

Assessing the impact of COVID-19 on product-level comparative advantage in Bangladesh's apparel exports

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257

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Abstract

Purpose – This study aims to examine how Bangladesh's apparel export competitiveness changed during the COVID-19 period across Harmonized System (HS) Chapters 61 and 62.

Design/methodology/approach – The study uses a quantitative, indicator-based design with United Nations (UN) Comtrade product-level trade data for 2017–2022. Competitiveness is assessed at the two- and four-digit product category levels within HS Chapters 61 and 62 using compound annual growth rate (CAGR), market share (MS), revealed comparative advantage (RCA), scaled normalized revealed comparative advantage (NRCA), revealed symmetric comparative advantage (RSCA) and trade balance index (TBI). Annual indicators provide the primary basis for interpretation, while monthly NRCA is used only as supplementary descriptive evidence of timing.

Findings – The results indicate that Bangladesh's apparel export performance did not follow a uniform pattern during the COVID-19 period. HS 61 and HS 62 retained a comparative advantage at the aggregate level, although a temporary weakening appeared in 2020. At the HS four-digit level, some categories showed declines in nominal export growth, market share and comparative-advantage indicators, while others remained comparatively stable or recovered after 2020. Stronger indicator performance was concentrated in core export categories, while several smaller and accessory-related categories showed weaker comparative and net-export positions.

Research limitations/implications – The study is based on descriptive, macro-level trade indicators and does not identify firm-level, supply-chain or causal mechanisms. Future research may use deflated values, quantity-based measures, seasonally adjusted monthly analysis and cross-country comparisons.

Originality/value – The study contributes to research on COVID-19 apparel trade by providing a disaggregated, product-level analysis of Bangladesh's export competitiveness. It applies established trade indicators within a crisis-sensitive global value chain perspective to examine differentiated product-level trade performance patterns.

Keywords COVID-19, Bangladesh, Export competitiveness, Comparative advantage, Apparel industry, Supply chain

Paper type Research article

1. Introduction

The apparel industry is one of the most important export sectors in the global economy, especially for developing countries that rely on labor-intensive manufacturing for export earnings, jobs, and industrial growth (Kim, 2019). Within this global trade structure,

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Bangladesh has become one of the world's leading apparel exporters and remains the second-largest after China (Dhaka Tribune, 2023). The sector is central to Bangladesh's economy because it supports export earnings, foreign exchange inflows, industrial activity, and large-scale employment (Shukla, 2023). In 2022, the apparel sector accounted for about 82% of the country's total exports, contributed about 9.3% to GDP, and employed more than four million workers directly (Hasan and Das, 2025; Shukla, 2023). However, this export success is also highly exposed to external shocks because the industry depends heavily on a small number of foreign markets and operates under strong buyer pressure within a concentrated export structure (Ishty, 2020). From a global value chain perspective, this dependence is important because apparel competitiveness is shaped not only by production capacity but also by buyer-driven sourcing relationships, product specialization, and demand shifts within international production networks (Gereffi *et al.*, 2021; Haukkala *et al.*, 2023). Therefore, understanding how major shocks affect Bangladesh's apparel export competitiveness is both economically and analytically important.

This need has become more urgent because Bangladesh's apparel sector has recently faced two major shocks: the post-Rana Plaza crisis and the COVID-19 pandemic. The Rana Plaza collapse heightened global scrutiny of workplace safety, compliance practices, and sourcing conditions in Bangladesh, while also undermining buyers' confidence in the sector (Barua and Ansary, 2017). Over time, however, the industry regained momentum through reforms, stronger compliance efforts, and renewed engagement with global buyers (Swazan and Das, 2021). COVID-19 then created a distinct shock by disrupting orders, production, logistics, and demand across the export-oriented apparel system (Ali *et al.*, 2021). Its effect was severe, as Bangladesh's apparel export earnings fell from US\$33.07 billion in 2019 to US\$27.47 billion in 2020 (Boudreau and Naeem, 2021). From a crisis-competitiveness perspective, such shocks may not affect all products equally because export categories differ in demand conditions, sourcing priority, production continuity, and their positions within buyer-driven value chains (Drożdż *et al.*, 2023; Startienė and Remeikienė, 2014). These developments raise an important question: whether the pandemic affected all apparel product categories equally or whether some categories were more vulnerable than others.

Existing studies on Bangladesh's apparel sector during COVID-19 have focused mainly on supply chain disruption, labor insecurity, buyer behavior, order cancellations, and aggregate export decline (Chakraborty and Biswas, 2020; Islam *et al.*, 2020; Kabir *et al.*, 2021). Together, these studies provide valuable evidence on how the COVID-19 crisis affected Bangladesh's apparel sector. However, they do not fully explain how export competitiveness shifted across detailed product categories at a finer level of analysis. A related body of literature has used revealed comparative advantage (RCA), normalized revealed comparative advantage (NRCA), revealed symmetric comparative advantage (RSCA), and other trade indicators to assess export competitiveness in textiles and apparel across different countries and product contexts (Das *et al.*, 2024a, b; Hasan *et al.*, 2024; Saki *et al.*, 2019). These studies show that comparative-advantage measures are useful for identifying specialization, relative strength, and shifts in competitive position across product categories. However, the crisis-sensitive application of these indicators to Bangladesh's apparel export performance during the COVID-19 period remains limited.

This gap matters because most existing Bangladesh-focused studies have emphasized supply chain disruption, labor outcomes, or aggregate export patterns rather than changes in comparative advantage across categories within the Harmonized System (HS) Chapters 61 and 62. The present study builds on that literature by moving beyond broad evidence on disruption and export decline to identify category-level losses, stability, and gains in export competitiveness across apparel product groups. Bangladesh is an especially important case for this purpose because apparel dominates the country's export structure and carries high economic and policy importance for national development (Hasan and Das, 2025). A Bangladesh-only focus is also appropriate, as this study aims to identify variation within the country's export basket rather than to compare countries at this stage. This approach enables

closer identification of category-specific variation in export competitiveness and trade performance patterns and can support later cross-country benchmarking with exporters such as Vietnam and Cambodia. Conceptually, the study draws on global value chain and crisis-competitiveness perspectives to examine whether the COVID-19 period was associated with uneven shifts in product-level comparative advantage within a buyer-driven export sector. Accordingly, this study examines changes in Bangladesh's apparel export competitiveness during the COVID-19 period across detailed product categories. It addresses two research questions:

- (1) Which Bangladeshi apparel product categories experienced declines, stability, or gains in export competitiveness during the COVID-19 period?
- (2) How did comparative advantage, market share, and nominal export growth shift across product categories within HS Chapters 61 and 62 during this period?

To answer these questions, the study first uses compound annual growth rate (CAGR), market share (MS), revealed comparative advantage (RCA), and normalized revealed comparative advantage (NRCA) at the two- and four-digit HS levels, through yearly and monthly analysis. It then applies the revealed symmetric comparative advantage (RSCA) and trade balance index (TBI) as complementary measures to cross-check and strengthen the interpretation of the results. In doing so, it provides a disaggregated view of apparel export-competitiveness patterns during the pandemic period. The study contributes by examining established trade-competitiveness indicators through a crisis-sensitive global value chain perspective of differentiated product-level performance. It also contributes to research on the impacts of COVID-19 in the apparel sector by providing product-level evidence on export competitiveness during the pandemic, rather than focusing solely on operational disruptions, labor outcomes, or aggregate export declines. Finally, it provides evidence that may inform industrial strategy, export diversification, and preparedness for future crises in Bangladesh's apparel sector.

2. Literature review

Bangladesh's apparel industry has long been studied as a major export sector whose strength depends on both internal capability and external market conditions. Earlier work showed that the sector expanded through low labor cost, quota-related advantages under the Multi-Fiber Arrangement (MFA), supportive policy conditions, and post-MFA growth, which helped Bangladesh become one of the world's leading apparel exporters ([Ansary and Barua, 2015](#)). However, this success remained vulnerable. The industry depended heavily on buyer confidence in European and North American markets and was exposed to political instability, energy shortages, distribution problems, and discriminatory treatment of buyers ([Ansary and Barua, 2015](#)). Post-Rana Plaza research further showed that export competitiveness became closely tied to safety compliance, institutional credibility, and rising remediation costs ([Barua and Ansary, 2017](#)). Other work has explained Bangladesh's competitiveness mainly through firm- and industry-level resources such as labor, infrastructure, policy support, and buyer relationships, rather than through product-level trade performance ([Swazan and Das, 2021](#)). Together, these studies show that Bangladesh's apparel competitiveness is not simply a matter of low-cost production but also depends on its position within buyer-driven global value chains.

A large share of the Bangladesh COVID-19 literature examined how the pandemic disrupted the apparel sector through supply chain breakdown, buyer behavior, production instability, and labor insecurity. Prior studies documented order cancellations, payment delays, sourcing disruptions, factory shutdowns, wage insecurity, and worker vulnerability during the crisis ([Ali et al., 2021](#); [Boudreau and Naeem, 2021](#); [Chakraborty and Biswas, 2020](#); [Islam et al., 2023](#); [Kabir et al., 2021](#); [Reza and Du Plessis, 2022](#)). At the trade level, studies showed

that knitwear and woven apparel shifted from positive pre-pandemic growth to sharp contractions after COVID-19 began (Islam *et al.*, 2020). Later reports also noted that recovery remained fragile because of inflation, recession fears, high freight costs, and rising input prices, despite Bangladesh's regained market share in 2022 (Dhaka Tribune, 2023; Shukla, 2023; Uddin, 2022). This literature explains why the crisis was severe, but it largely treats Bangladesh's apparel sector as an aggregate export system. It does not fully show whether decline, stability, or recovery was concentrated in specific HS categories.

Another major stream focused on apparel and textiles export competitiveness through trade-based indicators. This literature argues that when direct assessment of industry strength is difficult, trade patterns can reveal relative competitive position across countries, products, and time (Chi *et al.*, 2005). RCA has become a widely used starting point because it compares a product's export share with the corresponding world share, helping identify comparative advantage or disadvantage (Suwannarat, 2017). However, competitiveness is rarely uniform across a sector, with some product groups remaining strong while others weaken over time (Kim, 2019). Studies on India, Vietnam, Bangladesh, China, and wider apparel-exporting countries similarly show that product-level performance may diverge within the same industry or national export basket (Arun Kumar and Dhar, 2024; Das *et al.*, 2024a, b; Hasan *et al.*, 2024; Hasan and Das, 2025; Kathuria, 2018; Saki *et al.*, 2019). These studies provide the methodological foundation for product-level analysis, but they give less attention to how a crisis may reshape competitiveness within a single export-dependent apparel economy.

A related strand of the literature explains why multiple indicators are often needed rather than a single measure. While RCA remains widely used, it has important limitations: it is static, asymmetric, and unable to reveal deeper causes of competitiveness (Suwannarat, 2017). Later studies, therefore, used NRCA because it is symmetric around zero and more stable across countries and products (Saki *et al.*, 2019). Other research used RSCA to improve interpretation when export strength changes over time (Das *et al.*, 2024a; Startienė and Remeikienė, 2014). Studies have also shown that market share and CAGR provide useful information because they capture export presence and growth patterns that comparative-advantage measures alone cannot fully capture (Hasan and Das, 2025). Recent work argued that export growth, market share, comparative advantage, and export-import position each capture different aspects of trade performance and should be used together (Das *et al.*, 2024b). Product mapping using RSCA and TBI likewise showed that multi-indicator analysis helps identify relative strength, specialization, and net-exporting position across categories (Purwono *et al.*, 2022). Therefore, a multi-indicator approach is useful here because pandemic-period competitiveness may appear differently depending on whether the focus is growth, market presence, comparative advantage, or net export position.

This analytical need becomes stronger under crisis conditions. Research has shown that comparative advantage is not fixed and may shift as demand, logistics, costs, buyer strategy, and production continuity change (Drożdż *et al.*, 2023). Studies of post-crisis sectors found that many product groups may not regain pre-crisis strength even when the broader sector survives (Startienė and Remeikienė, 2014). Specifically in apparel, research on China showed uneven pandemic effects across Chapters 61 and 62 and across four-digit categories (Das *et al.*, 2024a). Broader work on fashion and supply chains also showed that shock exposure is multidimensional and linked to resilience, buyer power, and strategic adaptation, rather than to demand decline alone (Abeysekara *et al.*, 2019; D'Adamo and Lupi, 2021; Gereffi *et al.*, 2021; Haukkala *et al.*, 2023). From this perspective, differentiated product-level performance can be understood as an observed trade-performance pattern that may reflect variation in product demand, sourcing priority, buyer dependence, and production continuity. However, trade indicators can identify this variation only descriptively and cannot establish the underlying causal mechanisms.

Altogether, the literature shows that Bangladesh-focused COVID-19 studies explain sectoral disruption well through supply chain breakdowns, labor insecurity, factory instability,

buyer pressure, and aggregate export declines, while trade-competitiveness studies show that export performance is best understood through disaggregated, multi-indicator analysis. However, a clear link between these two strands of research remains missing. Research on the impacts of COVID-19 on Bangladesh's apparel exports does not capture how comparative advantage changed across detailed HS categories during the shock period, while broader competitiveness studies pay limited attention to Bangladesh under pandemic conditions at the yearly and monthly levels. The present study addresses this gap by examining product-level comparative-advantage patterns in the context of crisis-sensitive global value chain disruption. Using trade indicators, it identifies differentiated patterns of decline, stability, and recovery across Bangladesh's apparel export basket during the COVID-19 period. Because the analysis is descriptive, the underlying mechanisms behind category-level changes remain an area for future research.

3. Methodology

3.1 Research design and analytical framework

This study adopts a quantitative, descriptive, secondary-data design. It examines Bangladesh's apparel export competitiveness at the product level. The analysis is indicator-based rather than econometric or model-estimation-based. Therefore, the findings are interpreted as descriptive evidence of trade-performance patterns rather than causal estimates of COVID-19 effects. This design is appropriate because the research questions focus on identifying category-level changes in export competitiveness before, during, and after the COVID-19 shock. The analytical framework is grounded in the comparative-advantage and trade-competitiveness literature, which commonly evaluates export performance through trade-based indicators across products and over time (Balassa, 1965; Buckley *et al.*, 1988; Kim, 2019).

The study uses a within-country product-level design focused on Bangladesh's apparel export basket under HS Chapters 61 and 62. Its purpose is to identify variation across Bangladesh's product categories over time rather than to conduct cross-country benchmarking. Export competitiveness is evaluated using multiple complementary indicators, as no single measure captures the full picture of trade performance (Das *et al.*, 2024b; Purwono *et al.*, 2022). Together, these indicators reflect export growth, global export presence, comparative advantage, symmetric comparative position, and net trade position. Using several measures, therefore, improves the robustness and interpretability of category-level findings and aligns directly with the study's objective of identifying losses, stability, and gains across HS categories.

3.2 Data source, scope, and extraction procedure

The study uses product-level trade data from the United Nations Commodity Trade Statistics Database (UN Comtrade). The analysis follows the Harmonized System (HS) 2022 product classification. The HS system is well-suited to international trade analysis because it provides a standardized framework for identifying and comparing products across countries and over time (Hasan *et al.*, 2024). This study focuses on HS Chapters 61 and 62, which cover knitted or crocheted apparel and non-knitted apparel, respectively.

For data extraction, Bangladesh was selected as the partner economy because consistent reporter-based data were not available for all required observations. Therefore, the "all reporters" option was used to capture trade flows reported by all countries. Import flow was used to identify how much each country imported from Bangladesh in each product category, and these values were aggregated to represent Bangladesh's total exports to the world for competitiveness analysis. This importer-reported mirror-data approach improves product-level coverage, but it may introduce differences in reporting across countries due to valuation, timing, partner reporting practices, and re-export treatment. Trade values were taken in current U.S. dollars as reported in UN Comtrade. Therefore, growth-based indicators such as CAGR

are interpreted as nominal export value performance rather than real volume growth. Both yearly and monthly data were extracted for the period 2017–2022. For the TBI, the corresponding import values for Bangladesh were also extracted to calculate the net trade position.

The downloaded data were organized and processed in Microsoft Excel. Product codes were carefully checked to ensure consistency across yearly and monthly files, and the same HS classification, reporter/partner logic, trade-flow definition, and world denominator construction were applied throughout the study period. Zero or missing values were retained as reported in the database, where relevant, and no artificial imputation was applied. The prepared datasets were then cross-checked to ensure reasonable consistency between annual and monthly patterns where applicable. These steps were taken to improve transparency and replicability.

3.3 Product coverage and study period

The study does not use a sample. Instead, it uses a census of all 34 four-digit apparel product categories under HS Chapters 61 and 62. Chapter 61 contains 17 knitted or crocheted apparel categories, while Chapter 62 contains 17 non-knitted apparel categories. Full category coverage allows complete within-sector comparison and avoids selection bias that could arise from using only a subset of products.

The study period covers 2017–2022. The years 2017–2019 provide the pre-pandemic baseline. The years 2020–2021 capture the main period of disruption associated with COVID-19. The year 2022 captures early recovery and post-shock repositioning. This six-year window, therefore, allows a before-during-after comparison of changes in competitiveness and is well-suited to examining changes in Bangladesh's apparel export performance during the COVID-19 period.

3.4 Analytical indicators

3.4.1 Compound annual growth rate (CAGR). Compound annual growth rate (CAGR) measures the annualized, compounded rate of change in export value over a specified period, assuming constant growth over that period (Kavanagh, 2021). In this study, it is used to assess nominal export growth performance from 2017 to 2022:

$$CAGR = (V_{\text{final}} / V_{\text{begin}})^{(1/t)} - 1 \quad (1)$$

Where V_{final} is the export value at the end of the period, V_{begin} is the export value at the beginning of the period, and t is the number of years. A higher positive CAGR indicates stronger nominal export-value growth, while a negative CAGR indicates contraction over the study period.

3.4.2 Market share (MS). Market share (MS) is defined as the ratio of a country's exports of a product to total world exports of that product, capturing the country's relative export presence in the global market (Buckley *et al.*, 1988; Hasan and Das, 2025):

$$MS_{ij} = X_{ij} / X_{wj} \quad (2)$$

Where MS_{ij} is the market share of country i in product j , X_{ij} is the exports of product j by country i , and X_{wj} is the world exports of product j . A higher MS_{ij} value indicates a stronger global export position for that category.

3.4.3 Revealed comparative advantage (RCA). Revealed comparative advantage (RCA) measures a country's relative specialization in a product by comparing the share of that product in the country's total exports with its share in world exports (Balassa, 1965). This measure reflects whether a country exports a product more intensively than the global average:

$$RCA_{ij} = (X_{ij} / X_i) / (X_{wj} / X_w) \quad (3)$$

Where X_{ij} is the exports of product j by country i , X_i is the total exports of country i , X_{wj} is the world exports of product j , and X_w is the total world exports. An RCA_{ij} value greater than 1 indicates a revealed comparative advantage, while a value below 1 indicates a revealed comparative disadvantage.

3.4.4 Normalized revealed comparative advantage (NRCA). Normalized revealed comparative advantage (NRCA) is a standardized measure of comparative advantage that compares a country's actual export share of a product with its expected share under neutral trade conditions, allowing consistent comparison across products and over time (Yu *et al.*, 2009):

$$NRCA_{ij} = X_{ij} / X_w - (X_j * X_i) / (X_w * X_w) \quad (4)$$

Where X_{ij} is the exports of product j by country i , X_i is the total exports of country i , X_j is the world exports of product j , and X_w is the total world exports. A positive $NRCA_{ij}$ value indicates above-average comparative advantage, while a negative value indicates below-average comparative position. Because raw NRCA values are very small, this study reports NRCA values after multiplying them by 10^6 for ease of presentation, following prior applications of scaled NRCA in apparel trade analysis (Saki *et al.*, 2019). This scaling does not change the sign, ranking, or direction of the NRCA results; therefore, the interpretation focuses on the sign and relative movement of NRCA values rather than their unscaled absolute magnitude.

3.4.5 Revealed symmetric comparative advantage (RSCA). Revealed symmetric comparative advantage (RSCA) is a symmetric transformation of RCA that is used to reduce the asymmetry problem in the original RCA measure and improve the interpretation of comparative position (Dalum *et al.*, 1998; Startienė and Remeikienė, 2014):

$$RSCA_{ij} = (RCA_{ij} - 1) / (RCA_{ij} + 1) \quad (5)$$

RSCA values range from -1 to $+1$. Positive values indicate comparative advantage, while negative values indicate comparative disadvantage. In this study, RSCA is used as a complementary robustness measure to verify the direction of the RCA-based findings.

3.4.6 Trade balance index (TBI). The trade balance index (TBI) measures whether a country is a net exporter or net importer of a product and therefore indicates its trade position in that category (Lafay, 1992; Purwono *et al.*, 2022):

$$TBI_{ij} = (X_{ij} - M_{ij}) / (X_{ij} + M_{ij}) \quad (6)$$

Where X_{ij} is the exports of product j by country i , and M_{ij} is the imports of product j by country i . A positive TBI value indicates a net-exporting position, while a negative value indicates a net-importing position. TBI complements comparative-advantage measures by directly capturing trade position.

3.5 Analytical procedure

Yearly trade data were used to calculate CAGR, market share, RCA, NRCA, RSCA, and TBI across all HS categories. These yearly indicators were then used to compare category performance across the pre-pandemic, pandemic, and recovery periods. Both chapter-level and four-digit-level comparisons were conducted to identify broader patterns and more detailed category-specific changes.

Monthly trade data from UN Comtrade were used for a more fine-grained NRCA analysis. Because apparel exports are seasonal, the monthly analysis was not used as an independent basis for estimating changes in competitiveness. Instead, it was used only as a supplementary descriptive check to observe whether short-term movements in reported trade values were

broadly consistent with the annual patterns. No seasonal adjustment was applied because the study does not model monthly export cycles, estimate causal effects, or compare seasonally adjusted monthly competitiveness. The main interpretation is based on annual indicators, which are less affected by within-year seasonal fluctuation. Monthly NRCA results are therefore interpreted cautiously as timing-related descriptive evidence, not as seasonally adjusted evidence of changes in competitiveness.

3.6 Robustness and interpretation approach

RSCA and TBI were included as complementary measures to cross-check and strengthen the interpretation from CAGR, market share, RCA, and NRCA. RSCA helps verify comparative-advantage patterns using a symmetric form of RCA. TBI helps verify whether product categories also maintain a net-exporting position. When findings align across these measures, the interpretation of category-level competitiveness patterns becomes more consistent. However, because the study uses descriptive trade indicators rather than econometric estimation or counterfactual analysis, the results are interpreted as evidence of associations and category-level trade performance patterns rather than causal mechanisms.

4. Results and discussion

4.1 Overall patterns at the HS 2-digit level

The results show that Bangladesh maintained strong comparative-advantage indicators in both HS 61 and HS 62 throughout 2017–2022; however, trade performance during the COVID-19 period varied across product groups. At the HS 2-digit level, HS 61 (knitted or crocheted apparel) recorded stronger nominal export value growth than HS 62 (non-knitted apparel), with CAGRs of 11.53 and 7.88%, respectively (see [Figures 1 and 2](#)). Market share also remained broadly strong in both groups, and by 2022 it had increased sharply compared with 2021. This increase is interpreted with caution as a nominal market-share movement based on current U.S. dollar trade values and is considered alongside RCA, NRCA, RSCA, and TBI rather than as a standalone indicator of competitiveness. RCA and NRCA results suggest that both HS 61 and HS 62 retained a comparative advantage over the six-year period, although NRCA fell noticeably in 2020 before improving again. This pattern suggests that the COVID-19 period coincided with a temporary weakening of Bangladesh's apparel competitiveness; however, it did not result in a uniform sector-wide loss. Instead, the broad HS 2-digit results indicate temporary erosion followed by recovery, which already points to uneven performance within the export basket.

This broad pattern is important because it refines the more aggregate crisis narrative in earlier Bangladesh-apparel-industry-focused studies. [Islam *et al.* \(2020\)](#) reported a sharp collapse in the growth of knitwear, woven apparel, and total apparel exports in 2020, while [Boudreau and Naeem \(2021\)](#) documented a strong decline in factory-level revenue. Those studies accurately captured the severity of the shock; however, the present results show that Bangladesh's export position did not weaken evenly across all apparel categories. At the HS 2-digit level, both knitted and non-knitted apparel retained a comparative advantage despite the downturn. This suggests that the sector experienced a substantial crisis, but its trade effects were more differentiated than a broad export decline alone would imply. That distinction becomes much clearer when the analysis moves to HS 4-digit categories (see [Appendix Tables A1 and A2](#) for detailed product descriptions).

4.2 HS 61 (knitted apparel) findings: uneven decline within a stronger export base

Within HS 61, most four-digit product lines recorded positive nominal growth over the full study period, suggesting that Bangladesh's knitted apparel base remained comparatively strong in terms of trade performance even during the pandemic. The strongest CAGR values appeared in HS6114 (other garments), HS6103 (men's or boys' suits and trousers), HS6112

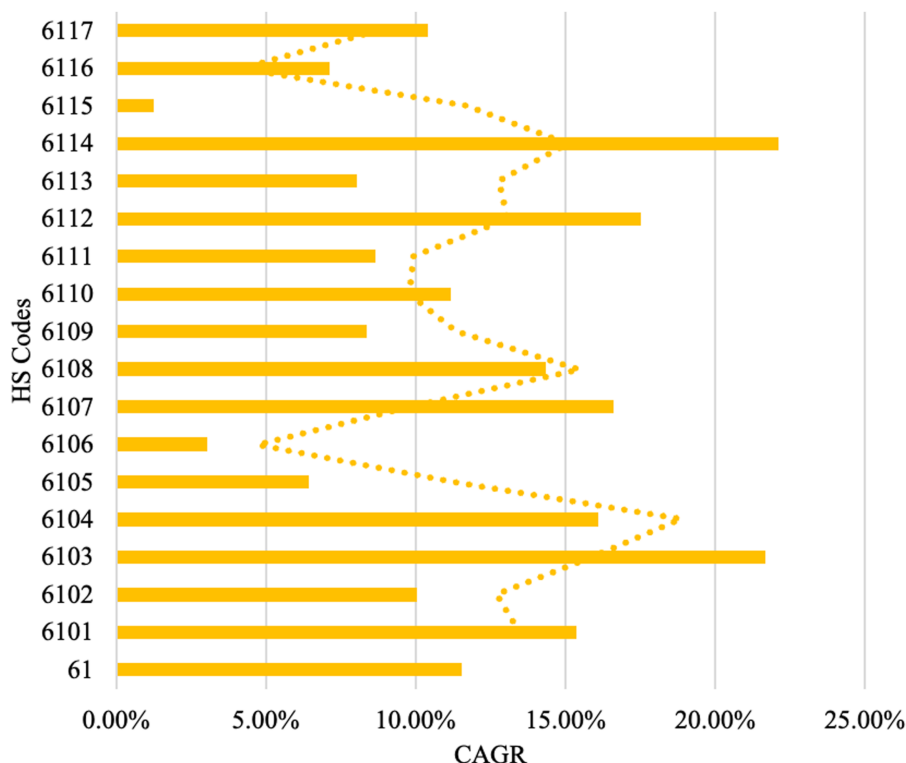


Figure 1. CAGR insights at the HS two and four-digit levels in chapter 61 (knitted apparel and clothing accessories). **Source:** Developed by authors

(track suits, ski suits, and swimwear), HS6107 (men's or boys' undergarments), and HS6104 (women's or girls' suits and dresses). By contrast, weaker growth was found in HS6115 (hosiery), HS6106 (women's blouses and shirts), HS6105 (men's shirts), HS6116 (gloves), and HS6109 (T-shirts and vests) (see [Figure 1](#)). Market-share results also show that several important knitted categories lost ground in 2020 before recovering later. For example, HS6105, HS6109, and HS6110 (sweaters, pullovers, and sweatshirts) all experienced a visible decline in market share during 2020, the first major pandemic-disruption year. In contrast, HS6114 increased its market share during the same period, suggesting that some knitted lines performed better than others (see [Table 1](#)).

RCA and NRCA results reinforce this uneven pattern. HS6115 emerged as the clearest case of pandemic-related erosion within HS 61, while HS6101, HS6102, HS6105, HS6106, HS6107, HS6108, HS6109, HS6110, and HS6113 also showed temporary weakening in comparative advantage during the COVID-19 period (see [Tables 2](#) and [3](#)). Monthly NRCA patterns suggest that several downturns coincided with 2020 and early 2021, although these movements should be interpreted with caution because seasonal adjustment was not applied. In contrast, HS6103, HS6104, HS6111, HS6112, HS6114, and HS6116 showed more stable competitiveness indicators, while HS6117 stayed weak but relatively stable. This result adds an important layer to earlier studies. [Boudreau and Naeem \(2021\)](#), [Kabir et al. \(2021\)](#), and [Islam et al. \(2023\)](#) explained how factory revenue, labor security, and buyer behavior deteriorated during COVID-19, but they did not show which groups of knitted products actually lost or retained export competitiveness. The present results show that Bangladesh's

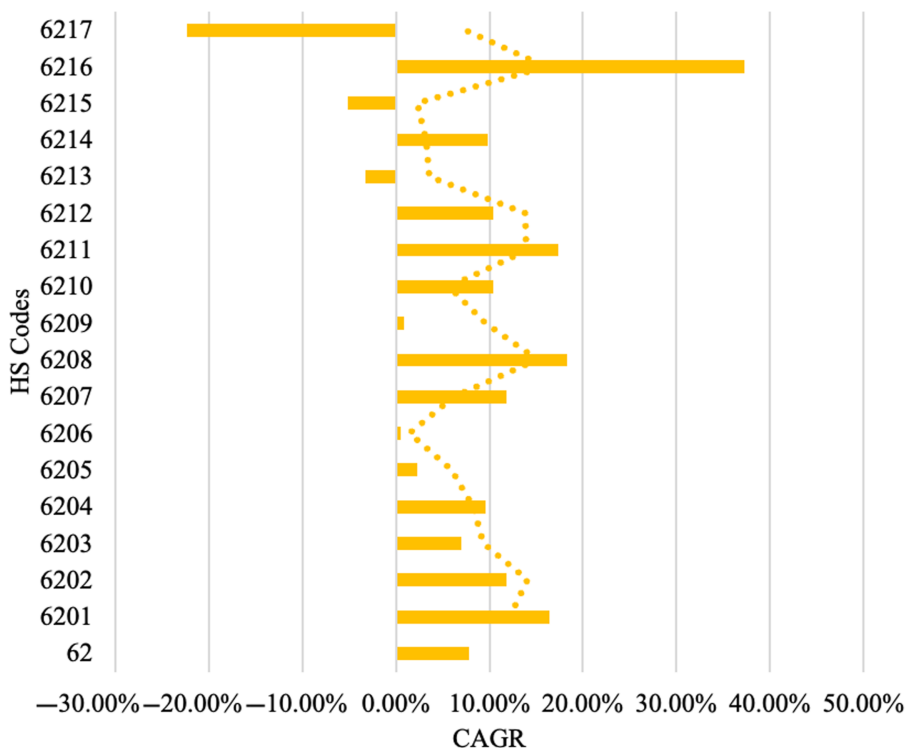


Figure 2. CAGR insights at the HS two and four-digit levels in chapter 62 (non-knitted apparel and clothing accessories). **Source:** Developed by authors

knitted apparel exports did not move together. Core product lines showed more stable competitiveness indicators, while a smaller group experienced greater weakening in comparative-advantage measures.

4.3 Interpreting differences across HS 61 categories

The HS 61 findings suggest that more stable trade-performance patterns may be associated with product position within Bangladesh's established export structure. Categories such as T-shirts, pullovers, men's and women's suits, and baby garments recorded relatively stronger competitiveness indicators in NRCA and market-share terms, even when they experienced temporary dips. One possible interpretation is that these categories reflect Bangladesh's established specialization in high-volume apparel lines and its stronger position in core export products. However, the present trade-indicator analysis cannot directly test buyer relationships, firm-level capabilities, or supply-chain mechanisms. This interpretation aligns with the broader literature indicating that Bangladesh's competitiveness has been strongest in categories supported by scale, labor-intensive specialization, and longstanding export capabilities (Hasan and Das, 2025; Kathuria, 2018).

By contrast, weaker HS 61 lines such as hosiery, gloves, and miscellaneous knitted accessories showed less favorable competitiveness indicators. These categories had lower NRCA values, weaker or unstable TBI patterns, and lower RSCA values, collectively suggesting a weaker comparative and trade-position profile during the study period. The observed weakening is consistent with prior studies on buyer-side disruption and demand

Table 1. Market share insights at the HS two and four-digit levels in chapter 61 (knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
61	12.34%	13.14%	13.47%	12.29%	12.74%	30.62%
6101	7.78%	7.79%	8.71%	7.70%	9.87%	22.14%
6102	10.73%	11.73%	9.33%	8.58%	9.50%	22.62%
6103	5.55%	6.24%	7.20%	7.15%	8.89%	22.41%
6104	8.19%	9.14%	10.11%	10.37%	10.79%	28.48%
6105	20.29%	21.81%	21.12%	17.99%	18.65%	33.84%
6106	12.36%	11.88%	12.46%	11.47%	11.25%	21.36%
6107	12.09%	14.52%	15.25%	14.04%	15.05%	36.24%
6108	11.08%	12.14%	12.45%	11.43%	12.69%	39.50%
6109	22.72%	23.81%	24.01%	21.31%	21.77%	37.67%
6110	13.92%	14.48%	14.27%	12.47%	12.91%	29.62%
6111	18.61%	20.06%	19.47%	19.79%	20.35%	36.76%
6112	3.38%	4.15%	4.24%	4.88%	4.24%	9.46%
6113	3.03%	2.11%	2.81%	2.42%	2.54%	7.53%
6114	4.94%	5.93%	6.22%	8.33%	10.13%	17.02%
6115	0.50%	0.40%	0.35%	0.29%	0.27%	0.64%
6116	0.95%	0.98%	0.92%	0.83%	0.95%	2.77%
6117	0.72%	0.83%	1.04%	1.20%	1.88%	1.72%

Source(s): Developed by authors**Table 2.** RCA insights at the HS two and four-digit levels in chapter 61 (knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
61	41.03	42.76	41.66	41.51	42.13	67.35
6101	25.76	25.09	26.69	25.34	32.39	48.07
6102	35.75	38.10	28.58	28.58	31.40	49.35
6103	18.42	20.34	21.94	23.87	29.37	47.39
6104	27.20	29.78	30.87	35.30	35.67	60.07
6105	67.41	70.86	64.13	61.41	61.77	73.26
6106	41.22	38.78	37.96	39.59	37.24	46.43
6107	40.62	47.53	46.90	47.88	49.86	76.70
6108	36.92	39.66	38.17	38.59	42.03	82.35
6109	75.51	77.32	73.12	72.43	72.09	81.79
6110	46.31	47.14	43.71	41.79	42.52	63.32
6111	61.62	65.19	59.27	66.46	67.27	79.56
6112	11.17	13.40	12.98	16.78	14.07	19.77
6113	10.03	6.93	8.59	8.56	8.37	15.95
6114	16.49	19.27	18.93	29.31	33.56	36.20
6115	1.67	1.31	1.08	0.99	0.90	1.37
6116	3.15	3.18	2.79	2.83	3.12	5.76
6117	2.41	2.69	3.29	4.01	6.19	3.64

Source(s): Developed by authors

uncertainty during COVID-19, although this study does not directly measure those mechanisms (Chakraborty and Biswas, 2020; Reza and Du Plessis, 2022). The result also supports the broader trade literature, which argues that product-level export performance can diverge sharply within the same industry when shocks coincide with uneven changes in market demand, production continuity, and sourcing relations (Drożdż *et al.*, 2023; Kim, 2019).

Table 3. NRCA insights at the HS two and four-digit levels in chapter 61 (knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
61	1377.20	1542.02	1592.82	1270.91	1626.89	1964.47
6101	10.27	10.36	11.50	10.40	12.73	21.12
6102	18.24	20.33	17.24	15.50	17.37	29.93
6103	37.41	40.91	45.94	47.22	65.27	95.73
6104	148.20	158.32	174.59	180.37	211.03	300.42
6105	84.50	84.05	87.76	67.54	59.39	103.52
6106	29.84	25.54	27.25	22.52	20.80	31.77
6107	42.36	47.79	50.77	49.61	57.84	80.50
6108	63.92	69.37	72.03	69.71	85.51	113.67
6109	476.95	484.56	508.25	440.15	433.87	655.21
6110	365.91	384.00	409.81	350.59	370.53	564.86
6111	66.03	67.21	65.69	66.86	70.51	91.36
6112	7.84	9.82	10.67	12.20	10.88	17.28
6113	2.07	1.24	2.06	1.90	1.73	2.80
6114	20.22	21.28	23.25	28.14	39.28	50.73
6115	1.34	0.62	0.14	−0.13	−0.20	0.93
6116	1.49	1.62	1.45	1.36	1.60	2.16
6117	0.66	0.87	1.26	1.56	2.47	1.21

Note(s): NRCA values are multiplied by 10⁶

Source(s): Developed by authors

4.4 HS 62 (non-knitted apparel) findings: broader temporary erosion but strong recovery

The HS 62 results show a somewhat different pattern. Growth was more mixed than in HS 61, and three categories recorded negative CAGR over the full study period: HS6213 (handkerchiefs), HS6215 (ties and bow ties), and HS6217 (other made-up clothing accessories). Several other lines showed only weak growth, including HS6206 (women's blouses and shirts) and HS6209 (babies' garments). At the same time, some non-knitted categories performed strongly, especially HS6216 (gloves), HS6208 (women's undergarments), HS6211 (track suits, ski suits, swimwear, and other garments), and HS6201 (men's or boys' overcoats and outerwear) (see [Figure 2](#)). Market-share analysis also shows that the 2020 pandemic-period decline in HS 62 was concentrated in several specific categories. HS6210 (garments made from coated fabrics), HS6201, HS6205 (men's shirts), and HS6208 all lost market share in 2020, while HS6207 (men's undergarments) and HS6215 showed temporary gains (see [Table 4](#)).

RCA and NRCA results suggest that non-knitted apparel experienced broader temporary erosion than knitted apparel. Bangladesh did not lose overall comparative advantage in HS 62, but eleven HS 4-digit lines, such as HS6201, HS6202, HS6203, HS6204, HS6205, HS6206, HS6208, HS6209, HS6210, HS6212, and HS6217, showed temporary weakening during the COVID-19 period (see [Tables 5](#) and [6](#)). Most of these categories recovered after the initial shock, indicating that the erosion was important but not permanent. In contrast, HS6207 and HS6211 remained comparatively more stable, while HS6213, HS6214, HS6215, and HS6216 showed less consistent but still relatively stable indicator performance in the original RCA/NRCA reading. These findings again go beyond earlier aggregate accounts. [Islam et al. \(2020\)](#) and [Ali et al. \(2021\)](#) showed that woven and knit apparel both suffered during COVID-19, but the present results indicate that even within HS 62, the observed decline was uneven, with some categories recovering after 2020.

4.5 RSCA and TBI findings as robustness checks

The RSCA and TBI results generally support the main findings from CAGR, market share, RCA, and NRCA, while also adding useful nuance. At the HS 2-digit level, TBI remained

Table 4. Market share insights at the HS two and four-digit levels in chapter 62 (non-knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
62	10.19%	10.55%	11.19%	10.16%	10.10%	23.27%
6201	5.71%	6.76%	7.39%	6.80%	7.43%	18.37%
6202	4.49%	5.39%	6.15%	6.71%	5.72%	11.98%
6203	18.68%	18.99%	18.99%	18.64%	18.70%	37.56%
6204	9.15%	9.77%	10.63%	10.11%	9.46%	18.30%
6205	22.35%	23.28%	24.76%	23.70%	21.15%	43.31%
6206	8.65%	8.63%	8.62%	8.23%	7.28%	13.74%
6207	7.33%	6.57%	7.65%	8.54%	9.46%	22.54%
6208	3.45%	4.02%	3.55%	2.75%	3.67%	10.14%
6209	24.01%	24.35%	25.67%	25.10%	23.47%	36.50%
6210	5.91%	5.79%	6.44%	3.55%	5.51%	15.88%
6211	2.81%	3.02%	3.23%	3.64%	3.69%	8.80%
6212	5.94%	6.34%	7.30%	7.10%	7.05%	18.98%
6213	0.11%	0.06%	0.20%	0.31%	0.18%	0.22%
6214	0.06%	0.07%	0.11%	0.35%	0.18%	0.16%
6215	0.29%	0.21%	0.28%	0.51%	7.72%	0.55%
6216	0.16%	0.22%	0.33%	0.28%	0.37%	1.85%
6217	2.63%	2.30%	1.71%	1.42%	0.63%	0.61%

Source(s): Developed by authors**Table 5.** RCA insights at the HS two and four-digit levels in chapter 62 (non-knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
62	33.75	34.25	33.99	33.98	33.39	51.93
6201	18.86	21.83	22.45	22.76	24.48	40.23
6202	14.74	17.39	18.50	22.15	18.86	26.27
6203	61.91	61.47	57.79	63.47	61.88	82.21
6204	30.33	31.59	32.24	34.37	31.28	39.61
6205	74.18	75.35	75.38	79.44	69.65	94.20
6206	28.66	27.92	26.31	28.00	24.05	30.11
6207	24.47	21.32	23.55	29.28	31.08	47.64
6208	11.59	13.07	10.91	9.31	12.11	21.21
6209	79.25	79.08	78.10	82.99	77.57	81.28
6210	19.58	18.78	19.72	11.25	18.14	34.16
6211	9.42	9.86	9.80	12.35	12.21	19.27
6212	19.63	20.54	22.21	24.15	23.37	40.53
6213	0.38	0.21	0.59	0.94	0.59	0.46
6214	0.18	0.23	0.35	1.14	0.60	0.37
6215	0.96	0.68	0.87	1.67	26.51	1.22
6216	0.56	0.73	1.01	0.89	1.23	3.76
6217	8.72	7.40	5.22	4.63	2.10	1.40

Source(s): Developed by authors

strongly positive for HS 61 and HS 62 throughout the study period, indicating that Bangladesh remained a net exporter of both knitted and non-knitted apparel even during the pandemic. At the HS 4-digit level, most major export categories in HS 61 also remained strongly positive in TBI terms. However, HS6113, HS6115, HS6116, and especially HS6117 were notably weaker, with HS6116 fluctuating around zero and HS6117 remaining negative throughout the

Table 6. NRCA insights at the HS two and four-digit levels in chapter 62 (non-knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
62	1184.61	1324.53	1374.20	1045.12	1158.95	1452.04
6201	43.78	55.25	62.36	55.00	59.65	91.86
6202	41.67	49.07	55.60	54.01	50.47	72.99
6203	445.76	445.68	462.29	398.82	369.49	607.02
6204	302.88	317.75	359.57	321.95	302.02	454.88
6205	163.66	158.01	165.78	127.92	93.75	176.86
6206	63.76	61.70	57.75	46.96	38.09	62.36
6207	4.97	4.49	5.00	5.21	6.07	8.45
6208	3.70	4.49	3.95	2.97	4.60	7.80
6209	27.74	27.30	27.23	22.92	19.88	27.46
6210	31.14	30.05	34.07	30.24	31.71	51.18
6211	18.16	19.79	22.68	23.23	22.81	40.42
6212	34.36	35.69	40.47	38.03	39.83	50.87
6213	−0.02	−0.03	−0.01	0.00	−0.01	−0.01
6214	−0.63	−0.60	−0.52	0.07	−0.21	−0.40
6215	−0.01	−0.06	−0.02	0.04	1.14	0.01
6216	−0.08	−0.06	−0.01	−0.01	0.06	0.41
6217	3.89	3.14	2.00	1.40	0.49	0.13

Note(s): NRCA values are multiplied by 10⁶

Source(s): Developed by authors

period (see [Table 7](#)). This suggests that not all categories with comparative-advantage indicators were equally strong as net-export lines. In HS 62, TBI remained positive for most core garment lines, but HS6212, HS6213, HS6214, HS6215, HS6216, and HS6217 showed weak or negative net export positions throughout the study period (see [Table 8](#)). This is especially important for interpretation because it shows that several accessory-related and

Table 7. TBI insights at the HS two and four-digit levels in chapter 61 (knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
61	0.94	0.96	0.97	0.96	0.95	0.94
6101	0.96	0.97	0.98	0.97	0.98	0.95
6102	0.97	0.99	0.99	0.99	0.98	0.93
6103	0.87	0.91	0.95	0.92	0.92	0.93
6104	0.95	0.93	0.99	0.98	0.99	0.95
6105	0.98	1.00	0.99	0.99	0.99	0.97
6106	0.99	1.00	0.98	0.98	0.99	0.94
6107	0.97	0.98	0.98	0.98	0.97	0.94
6108	0.97	0.97	0.98	0.99	0.95	0.95
6109	0.96	0.99	0.99	0.98	0.98	0.96
6110	0.98	0.99	0.99	0.99	0.98	0.96
6111	0.94	0.99	0.99	0.98	0.96	0.93
6112	0.97	0.89	0.99	0.98	0.99	0.98
6113	0.74	0.86	0.62	0.47	0.46	0.38
6114	0.95	0.85	0.90	0.95	0.97	0.95
6115	0.67	0.56	0.46	−0.01	0.14	0.29
6116	−0.07	0.01	−0.07	−0.07	−0.03	0.03
6117	−0.86	−0.80	−0.74	−0.69	−0.65	−0.81

Source(s): Developed by authors

Table 8. TBI insights at the HS two and four-digit levels in chapter 62 (non-knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
62	0.98	0.99	0.99	0.98	0.99	0.99
6201	0.95	0.98	0.98	0.94	0.98	0.92
6202	0.97	1.00	1.00	0.99	1.00	0.94
6203	0.93	0.93	0.97	0.95	0.97	0.94
6204	0.86	0.96	0.95	0.94	0.93	0.89
6205	0.98	0.99	0.98	0.98	0.98	0.94
6206	1.00	0.99	0.99	0.98	0.99	0.96
6207	0.91	0.91	0.94	0.98	0.95	0.91
6208	0.84	0.94	0.89	0.96	0.93	0.91
6209	0.94	0.96	0.97	0.93	0.96	0.93
6210	0.95	0.94	0.97	0.38	0.88	0.96
6211	0.78	0.79	0.73	0.85	0.80	0.80
6212	-0.07	-0.08	-0.04	-0.09	-0.08	-0.07
6213	-0.83	-0.75	-0.72	-0.48	-0.68	-0.88
6214	-0.94	-0.95	-0.94	-0.84	-0.92	-0.95
6215	-0.92	-0.94	-0.90	-0.82	0.21	-0.90
6216	-0.43	0.10	0.15	0.19	0.63	0.59
6217	-0.56	-0.59	-0.67	-0.75	-0.89	-0.93

Source(s): Developed by authors

smaller lines remained relatively fragile even when broader chapter-level indicators looked stronger.

RSCA results largely align with those of RCA and NRCA, thereby supporting the comparative-advantage interpretation. Because RSCA ranges from -1 to $+1$, positive values indicate comparative advantage, values close to zero indicate a weaker comparative position, and negative values indicate comparative disadvantage. In HS 61, most major apparel lines remained strongly positive in RSCA terms, while HS6115 moved close to zero and turned slightly negative in 2021, indicating a weaker position. HS6116 and HS6117 also recorded lower RSCA values than the core knitted categories, although they remained positive during the study period. In HS 62, most core garment categories remained positive, while HS6213 and HS6214 were mostly negative, HS6215 showed a temporary positive shift, and HS6216 moved from weak or negative values to positive values by the end of the period (see [Tables 9](#) and [10](#)). Overall, the addition of RSCA and TBI supports a more consistent interpretation of the main findings. The core message remains the same: Bangladesh's export competitiveness was affected unevenly across product lines, and the categories with weaker competitiveness indicators were often outside the sector's core export strengths.

4.6 Categories with relatively stronger and weaker competitiveness indicators

The longer-run NRCA patterns also help distinguish categories with relatively stronger or weaker indicator values contributing to Bangladesh's export competitiveness. In HS 61, the strongest contributors were concentrated in twelve categories, including HS6101, HS6102, HS6103, HS6104, HS6105, HS6106, HS6107, HS6108, HS6109, HS6110, HS6111, and HS6114, all of which recorded consistently higher NRCA values across the study period. By contrast, HS6112, HS6113, HS6115, HS6116, and HS6117 had relatively weaker indicator values (see [Table 3](#)). In HS 62, categories with relatively stronger indicator values included HS6201, HS6202, HS6203, HS6204, HS6205, HS6206, HS6209, HS6210, HS6211, and HS6212, while HS6207, HS6208, HS6213, HS6214, HS6215, HS6216, and HS6217 remained weaker (see [Table 6](#)).

Table 9. RSCA insights at the HS two and four-digit levels in chapter 61 (knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
61	0.95	0.95	0.95	0.95	0.95	0.97
6101	0.93	0.92	0.93	0.92	0.94	0.96
6102	0.95	0.95	0.93	0.93	0.94	0.96
6103	0.90	0.91	0.91	0.92	0.93	0.96
6104	0.93	0.94	0.94	0.94	0.95	0.97
6105	0.97	0.97	0.97	0.97	0.97	0.97
6106	0.95	0.95	0.95	0.95	0.95	0.96
6107	0.95	0.96	0.96	0.96	0.96	0.97
6108	0.95	0.95	0.95	0.95	0.95	0.98
6109	0.97	0.97	0.97	0.97	0.97	0.98
6110	0.96	0.96	0.96	0.95	0.95	0.97
6111	0.97	0.97	0.97	0.97	0.97	0.98
6112	0.84	0.86	0.86	0.89	0.87	0.90
6113	0.82	0.75	0.79	0.79	0.79	0.88
6114	0.89	0.90	0.90	0.93	0.94	0.95
6115	0.25	0.13	0.04	0.00	−0.05	0.16
6116	0.52	0.52	0.47	0.48	0.51	0.70
6117	0.41	0.46	0.53	0.60	0.72	0.57

Source(s): Developed by authors**Table 10.** RSCA insights at the HS two and four-digit levels in chapter 62 (non-knitted apparel and clothing accessories)

HS codes	2017	2018	2019	2020	2021	2022
62	0.94	0.94	0.94	0.94	0.94	0.96
6201	0.90	0.91	0.91	0.92	0.92	0.95
6202	0.87	0.89	0.90	0.91	0.90	0.93
6203	0.97	0.97	0.97	0.97	0.97	0.98
6204	0.94	0.94	0.94	0.94	0.94	0.95
6205	0.97	0.97	0.97	0.98	0.97	0.98
6206	0.93	0.93	0.93	0.93	0.92	0.94
6207	0.92	0.91	0.92	0.93	0.94	0.96
6208	0.84	0.86	0.83	0.81	0.85	0.91
6209	0.98	0.98	0.97	0.98	0.97	0.98
6210	0.90	0.90	0.90	0.84	0.90	0.94
6211	0.81	0.82	0.81	0.85	0.85	0.90
6212	0.90	0.91	0.91	0.92	0.92	0.95
6213	−0.45	−0.66	−0.26	−0.03	−0.26	−0.37
6214	−0.69	−0.63	−0.49	0.07	−0.25	−0.46
6215	−0.02	−0.19	−0.07	0.25	0.93	0.10
6216	−0.29	−0.16	0.00	−0.06	0.10	0.58
6217	0.79	0.76	0.68	0.64	0.36	0.17

Source(s): Developed by authors

These distinctions have practical value because they show that Bangladesh's apparel competitiveness is not equally driven across all product groups. Some categories combine high market share, sustained comparative advantage, positive RSCA, and positive TBI, thereby contributing relatively more to Bangladesh's observed export competitiveness. Others show a weaker comparative position or less stable trade orientation and therefore may warrant closer

monitoring and further diagnostic assessment. This finding aligns with the broader apparel competitiveness literature, which argues that product-level export structure matters because a country's apparent sector-wide strength may depend heavily on a narrower set of categories than aggregate export totals suggest (Hasan *et al.*, 2024; Saki *et al.*, 2019).

4.7 Discussion: product-level insights in the context of COVID-19 apparel studies

The findings of this study provide a product-level perspective on Bangladesh's apparel export performance during COVID-19, a perspective that remains underexplored in existing studies. Islam *et al.* (2023) documented unfair buyer practices, factory stress, and labor decline, but they did not identify which HS product categories lost, retained, or regained export competitiveness. Boudreau and Naem (2021) reported strong declines in factory-level revenue and employment, but their analysis remained at the factory and buyer-response levels rather than at the product-category level. Kabir *et al.* (2021) framed the crisis mainly as a labor and humanitarian shock, while Islam *et al.* (2020) emphasized the broad collapse in knitwear and woven exports at the aggregate level. Ali *et al.* (2021), Reza and Du Plessis (2022), and Chakraborty and Biswas (2020) all explained the crisis in terms of supply chain disruption, buyer power, cost pressure, and resilience failure. Those studies were important, but they did not distinguish the internal restructuring of export competitiveness across HS 4-digit lines.

By contrast, the present findings show that the COVID-19 period did not correspond to a uniform decline across Bangladesh's apparel export basket. Some categories experienced temporary erosion, some remained relatively stable, and some recovered quickly after 2020. This category-level evidence provides additional context for interpreting earlier discussions of buyer power, factory stress, and supply-chain disruption alongside observed changes in comparative advantage, market share, export specialization, and net export position. These category-level differences may be partly understood in relation to global value chain dynamics, buyer behavior, and uneven demand. However, because the analysis is based on descriptive trade indicators, the study does not make causal claims about the mechanisms behind these differences. This interpretation is consistent with the broader fashion and global value chain literature, which emphasizes that shock effects may be shaped not only by demand collapse but also by buyer power, product positioning, and the structure of sourcing networks (Gereffi *et al.*, 2021; Haukkala *et al.*, 2023).

5. Conclusion

This study examined changes in Bangladesh's apparel export competitiveness during the COVID-19 period across HS Chapters 61 and 62. Using CAGR, market share, RCA, scaled NRCA, RSCA, and TBI at the two- and four-digit levels, together with annual analysis and supplementary monthly evidence, the study found that the pandemic period did not correspond to a uniform decline across Bangladesh's apparel export basket. Instead, the findings indicate an uneven pattern of category-level decline, stability, and recovery. At the HS 2-digit level, HS 61 and HS 62 maintained a comparative advantage throughout the study period, though they temporarily weakened during the main COVID-19 shock. At the HS 4-digit level, however, the indicator patterns were more differentiated. Some categories experienced visible erosion in nominal export growth, market share, and comparative advantage, while others remained stable or recovered quickly after 2020.

A central contribution of this study is that it goes beyond broad sector-level evidence to identify which product groups showed relatively stronger or weaker trade-competitiveness patterns during the pandemic period. In HS 61, stronger, more stable indicator performance was concentrated in core export lines such as HS6103, HS6104, HS6111, HS6112, and HS6114, while weaker performance was observed in categories including HS6115, HS6116, and HS6117. In HS 62, stronger positions were sustained in categories such as HS6207 and HS6211, while more fragile patterns emerged in HS6212, HS6213, HS6214, HS6215,

HS6216, and HS6217. The RSCA values, together with TBI results, provide additional support for the interpretation that weaker categories generally had lower comparative positions or weaker net export positions. The scaled NRCA values are interpreted based on sign, ranking, and relative movement rather than unscaled magnitude. Overall, the study shows that Bangladesh's apparel export performance during COVID-19 was uneven, with different degrees of stability, weakening, and recovery across product categories.

5.1 Theoretical and practical implications

The study contributes to the export competitiveness literature by showing that product-level comparative advantage may vary unevenly during periods of major external shocks, even when aggregate sector-level competitiveness remains strong. This is important because it shows that broad national export performance can hide substantial differences across narrower product lines. The study also supports the use of a multi-indicator approach in apparel trade analysis. It shows that nominal growth, market share, comparative advantage, symmetric comparative position, and net export status together provide a more complete understanding of category-level trade-performance variation than any single measure alone. In this way, the findings support a more dynamic view of comparative advantage, especially in a shock-prone global industry such as apparel.

The findings also offer policy-diagnostic and trade-monitoring implications. First, they show that Bangladesh's stronger indicator performance was concentrated in a core set of knitted and non-knitted categories with long-established export strength. These categories may warrant continued monitoring in discussions of export strategy, industrial support, and technological upgrading. Second, weaker or unstable categories may require further diagnostic assessment before specific interventions are proposed. In particular, categories such as HS6115, HS6116, HS6117, HS6212, HS6213, HS6214, HS6215, HS6216, and HS6217 appear to warrant closer examination of demand conditions, product upgrading needs, buyer dependence, and supply chain constraints. Third, the results suggest that policymakers and industry actors should not interpret recovery in total exports as evidence of recovery across all product groups. Product-level monitoring can help identify where export strength appears sustained and where vulnerability may persist.

The study also offers cautious managerial implications. Firms operating in stronger categories may use these product-level patterns as a starting point for further assessment of buyer relationships, production capability, and long-term market positioning. Firms in weaker categories may need additional firm-level evidence before drawing conclusions about flexibility, demand dependence, contracting practices, or product and market diversification. More broadly, the findings suggest that future export planning may benefit from combining monitoring of established strong categories with further diagnosis of weaker lines. Such assessment may include attention to supply chain continuity, buyer governance, productivity, and product-category-level planning, but these issues require additional micro-level evidence.

5.2 Limitations and future research directions

This study has several limitations. First, it is based on trade-based competitiveness indicators and therefore captures export performance and comparative position rather than the full set of firm-level, organizational, or institutional drivers behind those outcomes. Second, the study focuses on the period 2017–2022, which is appropriate for examining pre-pandemic, pandemic, and early-recovery dynamics but does not capture longer-term post-pandemic restructuring. Third, although the analysis is disaggregated to the four-digit HS level, it remains a macro trade analysis and cannot fully explain why firms within the same category may perform differently. Fourth, the study focuses solely on Bangladesh and does not benchmark its category-level shifts against those of comparable apparel exporters. Fifth, the analysis uses current U.S. dollar trade values, meaning that CAGR and related export-value growth indicators may partly reflect price changes, inflation, and unit-value effects rather than

real export-volume changes. Sixth, the use of importer-reported mirror statistics may introduce aggregation noise, especially at the HS 4-digit and monthly levels, due to differences in reporting across partner countries. Seventh, monthly NRCA results were not seasonally adjusted; therefore, they are interpreted only as supplementary descriptive evidence of timing patterns, not as seasonally adjusted competitiveness shifts. Finally, trade competitiveness indicators remain sensitive to data construction choices, denominator definitions, and reporting consistency. Therefore, the category-level classifications should be interpreted as descriptive patterns rather than definitive causal evidence of changes in structural competitiveness.

Future research can extend this work in several ways. Firm-level studies could examine how factories in stronger and weaker HS categories differed in productivity, technology adoption, buyer dependence, and adaptive capacity during the pandemic. Supply chain studies could explore how sourcing structure, contracting practices, lead times, and buyer power are associated with category-level trade performance outcomes. Labor-focused research could examine whether the categories that experienced sharper trade erosion were also associated with greater employment instability, wage pressure, or worker vulnerability. Future studies may also apply deflated trade values, quantity-based measures, or seasonally adjusted monthly analysis where reliable data are available. Future studies could also compare Bangladesh with other major apparel exporters, such as Vietnam and Cambodia, to determine whether the category-level patterns identified here are country-specific or part of a broader shift in global apparel trade. Such extensions would help deepen understanding of how export competitiveness varies under shock conditions and how apparel-exporting economies may better prepare for future disruptions.

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Author contributions

The first author collected, analyzed, and interpreted data and drafted the manuscript.

The second author conceived and designed the study and revised the manuscript critically for important intellectual content. Both authors read and approved the final manuscript.

Availability of data and materials

The data supporting the findings of this study are available on request.

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Supplementary material

The supplementary material for this article can be found online.

References

- Abeysekara, N., Wang, H. and Kuruppuarachchi, D. (2019), "Effect of supply-chain resilience on firm performance and competitive advantage", *Business Process Management Journal*, Vol. 25 No. 7, pp. 1673-1695, doi: [10.1108/BPMJ-09-2018-0241](https://doi.org/10.1108/BPMJ-09-2018-0241).
- Ali, M., Rahman, S.M. and Frederico, G.F. (2021), "Capability components of supply chain resilience for readymade garments (RMG) sector in Bangladesh during COVID-19", *Modern Supply Chain Research and Applications*, Vol. 3 No. 2, pp. 127-144, doi: [10.1108/MSRA-06-2020-0015](https://doi.org/10.1108/MSRA-06-2020-0015).
- Ansary, M.A. and Barua, U. (2015), "Workplace safety compliance of RMG industry in Bangladesh: structural assessment of RMG factory buildings", *International Journal of Disaster Risk Reduction*, Vol. 14, pp. 424-437, doi: [10.1016/j.ijdr.2015.09.008](https://doi.org/10.1016/j.ijdr.2015.09.008).
- Arun Kumar, R. and Dhar, B. (2024), "Trade liberalisation and export competitiveness of Indian manufacturing industries: some explanations", *Journal of the Asia Pacific Economy*, Vol. 29 No. 4, pp. 2191-2225, doi: [10.1080/13547860.2023.2202095](https://doi.org/10.1080/13547860.2023.2202095).
- Balassa, B. (1965), "Trade liberalisation and 'revealed' comparative advantage 1", *The Manchester School*, Vol. 33 No. 2, pp. 99-123, doi: [10.1111/j.1467-9957.1965.tb00050.x](https://doi.org/10.1111/j.1467-9957.1965.tb00050.x).
- Barua, U. and Ansary, M.A. (2017), "Workplace safety in Bangladesh ready-made garment sector: 3 years after the Rana Plaza collapse", *International Journal of Occupational Safety and Ergonomics*, Vol. 23 No. 4, pp. 578-583, doi: [10.1080/10803548.2016.1251150](https://doi.org/10.1080/10803548.2016.1251150).
- Boudreau, L. and Naeem, F. (2021), *The Economic Effects of COVID-19 on Garment Factories in Bangladesh*, International Growth Centre, available at: <https://www.theigc.org/sites/default/files/2021/10/Boudreau-and-Naeem-2021-Policy-brief.pdf> (accessed 14 April 2026).
- Buckley, P.J., Pass, C.L. and Prescott, K. (1988), "Measures of international competitiveness: a critical survey", *Journal of Marketing Management*, Vol. 4 No. 2, pp. 175-200, doi: [10.1080/0267257X.1988.9964068](https://doi.org/10.1080/0267257X.1988.9964068).
- Chakraborty, S. and Biswas, M.C. (2020), "Impact of COVID-19 on the textile, apparel and fashion manufacturing industry supply chain: case study on a ready-made garment manufacturing industry", *Journal of Supply Chain Management, Logistics and Procurement*, Vol. 3 No. 2, pp. 181-199, doi: [10.69554/gjkl4967](https://doi.org/10.69554/gjkl4967).
- Chi, T., Kilduff, P. and Dyer, C. (2005), "An assessment of US comparative advantage in technical textiles from a trade perspective", *Journal of Industrial Textiles*, Vol. 35 No. 1, pp. 17-37, doi: [10.1177/1528083705053387](https://doi.org/10.1177/1528083705053387).
- Dalum, B., Laursen, K. and Villumsen, G. (1998), "Structural change in OECD export specialisation patterns: de-specialisation and 'stickiness'", *International Review of Applied Economics*, Vol. 12 No. 3, pp. 423-443, doi: [10.1080/02692179800000017](https://doi.org/10.1080/02692179800000017).
- Das, S., Hasan, M.R. and Das, D. (2024a), "The weave of challenges: China's apparel export competitiveness in the face of zero-COVID policy", *International Journal of Global Business and Competitiveness*, Vol. 19 No. 1, pp. 37-48, doi: [10.1007/s42943-024-00094-6](https://doi.org/10.1007/s42943-024-00094-6).
- Das, S., Hasan, M.R. and Das, D. (2024b), "Who is the next China? Comparative advantage analysis from top ten apparel exporting nations", *Competitiveness Review: An International Business Journal*, Vol. 34 No. 6, pp. 1127-1154, doi: [10.1108/CR-06-2023-0143](https://doi.org/10.1108/CR-06-2023-0143).
- Dhaka Tribune (2023), "Bangladesh expands RMG market share globally", 2 August, available at: <https://www.dhakatribune.com/business/321459/rmg-market-share> (accessed 14 April 2026).
- Drozd, J., Burinskas, A. and Cohen, V. (2023), "The impact of the COVID-19 pandemic on the revealed comparative advantage of industries in the Baltic States", *Economies*, Vol. 11 No. 2, p. 47, doi: [10.3390/economies11020047](https://doi.org/10.3390/economies11020047).
- D'Adamo, I. and Lupi, G. (2021), "Sustainability and resilience after COVID-19: a circular premium in the fashion industry", *Sustainability*, Vol. 13 No. 4, p. 1861, doi: [10.3390/su13041861](https://doi.org/10.3390/su13041861).

- Gereffi, G., Lim, H.-C. and Lee, J. (2021), "Trade policies, firm strategies, and adaptive reconfigurations of global value chains", *Journal of International Business Policy*, Vol. 4 No. 4, pp. 506-522, doi: [10.1057/s42214-021-00102-z](https://doi.org/10.1057/s42214-021-00102-z).
- Hasan, M.R. and Das, D. (2025), "What makes the second-largest apparel-exporting nation? An in-depth analysis of competitiveness and comparative advantage in Bangladesh's apparel industry", *Competitiveness Review: An International Business Journal*, Vol. 35 No. 3, pp. 498-528, doi: [10.1108/CR-01-2024-0011](https://doi.org/10.1108/CR-01-2024-0011).
- Hasan, M.R., Swazan, I.S. and Das, D. (2024), "Beyond the seams: evaluating competitiveness and comparative advantage in Vietnam's apparel industry", *Journal of Chinese Economic and Foreign Trade Studies*, Vol. 17 No. 1, pp. 4-28, doi: [10.1108/JCEFTS-10-2023-0050](https://doi.org/10.1108/JCEFTS-10-2023-0050).
- Haukkala, T., Niinimäki, K. and Turunen, L.L.M. (2023), "Fashion in turmoil: impact of the COVID-19 pandemic on Finland's textile and fashion industry", *Sustainability: Science, Practice and Policy*, Vol. 19 No. 1, 2173424, doi: [10.1080/15487733.2023.2173424](https://doi.org/10.1080/15487733.2023.2173424).
- Ishty, S.I. (2020), "'Your order has been cancelled': the coronavirus impact on the RMG sector", *Financial Express*, 23 March, available at: <https://thefinancialexpress.com.bd/views/views/your-order-has-been-cancelled-the-coronavirus-impact-on-the-rmg-sector-1584974682> (accessed 14 April 2026).
- Islam, M.R., Hassan, M.A., Hassan, M.S., Rahman, S. and Nargis, N. (2020), "Impact of COVID-19 pandemic on readymade garments (RMG) industry of Bangladesh", *International Journal of Management*, Vol. 11 No. 7, pp. 1125-1132.
- Islam, M.A., Abbott, P., Haque, S. and Gooch, F. (2023), *Impact of Global Clothing Retailers' Unfair Practices on Bangladeshi Suppliers during Covid-19*, Aberdeen, doi: [10.57064/2164/19814](https://doi.org/10.57064/2164/19814).
- Kabir, H., Maple, M. and Usher, K. (2021), "The impact of COVID-19 on Bangladeshi readymade garment (RMG) workers", *Journal of Public Health*, Vol. 43 No. 1, pp. 47-52, doi: [10.1093/pubmed/fdaa126](https://doi.org/10.1093/pubmed/fdaa126).
- Kathuria, L.M. (2018), "Comparative advantages in clothing exports: India faces threat from competing nations", *Competitiveness Review: An International Business Journal*, Vol. 28 No. 5, pp. 518-540, doi: [10.1108/CR-01-2017-0010](https://doi.org/10.1108/CR-01-2017-0010).
- Kavanagh, R. (2021), *What Is Compound Annual Growth Rate?*, Business Insider Africa, 30 July, available at: <https://africa.businessinsider.com/news/what-is-compound-annual-growth-rate/?pe8rzhf> (accessed 15 April 2026).
- Kim, M. (2019), "Export competitiveness of India's textiles and clothing sector in the United States", *Economies*, Vol. 7 No. 2, p. 47, doi: [10.3390/economies7020047](https://doi.org/10.3390/economies7020047).
- Lafay, G. (1992), "Comparative advantages", *International Trade Modelling*, Vol. 11 No. 209.
- Purwono, R., Sugiharti, L., Handoyo, R.D. and Esquivias, M.A. (2022), "Trade liberalization and comparative advantage: evidence from Indonesia and Asian trade partners", *Economies*, Vol. 10 No. 4, p. 80, doi: [10.3390/economies10040080](https://doi.org/10.3390/economies10040080).
- Reza, N. and Du Plessis, J.J. (2022), "The garment industry in Bangladesh, corporate social responsibility of multinational corporations, and the impact of COVID-19", *Asian Journal of Law and Society*, Vol. 9 No. 2, pp. 255-285, doi: [10.1017/als.2022.9](https://doi.org/10.1017/als.2022.9).
- Saki, Z., Moore, M., Kandilov, I., Rothenberg, L. and Godfrey, A.B. (2019), "Revealed comparative advantage for US textiles and apparel", *Competitiveness Review: An International Business Journal*, Vol. 29 No. 4, pp. 462-478, doi: [10.1108/CR-03-2018-0025](https://doi.org/10.1108/CR-03-2018-0025).
- Shukla, A. (2023), "Garments industry slowdown is key 2023 risk for Bangladesh", *The Business Standard*, Vol. 10, February, available at: <https://www.tbsnews.net/economy/rmg/garments-industry-slowdown-key-2023-risk-bangladesh-583206> (accessed 14 April 2026).
- Startienė, G. and Remeikienė, R. (2014), "Evaluation of revealed comparative advantage of Lithuanian industry in global markets", *Procedia - Social and Behavioral Sciences*, Vol. 110, pp. 428-438, doi: [10.1016/j.sbspro.2013.12.887](https://doi.org/10.1016/j.sbspro.2013.12.887).
- Suwanarat, P. (2017), "Ascertaining the competitiveness of Thai exports to PRC", *Competitiveness Review: An International Business Journal*, Vol. 27 No. 3, pp. 275-299, doi: [10.1108/CR-04-2016-0026](https://doi.org/10.1108/CR-04-2016-0026).

- Swazan, I.S. and Das, D. (2021), "What is Bangladesh's competitive advantage? An exploratory content analysis of the unique firm resources claimed by Bangladeshi apparel export firms", *International Journal of Fashion Design, Technology and Education*, Vol. 14 No. 1, pp. 69-77, doi: [10.1080/17543266.2020.1859626](https://doi.org/10.1080/17543266.2020.1859626).
- Uddin, J. (2022), "RMG orders tumble 30% amid record global inflation", *The Business Standard*, available at: <https://www.tbsnews.net/economy/rmg/rmg-orders-tumble-30-amid-record-global-inflation-459434> (accessed 15 April 2026).
- Yu, R., Cai, J. and Leung, P. (2009), "The normalized revealed comparative advantage index", *The Annals of Regional Science*, Vol. 43 No. 1, pp. 267-282, doi: [10.1007/s00168-008-0213-3](https://doi.org/10.1007/s00168-008-0213-3).

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