transaction costs. Since Anderson's pioneering work (1979), more studies have provided a

theoretical basis for the gravity model and supported its use in international trade research. Rahman et al. (2019) used gravity panel data analysis and found that the importer's GDP, real exchange rate, and per capita GDP are key factors in Bangladesh's textile exports. They also found that geographical distance does not significantly impact the textile trade.

However, there are differing views on how trade liberalization affects GDP growth. Greenaway et al. (1998) found that trade openness can either increase or decrease economic progress, depending on the specific conditions of a country. Rodríguez and Rodrik (1999) argued that many studies showing a positive link between trade liberalization and exports use flawed measures of trade openness. Some studies, such as those by Jung and Marshall (1985), Abhayaratne (1996), Sinha and Sinha (1996), and Guillaumet and Richaud (2001), found no causal relationship between trade and growth. Harrison (1996), and Harrison and Hanson (1999) suggested that Sachs and Warner (1995) did not prove a strong connection between open trade policies and long-term growth. Hence, the impact of trade liberalization on growth varies, and the discussion about its effects persists.

5. Data and Methodology

The study is entirely based on secondary data collection from authentic sources such as the Bangladesh Bureau of Statistics, the World Bank, the CEPII Gravity Database, the IMF, and the Observatory of Economic Complexity. To run econometric simulations Stata-18 SE has been used.

For the descriptive analysis of ECI¹, the data has been collected from the OEC for 20 years, 2002-2022. For the Gravity Model analysis, we took 3,667 observations of 243 countries available in the CEPII Gravity dataset for the period 1980-2022. We incorporated the ECI indices separately for the top 10 exporting countries of Bangladesh, such as the USA, UK, Germany, Australia, Spain Canada, Italy, India, Japan, and France as exporters and countries that are similar in development and geography to Bangladesh namely, Vietnam, Pakistan, Indonesia, Sri Lanka, Malaysia, Cambodia, Ghana, Kenya, and Tanzania as importers. Multilateral resistance terms have been used in the form of country-time fixed effects to control for omitted variable bias by considering the relative ease or difficulty each country faces in trading with other nations. Through high-dimensional fixed effects regression and Poisson Pseudo Maximum Likelihood, we see the

¹ [Measurement of Economic Complexity Index](#)

effects on trade flow of distance, border, official common language, common colonial history, the product of ECI of exporting country with GDP per capita of importing country, exporter-year and importer-year fixed effects.

For the Ordinary Least Square (OLS) regression analysis on the effects of economic complexity, exports, and the interaction of complexity and exports on the GDP growth for the period 2000-2022, we collected data from the OEC and World Bank. We employed a robust OLS regression and pseudo-Poisson maximum likelihood to check whether exports increased and ultimately benefited GDP in the years when complexity was higher.

- The gravity equation for this study is as follows:

$$\ln(\text{Trade}_{xi}) = \beta_0 + \beta_1 \ln(\text{Distance}_{xi}) + \beta_2 \text{Border} + \beta_3 \text{LNG} + \beta_4 \text{Col} + \beta_5 (\text{ECI}_x \cdot \text{GDPpc}_i) + D_{xt} + D_{it} + \varepsilon$$

where,

Trade_{xi} = Trade flow between exporting country x and importing country i

Distance_{xi} = Distance between exporting country x and importing country i

Border = Dummy variable indicating the presence of a border between countries (1 if there is, 0 otherwise).

LNG = Dummy variable indicating the presence of an official common language (1 if there is, 0 otherwise).

Col = Dummy variable indicating the presence of a common colonial history (1 if there is, 0 otherwise).

$\text{ECI}_x \cdot \text{GDPpc}_i$ = Product of ECI value of the exporter and GDP per capita of the importer

D_{xt} = represents exporter-year fixed effects

D_{it} = represents importer-year fixed effects

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Coefficients to be determined

ε = error term

- The equation for the OLS regression analysis has been:

$$\text{GDP}_i = \beta_0 + \beta_1 \text{EXP}_i + \beta_2 \text{ECI}_i + \beta_3 (\text{ECI}_i * \text{EXP}_i) + \varepsilon_i$$

where,

GDP = Gross Domestic Product Growth Rate (% annual)

EXP = Exports Growth Rate (annual % of goods and services)

ECI = Economic Complexity Index

$(ECI*EXP)$ = Product of the Economic Complexity Indices and Exports Growth Rate

ε = error term

6. Findings and Discussion

6.1 Economic Complexity Index Analysis:

According to the Observatory of Economic Complexity, Bangladesh ranks 101 out of 133 in the Economic Complexity Index ranking with a numeric value of -0.82 and is generally termed as a less complex country. The following graph shows the ECI for Bangladesh from 2002 to 2022:

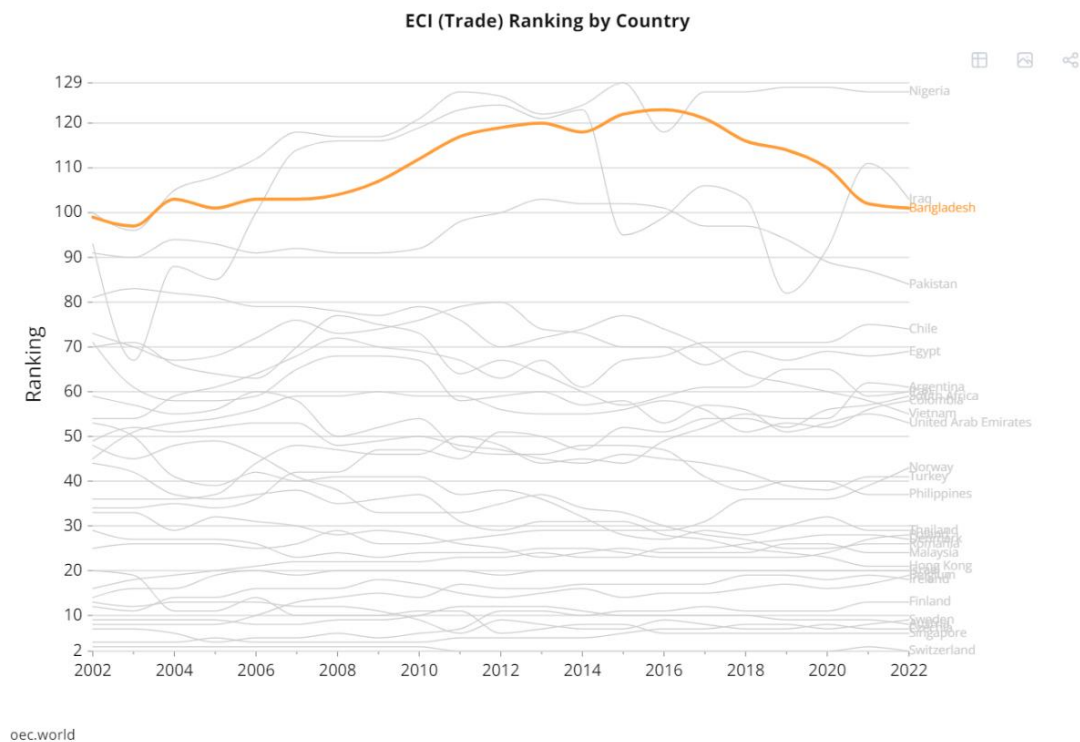


Figure 4: ECI Trade Ranking by Country
Source: Observatory of Economic Complexity

According to Figure 4, the vertical axis represents the ranking positions, with lower numbers indicating higher complexity. Rankings range from 1 (highest complexity) to 129 (lowest complexity). The horizontal axis represents the years from 2002 to 2022. Each line depicts the ranking of a country's ECI over the years.

The line for Bangladesh is highlighted in orange, while other countries are shown in gray for comparison. In 2002, Bangladesh's ECI ranking was just below 100. Bangladesh's ranking initially improved slightly until around 2005, indicating an increase in economic complexity. From 2005 onwards, Bangladesh's ranking gradually declined, reaching its lowest point (highest numerical rank) around 2015.

Post-2015, there is a noticeable improvement in the ranking, showing an upward trend in economic complexity. By 2022, Bangladesh's ECI ranking is around 105, showing some improvement compared to its lowest point but still indicating moderate economic complexity. Various other countries are plotted, with their rankings fluctuating over the years.

Countries like Nigeria and Iraq are placed at the lower end (higher numerical rankings) consistently, indicating lower economic complexity. Countries such as Switzerland, Sweden, Singapore, and Finland maintain higher positions (lower numerical rankings), reflecting higher economic complexity. Bangladesh is positioned better than countries like Nigeria and Iraq but is less complex compared to many developed countries and some emerging economies.

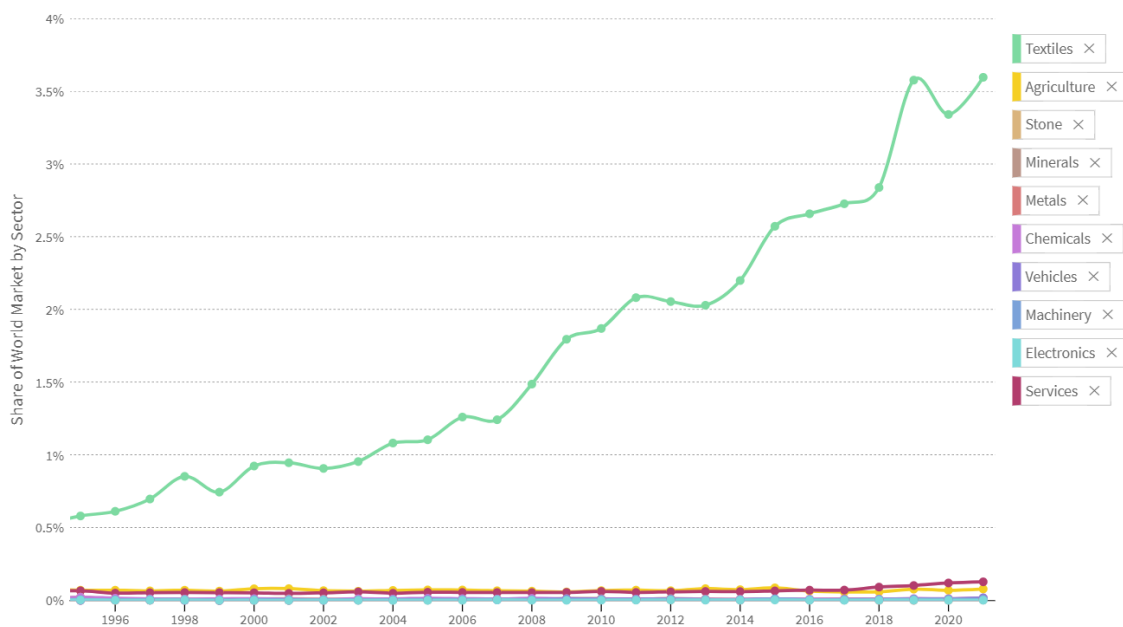


Figure 5: Share in the World Market by Sector
Source: Atlas of Economic Complexity

Figure 5 illustrates Bangladesh's global market share in various sectors from 1995 to 2021. Each sector is represented by a different colored line, and the vertical axis indicates the percentage share of the world market, while the horizontal axis spans from 1995 to 2021.

Initially, Bangladesh’s share in the world textile market was below 0.5%. From 1995 onwards, there is a steady increase in the market share. Significant growth is observed around the early 2000s and then again from 2010 onwards. By 2021, the market share for textiles approaches 3.5%, indicating substantial growth over the period.

For agriculture, the share remains relatively constant, starting just below 0.5% and maintaining that level with minor fluctuations throughout the period. For stone, minerals, metals, chemicals, vehicles, machinery, electronics, and services, these sectors collectively exhibit minimal changes in their market shares. All sectors remain below 0.5% of the world market share throughout the observed period. There is no significant upward or downward trend in any of these sectors.

In 2022, Bangladesh became the 52nd exporter in the world through \$64.2B worth of exports. Over the past five years, Bangladesh's exports have increased by \$23.8 billion, rising from \$40.3 billion in 2017 to \$64.2 billion in 2022. The most recent exports are led by Knit T-shirts (\$9.06B), Non-Knit Men's Suits (\$8.82B), Knit Sweaters (\$8.02B), Non-Knit Women's Suits (\$6.63B), and Knit Women's Suits (\$4.08B) (The OEC, 2024).

6.2 Gravity-model Analysis

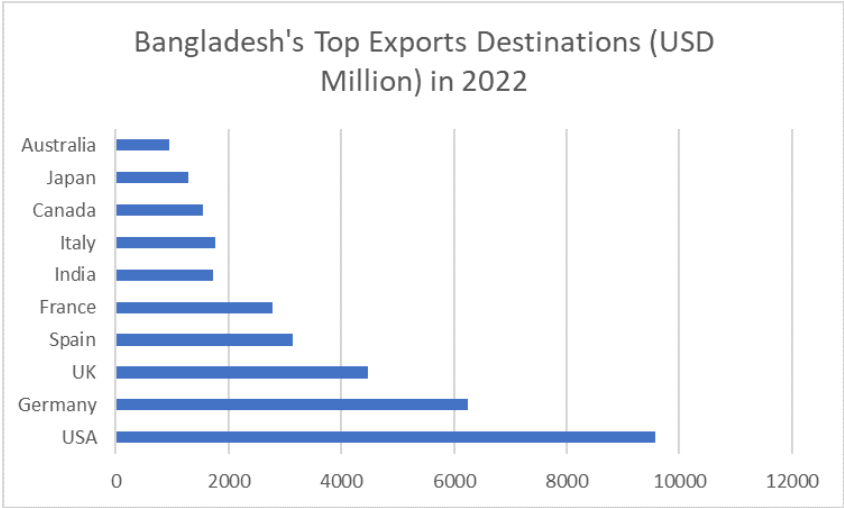


Figure 6: Top Export Destinations in 2022
Source: Author (Data collected from CEPII Gravity Dataset and Bangladesh Bureau of Statistics)

Figure 6 depicts the value of exports from Bangladesh to different countries in 2022, measured in millions of USD. It reflects the principles of the gravity model, which suggests that trade volumes are higher with

larger economies and countries that are closer geographically. The United States, being one of the world's largest economies, is a significant trade partner for Bangladesh despite the considerable distance. This is because the economic size of the USA outweighs the impact of distance, resulting in substantial trade volume. Germany, as one of Europe's largest economies, also sees high trade volumes with Bangladesh, facilitated by its significant economic size and relatively closer distance compared to the USA. The United Kingdom, with its substantial GDP and historical trade ties with Bangladesh through commonwealth relationships, is another important export destination despite a moderate distance. India, being geographically close to Bangladesh by sharing a border, benefits from reduced transportation costs, and its large and expanding economy further enhances its importance as a trade partner. Spain, France, Italy, Japan, Canada, and Australia, all large economies with substantial GDPs, participate in trade with Bangladesh through various collective market policies, further facilitating trade relations.

<u>Regression HDFE</u>		<u>PPML HDFE</u>	
	Trade flows		Trade flows
<u>Ln(Distance)</u>	-0.799*** (0.0677)	<u>Ln(Distance)</u>	-0.673*** (-6.49)
Border	-1.766*** (0.175)	Border	-2.190*** (-12.03)
Official Common Language	-0.326*** (0.0770)	Official Common Language	0.178* (2.07)
common colony	0.809*** (0.101)	common colony	0.378*** (5.31)
<u>ExporterECI*ImporterG DPpc</u>	0.00144 (0.00278)	<u>ExporterECI*ImporterG DPpc</u>	0.00555** (3.22)
Constant	18.98*** (0.608)	Constant	21.72*** (23.46)
Observations	3667	Observations	3667
Adjusted R ²	0.814		
Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		<i>t</i> statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	

Table 1: Gravity Model Estimates

Table 1 presents a comprehensive comparison of two different econometric models analyzing trade flows of the gravity model. Key findings include the significant negative impact of distance and borders on trade, the positive impact of a shared colonial history, and varying effects of common language depending on the model. All figures are statistically significant. The interaction between economic complexity and GDP per

capita is significant in the PPML model, suggesting a delicately positive relationship between economic factors and trade among countries.

The positive and significant interaction term in the PPML model indicates that the trade flows are higher when a country with a sophisticated, diverse export base trades with a wealthier country. This makes intuitive sense because countries producing complex products are likely to find better markets in wealthier countries where there is higher demand and capacity to purchase such products. On the other hand, wealthier countries have higher purchasing power, making them more likely to import a variety of sophisticated goods.

The difference in significance of the interaction term between the two models could be due to the nature of PPML, which handles zero trade flows and heteroskedasticity better than a log-linear OLS model. This might suggest that the combined effect of ECI and GDP per capita is more accurately captured in a PPML framework.

In the context of Bangladesh, these results somewhat explain the recent trade scenario of the country explained earlier. Bangladesh does not share a border with its major exporting countries except India which means that the negative effect of border on trade flows is justified. The mixed coefficients for a common language suggest that while it can facilitate trade, it is not the sole determinant as Bangladesh exports significantly to non-English-speaking countries (Germany, France, Spain), indicating that language might not be a major barrier in these cases. The positive coefficients for a common colonial history are relevant to Bangladesh's trade with the UK. The historical ties likely facilitate trade, contributing to the UK being one of the top export destinations. The negative coefficient for distance implies that Bangladesh's exports are likely to be higher with geographically closer countries. However, despite this, the USA (far from Bangladesh) is the top export destination. This indicates that factors other than distance, such as economic size and trade agreements, play a significant role in driving exports to the USA. The significant positive interaction term in the PPML model suggests that Bangladesh's exports are higher to wealthier countries that value complex products. This is evident in the significant exports to economically advanced countries like the USA, Germany, and the UK.

6.3 Analysis between Economic Complexity, Exports and GDP Growth

Gaining an idea about the possible factors contributing to Bangladesh's market from the gravity model analysis, we now specifically emphasize the effects of economic complexity on exports and consequently in driving economic growth.

<u>Regression</u>		<u>PPML</u>	
	<u>GDP</u>		<u>GDP</u>
Exports	0.165 (0.111)	Exports	0.0244 (0.0169)
ECI	0.658 (1.532)	ECI	0.104 (0.255)
ECI*Exports*	0.106 (0.0746)	ECI*Exports*	0.0156 (0.0114)
Constant	6.597** (1.999)	Constant	1.883*** (0.334)
Observations	23	Observations	23
Adjusted R ²	0.219	Adjusted R ²	
Standard errors in parentheses		Standard errors in parentheses	
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	

Table 2: OLS regression estimates

Table 2 presents a comparison of two different econometric models analyzing GDP for Bangladesh. Both models show a positive but statistically insignificant relationship between exports and GDP, economic complexity and GDP, and the combined effect of exports and economic complexity on GDP growth. This suggests that while exports are important, their direct impact on GDP growth in this sample is not strong enough. One of the plausible explanations for this insignificance could be the low number of observations used for the analysis. On the other hand, the results indicate that higher economic complexity is associated with higher GDP and the interaction term supports the idea that countries with more complex economies benefit more from exports.

Hence, although, textiles and garments are the major components of Bangladesh's exports, the export basket along with other minor products is not complex enough to have a significant impact on the GDP growth of Bangladesh alone. This suggests that there could be other socioeconomic factors that have a prominent impact on the progress of the economy, such as remittances. A study by Saha (2021), found that foreign remittance has a long-run, massive impact on the GDP growth of Bangladesh through domestic investment.

7. Implications

Bangladesh's journey from an agriculture-based economy to a major manufacturing goods producer is commendable. Over the years, it has managed to pull itself up from many economic downturns with its resilient approach towards the efficiency of textile production and exports. However, some policy implications should be considered to ensure that the progress of Bangladesh's economy persists for generations and the economy does not stumble hard in the face of unfavorable economic circumstances.

From the ECI analysis, the overwhelming growth in the textile sector underscores Bangladesh's heavy economic reliance on textiles and garments, which may pose risks if global textile demand fluctuates. Diversification into other sectors appears limited, the stagnant or minimal growth in other sectors suggests potential areas for policy focus and economic development. Investing in and promoting other sectors could help diversify the economy and reduce dependence on textiles.

From the Gravity Model analysis, the heavy reliance on a few major markets like the USA and Germany suggests a potential vulnerability to economic fluctuations or policy changes in these countries. Expanding into other new markets and sectors could mitigate risks associated with over-reliance on a few large markets. Enhancing trade relationships with existing major markets while exploring new markets can help sustain and grow Bangladesh's export sector. Strengthening regional trade within South Asia and expanding into emerging markets could provide additional growth opportunities as well as decrease distance and transportation costs.

From OLS regression analysis, future research could focus on exploring additional variables and using larger datasets to further elucidate these relationships between ECI, exports, and GDP growth. Robustness checks and alternative model specifications can help confirm these findings and provide deeper insights into the factors driving GDP growth in the context of international trade.

8. Conclusion

Globalization, by trade openness and liberalization, has brought about immense progress to many developing nations around the world. Bangladesh, being one of the recipients of this benefit has emerged as one of the fastest-growing economies. Its path-breaking journey in contributing to the world market through textile and ready-made garments exports is an example for many. However, Bangladesh falls short in the productive capability and specialization required to be a complex economy in the run with other

countries. Although the gravity model analysis somewhat explained the international trade scenario of Bangladesh, the economic complexity, exports, and GDP analysis could not find a significant effect in driving economic growth. It is safe to say, that trade liberalization has immensely boosted the exports of Bangladesh but had little impact on the export production specialization. The economy has to thrive in diversifying its export basket and expanding its market to avoid sudden economic downturns in exporting nations. Further investigation of possible factors such as foreign direct investment and remittances are required to obtain a clear picture of GDP progression in Bangladesh.

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Appendix

Year	GDP Growth Rate	Imports	Exports	Exchange Rate	FDI (% of GDP)	Inflation	Trade (% of Growth)
1980	0.81	33.43	0.95	15.45	0.04		23.37
1981	7.23	-52.51	-31.76	17.98	0.02		19.24
1982	2.13	9.40	-4.45	22.11	0.03		20.60
1983	3.88	-4.14	9.23	24.61	0.00		20.31
1984	4.80	-6.46	-0.94	25.35	-0.00		16.81
1985	3.34	7.24	7.89	27.99	-0.02		18.22
1986	4.17	-4.15	-1.14	30.40	0.01		17.01
1987	3.77	5.70	1.90	30.94	0.01	9.87	16.68
1988	2.41	7.49	10.67	31.73	0.00	7.41	17.67
1989	2.83	15.04	8.90	32.27	0.00	6.04	18.32
1990	5.62	9.31	17.78	34.56	0.01	6.12	18.96
1991	3.48	-15.01	-3.09	36.59	0.00	6.35	18.88
1992	5.44	-8.79	21.84	38.95	0.01	3.63	19.93
1993	4.71	37.41	16.39	39.56	0.04	3.01	23.12
1994	3.89	-6.11	3.67	40.21	0.03	5.31	22.86
1995	5.12	48.39	30.72	40.27	0.00	10.29	28.20
1996	4.52	14.10	8.07	41.79	0.02	2.37	26.07
1997	4.48	3.04	14.31	43.89	0.28	5.30	26.32
1998	5.17	4.47	12.26	46.90	0.38	8.40	27.88
1999	4.67	2.30	2.25	49.08	0.35	6.10	28.38
2000	5.29	10.23	14.39	52.14	0.52	2.20	29.32
2001	5.07	12.84	14.90	55.80	0.14	2.00	32.09
2002	3.83	-4.84	-0.16	57.88	0.09	3.33	28.96
2003	4.73	8.54	-1.69	58.15	0.44	5.66	27.65
2004	5.23	84.74	85.61	59.51	0.68	7.58	26.85
2005	6.53	38.06	43.00	64.32	1.17	7.04	34.39
2006	6.67	18.19	25.47	68.93	0.63	6.76	38.11
2007	7.05	15.98	12.97	68.87	0.81	9.10	39.94
2008	6.01	-1.90	7.08	68.59	1.44	8.90	42.62
2009	5.04	-2.59	0.02	69.03	0.87	5.42	40.09
2010	5.57	0.68	0.94	69.64	1.06	8.12	37.80
2011	6.46	29.15	29.33	74.15	0.98	11.39	47.42
2012	6.52	10.51	12.53	81.86	1.18	6.21	48.11
2013	6.01	1.21	2.45	78.10	1.73	7.53	46.29
2014	6.06	1.16	3.20	77.64	1.46	6.99	44.51
2015	6.55	3.20	-2.82	77.94	1.45	6.19	42.08
2016	7.11	-7.09	2.19	78.46	0.87	5.51	31.33
2017	6.59	5.16	-1.84	80.43	0.61	5.70	29.99
2018	7.31	23.93	6.10	83.46	0.75	5.54	32.51
2019	7.88	0.50	11.45	84.45	0.54	5.59	31.57
2020	3.44	-11.40	-17.50	84.87	0.40	5.69	26.27
2021	6.93	15.26	9.19	85.08	0.41	5.54	27.72
2022	7.09	31.18	29.39	91.74	0.35	7.69	33.77

This table has been used to graph data for Section.3.

Data source: World Development Indicators, World Bank