



The Weave of Challenges: China's Apparel Export Competitiveness in the Face of Zero-COVID Policy

Sudipta Das¹ · Md Rokibul Hasan¹ · Debanjan Das¹

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Abstract

The Chinese textile and apparel industry has been a global frontrunner for the past 2 decades, yet recent challenges have emerged. Issues such as escalated labor and production costs, trade conflicts, and intensified competition from neighboring Asian countries have posed significant hurdles. Moreover, the COVID-19 pandemic has deepened pressure on China's apparel exports. The government's implementation of the Zero-COVID policy aimed at decreasing the pandemic led to reduced production, factory closures, and supply chain disruptions, negatively impacting the industry's reputation with Western buyers and consequently influencing the export competitiveness of Chinese apparel. Therefore, this study focuses on assessing the export competitiveness of Chinese apparel exports, analyzing two and four-digit product categories under Harmonized System (HS) codes 61 and 62. To achieve this, the study employed evaluation tools such as Compound Annual Growth Rate (CAGR), Market Share (MS), Revealed Symmetric Comparative Advantage (RSCA), and Normalized Revealed Comparative Advantage (NRCA). Findings highlighted significant impacts of the Zero-COVID policy, affecting 31 out of 34 product categories. Chapter 61 displayed a positive 4.75% annual growth rate, while Chapter 62 exhibited a negative growth rate of -1.15%. The study carries significant implications for various stakeholders in both Chinese and other apparel exporting industries, encompassing government entities, industry officials, policymakers, investors, researchers, and students. The limitations arise from the study's reliance on RSCA and NRCA as competitiveness indicators, particularly in utilizing a macro-level approach for measurement without delving into a micro-level perspective. This constitutes a noteworthy constraint in the study's analytical framework.

Keywords COVID-19 · Trade agreements · Apparel exports · Comparative advantage

JEL Classification F14 (Empirical Studies of Trade)

Introduction

Export competitiveness is determined by a firm's capacity to compete globally in terms of goods and services (Ghag et al., 2022). For a firm, it involves achieving financial and non-financial success in foreign markets by offering

comparable products and services. The firm's performance is measured through indicators like exports, foreign direct investment, and market share. Companies consistently strive to enhance and advance their performance to attain a competitive edge (Momaya, 2019). Among the nations exporting apparel, China is leading in global textile and apparel exports (Das et al., 2024c). However, recent trade wars, rising costs, and the COVID-19 pandemic have significantly impacted China's textile and apparel export competitiveness (Guan et al., 2019).

Chinese Textile and Apparel Industry

China's global leadership stems from its remarkable journey in the textile and clothing industries, which began with the economic reforms in 1978, driving rapid development

✉ Sudipta Das
sudipta13002@gmail.com

Md Rokibul Hasan
mdrokibulhasanshohan14@gmail.com

Debanjan Das
debanjan.das@mail.wvu.edu

¹ Department of Fashion, Dress and Merchandising, Davis College of Agriculture, Natural Resources and Design, WV University, Morgantown, WV, USA

(Zhang et al., 2016). Joining the World Trade Organization (WTO) in 2001 opened doors to international markets, and when quotas were phased out in 2005. China's mounting as a dominant force in the global apparel industry can be attributed to several key factors. The availability of skilled labor at competitive wages and a robust manufacturing infrastructure have driven this growth. China's extensive supply chain networks have further reinforced its position as an industry powerhouse. One of the critical elements contributing to China's success is its strong domestic supply chain, particularly in cotton production. In 2021, China emerged as the world leader, producing a stunning 5.88 million metric tons of cotton (Shahbandeh, 2022). In addition to its domestic strengths, China's participation in free trade agreements with various nations has been a game-changer. These agreements have paved the way for the seamless flow of woolen products from raw material production to consumption, further solidifying China's standing as a global apparel industry leader. Recent trade agreements, including the 2022 Regional Comprehensive Economic Partnership (RCEP), the China-Australia Free Trade Agreement (ChAFTA), China-South Korea Free Trade Agreement (CSKFTA) in 2015, China-New Zealand Free Trade Agreement (NZCFTA) in 2008, and the ASEAN-China Free Trade Area (ACFTA) in 2002, have solidified China's standing as a global apparel industry leader (Das et al., 2024a). China's remarkable apparel exports, totaling \$176 billion, stand five times higher than its nearest competitor, Bangladesh (WTO, 2022).

China launched The Belt and Road Initiative (BRI) in 2013 to enhance its global reach, attracting significant foreign investments along the Silk Road. China's outbound foreign investments in the textile and apparel sector exceeded \$6.7 billion from 2015 to 2020, with about 26.6% directed to neighboring Southeast Asian countries (Lu, 2021). Moreover, China has established an extensive domestic production network that significantly reduces the logistical expenses associated with manufacturing. This move helps counterbalance the challenges posed by increasing labor costs. Additionally, Chinese consumers are inclined to purchase domestic clothing brands. A consumer survey revealed that roughly 60% of Chinese consumers prefer fashion items from local brands, underscoring the growing preference for domestic products and contributing to China's thriving apparel industry (Ma, 2022).

Impact of Zero-COVID Policy on Chinese Textile and Apparel Industry

The COVID-19 pandemic brought China's manufacturing to a standstill as it had done in most countries. In response to COVID-19, the government set up a strict "Zero-COVID" policy, which included mass testing, building-to-county lockdowns, port closures, and travel restrictions to reduce the

number of COVID-19 cases to zero or close to zero (Burki, 2022). The Zero-COVID policy implemented by China can be defined as a proactive public health strategy that seeks to eradicate the COVID-19 virus by swiftly responding to new cases and implementing rigorous measures to achieve and maintain zero local transmission (Yuan et al., 2022). This policy has had far-reaching implications for the textile and apparel industry, affecting everything from production to exports (Castañeda-Navarrete et al., 2021). At the onset of the pandemic, over 28,000 textile manufacturers in Guangdong, a key province for textile production, were impacted as millions of people faced lockdowns due to a small number of COVID-19 cases. Consequently, there were 16% fewer exports than before the pandemic (Guinebault, 2022). Lockdowns in Shanghai have raised concerns in China's textile apparel sector. Jiangsu province houses nearly 13,600 textile exporters, while Zhejiang province to the south has around 12,300, adding to the industry's worries.

The challenges did not stop at factory closures and lockdowns. Workers in Guangzhou have become increasingly reluctant to return to work. Previous experiences of prolonged lockdowns, lack of wages, and violent protests during China's efforts to combat the virus have left many scarred. Nearly 40% of workers who returned to their hometowns for the New Year expressed their desire to find employment there, with around 15% already doing so (The Japan Times, 2023). Zhejiang, which is one of the export-oriented textile industries, faced a severe impact from COVID-19, leading to a significant drop in export values and annual growth rates, including a decline of 23.4%, 12.3%, and 20.8% in February, March, and April 2020. Rising raw material costs further hampered businesses, resulting in minimal or negative earnings, reflecting the industry's challenges during the pandemic (Xu et al., 2023).

China faced challenges, with a reported increase in the unemployment rate to 5.7% in February 2020, including substantial manufacturing job losses (Chakraborty & Biswas, 2020). Due to the policy, China experienced a significant drop in its apparel export market share to a record low of 21.3% in February 2020, a substantial decrease from its market share of 31% in 2019 (Lu, 2020). With the virus outbreak, China's ports and transportation centers were closed, disrupting the apparel supply chain. The strict Zero-COVID policy had a significant impact on the industrial production of the country. The consequences were far-reaching, leading to order cancellations, factory closures, and disruptions in the apparel supply chain. These challenges were compounded by government lockdowns that disrupted production, China's dependence on imported textile materials, and the heightened importance of cost competitiveness for fashion brands and retailers, ultimately impacting China's global market position (Lu & Langro, 2021). The Suez Canal blockage made things even worse, causing delays. China's

port closures in places like Ningbo-Zhoushan, the world's third-busiest port, added more trouble, causing shipping costs from China to rise sharply. These resulted in congested ports and slower operations due to COVID-19 restrictions. Importers have had a tough time, facing high shipping costs and disruption (Leggett, 2021).

Furthermore, the policy resulted in processing delays at Shenzhen's Yantian terminal, leading to long wait times, which tripled from three to nine days for shipments, causing severe supply chain disruptions (Tan, 2021). Due to these challenges, some companies moved their orders from China to other countries like Vietnam, Bangladesh, and India to protect their supply chains (Hasan et al., 2024; Husband, 2022). As a result, China's clothing exports to the US fell by 46.1% in February 2020 compared to February 2019 (Lu, 2020). Also, WTO (2022) reported that China's total clothing exports decreased from US\$ 151.5 billion in 2019 to US\$ 141.5 billion in 2020. These changes had a significant impact on China's export competitiveness.

Asian Textile and Apparel Industry Strategies in the COVID-19 Period

Bangladesh, Vietnam, India, and Turkey form the major Textile and Apparel exporting countries in the Asian marketplace, apart from China. Different countries had different strategies to respond to the COVID-19 crisis, even though most had inadequate pandemic preparedness. Initiating interventions as early as February and March 2020, these nations swiftly implemented measures to curb the spread of the virus (Babu et al., 2021). These nations implemented various strategies to bolster export businesses, supply chains, and logistics during the COVID-19 pandemic. To alleviate economic challenges, financial support and incentives were extended to businesses, including tax relief and subsidies. Such as, the government of Bangladesh initiated a comprehensive economic recovery package amounting to \$12.37 billion, which included support for export-oriented industries, credit for various enterprises, assistance for unemployed youth and returning migrant workers, and safety nets for people experiencing poverty (Islam et al., 2020). In India, the government implemented region-based lockdowns based on the severity of the spread of the COVID-19 virus and infection severity. A risk-based approach was adopted, with restrictions to be lifted staggered to prevent a deadly resurgence (Tabish, 2020). To tackle the economic impact of COVID-19, the Turkish government prioritized domestic production with increased tariffs on key sectors, adopted a low-interest rate policy for market stability, restricted layoffs, and provided financial support for workers. Additionally, a comprehensive Economic Stability Shield package of 260 billion TRY (\$38.3 billion) was introduced to aid

businesses, particularly small and medium-sized enterprises (Babaoglu & Kulaç, 2022).

Research Gap and Objective

Previous research has extensively investigated the impacts of COVID-19 on the global textile and apparel industries. However, there is a notable absence of studies explicitly delving into the challenges faced by China's apparel exports within the framework of the Zero-COVID policy. While Xu et al., (2023) have examined the impact of the Zero-COVID policy on China's international trade in two economic zones, the gap remains in understanding how the COVID-19 pandemic has affected China's apparel exports.

There is a distinct lack of comparative analyses that examine China's apparel export sector in relation to the Zero-COVID policy throughout the pandemic. Recognizing the importance of addressing this research gap, this study undertakes to reveal the overall impact of the Zero-COVID policy on Chinese apparel exports. The objective is to identify specific product categories affected during the policy initiation, ascertain whether these impacts have led to sustained competitive disadvantages or rebounded, and ultimately comprehensively assess and analyze China's apparel export competitiveness in the context of the Zero-COVID policy.

Data and Methodology

The monthly trade data for this study (HS codes 61 and 62) from 2017 to 2021 (60 months) were obtained from the United Nations Commodity Trade database website, which is generally considered a good source of import and export prices (Chen et al., 2022). The Harmonized System (HS) chapters 61 and 62 encompass knitted and not knitted apparel and clothing Accessories, which covers all apparel exports. These chapters enable the precise classification of each item within the woven and knitted apparel product categories in two-digit, four-digit, and six-digit levels. This hierarchical structure of the HS codes facilitates detailed categorization and analysis of diverse apparel items.

Significantly, researchers Kathuria, (2013); Saki et al., (2019) have utilized two and four-digit HS codes within chapters 61 and 62 to measure the apparel export competitiveness of India, Bangladesh, and the U.S. In a broader context, Das et al. (2024a, b) extended this methodology to analyze the competitiveness of the top ten apparel-exporting nations, including China, employing two and four-digit HS codes within chapters 61 and 62.

Kathuria, (2018) admitted that the HS system has been widely adopted by many countries worldwide since it was created in 1988. The present study employed various metrics to assess the Chinese Textile and Apparel industry's export

competitiveness, including Compound Annual Growth Rate (CAGR), Market Share (MS), Revealed Symmetric Comparative Advantage (RSCA), and Normalized Revealed Comparative Advantage (NRCA).

Compound Annual Growth Rate (CAGR)

CAGR determines the product's growth rate over a specific period. It involved analyzing the revenue or production growth of key players in the sector. When CAGR produces a positive figure, it signifies an increase, whereas a negative value implies a decrease (Long, 2021). CAGR was calculated by:

$$\text{CAGR} = 100 * ((\text{Export value of specific product of a country of ending year} / \text{Export value of specific product of a country of beginning year})^{1/(\text{Ending year} - \text{Beginning year})} - 1)$$

Market Share (MS)

Market share (MS) is a way to measure how competitive an industry is on the world stage by comparing the export value of a particular product from a specific country to the total export value of that same product around the world. If a country's MS percentage is higher, its industry is more competitive globally (Zhang & Bai, 2014).

$\text{MS} = (\text{Export value of a specific product from a Country} / \text{total export value of specific product worldwide}) * 100$

Revealed Symmetric Comparative Advantage (RSCA)

The Revealed Comparative Advantage (RCA) index, introduced by Balassa, (1965), is commonly utilized to measure export competitiveness. Yet, it has an issue with asymmetry, examined by Vollrath, (1991) and later by Laursen, (2015). This led to the identification of a balanced version called revealed symmetric comparative advantage (RSCA). RSCA is calculated as $[(\text{RCA} - 1) / (\text{RCA} + 1)]$ and spans from -1 to $+1$.

$$\text{RCA} = [(\text{Specific product's exports value of a country/country's total exports}) / (\text{Specific product's exports value of a country/world's total exports})]$$

Normalized Revealed Comparative Advantage (NRCA)

The NRCA index measures a country's export competitiveness of a product. It normalizes the RCA index to address issues related to asymmetry and scale. It adjusts the RCA values to a more comparable scale, typically ranging from 0 to 1, offering a standardized assessment of comparative advantage across different industries (Yu et al., 2009).

$$\text{NRCA} = \text{NRCA} = X_{ij} / X_w - (X_j * X_i) / (X_w * X_w)$$

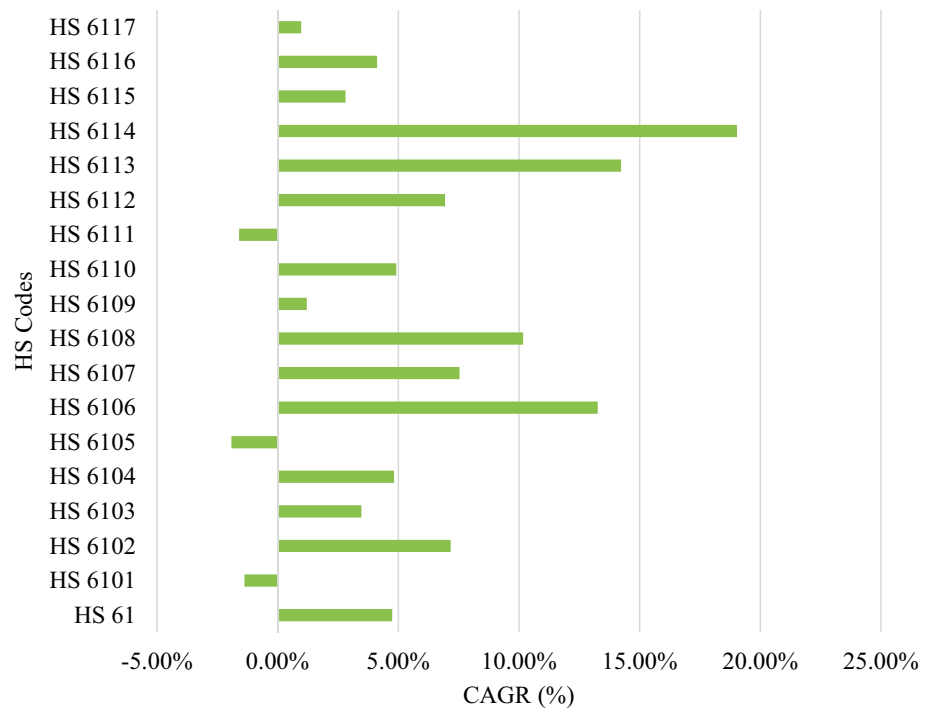
X_{ij} = i^{th} country's export of product j
 X_w = total world exports
 X_i = total exports of the i^{th} country
 X_j = World's export of product j

Results and Discussion

Compound Annual Growth Rate (CAGR)

China registered a positive CAGR of 4.75% in HS61 from 2017 to 2021. However, the analysis at the four-digit level of chapter 61 revealed different findings. Three out of seventeen sub-categories experienced negative growth over the 5-year timeframe. Among all the sub-categories, HS6114 had the highest CAGR of 19.03%, followed by HS6113 (14.23%), HS6106 (13.26%), HS6108 (10.17%), and HS6107 (7.53%). On the other hand, HS6105 had the lowest CAGR of -1.92% , followed by HS6111 (-1.60%), HS6101 (-1.38%), HS6117 (0.98%), and HS6109 (1.21%). See Fig. 1 for the graphical representation of CAGR values at two and four digits of HS61. The detailed descriptions of the HS codes are available in separate supplementary file—Appendix Table A1.

Unlike in HS61, China went through a negative CAGR of -1.15% in HS62 between 2017 and 2021. However, the extended analysis at four-digit level sub-categories in Chapter 62 pointed out that 7 out of 17 categories showed a positive CAGR in the studied period. Among these categories, HS6217 possessed the highest CAGR of 8.32%. Some other categories experiencing considerable growth included HS6211 (6.23%), HS6208 (6.21%), HS6212 (4.84%), and HS6210 (4.71%). China endured a negative growth rate in

Fig. 1 CAGR of HS61 at two and four-digit levels

the remaining ten sub-categories, among which HS6215 elicited the lowest CAGR of -19.84%. Other poor-performing categories included HS6205 (-13.97%), HS6213 (-13.59%), HS6214 (-11.94%), and HS6209 (-7.65%). See Fig. 2 for the graphical representation of CAGR values at two and four digits of HS62. The detailed descriptions of the HS codes are available in Appendix Table A2.

Market Share (MS) Analysis

To precisely locate the impact of the Zero-COVID policy on China's market share in the global apparel trade, we calculated China's market share in HS61 and HS62 from 2019 to 2021. This 36-month time frame was chosen because it would allow us to thoroughly understand the fluctuations in the market share before and after the policy was enacted. The analysis in Chapter 61 revealed that China had nearly 30% of the market share in HS61 from January 2019 to January 2020. Despite being a major player in the industry, the country's market share took a significant hit, dropping to 8.35% in February 2020. However, this downfall lasted only a month, after which the country regained its market share, reaching almost 40% in the latter half of 2021 (see Appendix Fig. A1).

The market share analysis suggested a similar finding in Chapter 62, where the share proportion fluctuated (19.68% to 31.08%) between January 2019 and January

2020 before declining to 7.72% in February 2020. Like Chapter 61, China again reclaimed its market share following the downturn and took over almost 35% within this chapter in the following months. Though the country suffered a downward trend in the first two quarters of 2021, it maintained a sustained market share of about 30% during the following quarters of 2021 (see Appendix Fig. A2).

Revealed Symmetric Comparative Advantage (RSCA) Insights

RSCA indices are measured by first calculating the RCA values. RSCA indices are calculated for 2017–2021, revealing China's sustained comparative advantage in HS61 and HS62. As it did not show much regarding the impact of the Zero-COVID policy on China's apparel export performance, we extended our analysis to the four-digit sub-categories of chapters 61 and 62. Monthly analyses of RCA of HS61 and 62 at two-digit levels are presented in Appendix Figs. A3 and A4.

Further analysis in Chapter 61 highlighted that China had a comparative advantage in 12 out of the 17 sub-categories from 2017 to 2021. Those categories are HS6103, HS6104, HS6107, HS6108, HS6109, HS6110, HS6111, HS6112, HS6114, HS6115, HS6116 and HS6117. Only one sub-category (HS6106) carried a comparative disadvantage

throughout the studied period, demonstrating little impact on the policy. The other four sub-categories did have some influence as they encountered a comparative disadvantage as the policy took effect, though they started with an advantage in 2017. Specifically, HS6101 and HS6105 experienced a disadvantage from 2019 to 2021, whereas the disadvantage

occurred during 2020–2021 for HS6102 and in 2020 for HS6113. Indeed, the rest of the sub-categories did not explicitly show any disadvantages; however, all the sub-categories experienced a decline in their respective advantages as the Zero-COVID policy started to perform. The countrywide lockdown imposed by the Zero-COVID policy disrupted cross-border trade (Mandhana, 2022), which could have resulted in the disadvantages of these categories (Table 1).

Table 1 RSCA insights at HS 61 at two- and four-digit levels

HS codes	2017	2018	2019	2020	2021
61	0.46	0.45	0.42	0.32	0.36
6101	0.08	0.02	-0.05	-0.21	-0.14
6102	0.09	0.09	0.08	-0.07	-0.02
6103	0.56	0.54	0.49	0.41	0.44
6104	0.55	0.53	0.49	0.39	0.45
6105	0.06	0.06	-0.01	-0.12	-0.05
6106	-0.40	-0.38	-0.44	-0.41	-0.23
6107	0.50	0.50	0.49	0.40	0.42
6108	0.58	0.57	0.56	0.50	0.53
6109	0.26	0.23	0.17	0.07	0.12
6110	0.48	0.46	0.44	0.36	0.35
6111	0.48	0.46	0.42	0.29	0.29
6112	0.48	0.47	0.43	0.35	0.40
6113	0.06	0.13	0.03	-0.01	0.12
6114	0.16	0.25	0.27	0.22	0.33
6115	0.57	0.55	0.56	0.47	0.47
6116	0.65	0.65	0.63	0.55	0.55
6117	0.63	0.61	0.60	0.53	0.50

Negative values denote the disadvantages

The analysis in Chapter 62 revealed HS6210 and HS6217 as unaffected by the Zero-COVID policy, as one (HS6210) managed a sustained comparative advantage. At the same time, the other tolerated a complete disadvantage following a similar trend before and after the pandemic. Except for these2, the rest of the 15 sub-categories were impacted by the policy as they endured a decline in their relative comparative advantage in 2020 compared to 2019. Though the categories lost their respective advantages somewhat, none came across any disadvantage due to the policy except for HS6206. Despite holding an advantage in 2017 and 2018, the category confronted a comparative disadvantage between 2019 and 2021. These findings indicated that the policy considerably impacted the export performances of these product categories. As the policy required the closing down of businesses, including apparel manufacturing hubs, it forced many fashion brands to experience unprecedented sales drops, resulting in financial losses (Husband, 2022). This might have influenced the export performances of these categories (Table 2).

Fig. 2 CAGR of HS 62 at two and four-digit levels

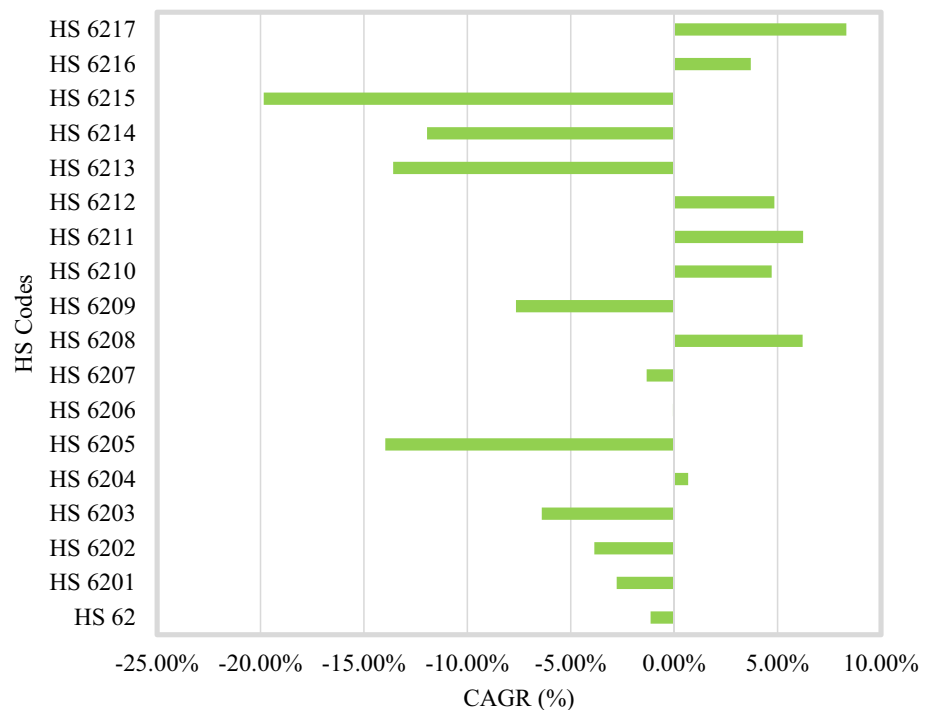


Table 2 RSCA insights at HS62 at two and four-digit levels

HS Codes	2017	2018	2019	2020	2021
62	0.46	0.42	0.40	0.42	0.44
6201	0.48	0.43	0.37	0.22	0.26
6202	0.56	0.48	0.42	0.28	0.35
6203	0.37	0.34	0.31	0.14	0.15
6204	0.53	0.47	0.42	0.34	0.39
6205	0.26	0.26	0.15	0.02	0.02
6206	0.07	0.02	-0.01	-0.06	0.05
6207	0.46	0.42	0.41	0.34	0.30
6208	0.58	0.51	0.47	0.43	0.48
6209	0.36	0.28	0.30	0.20	0.18
6210	0.52	0.49	0.47	0.53	0.41
6211	0.41	0.37	0.44	0.40	0.38
6212	0.49	0.46	0.44	0.40	0.42
6213	0.66	0.64	0.63	0.56	0.58
6214	0.50	0.46	0.43	0.37	0.32
6215	0.51	0.48	0.46	0.33	0.39
6216	0.49	0.48	0.47	0.35	0.37
6217	-0.05	-0.10	-0.05	-0.05	0.00

Negative values denote the disadvantages

Normalized Revealed Comparative Advantage (NRCA) Insights

The NRCA indices suggested that China had a strong comparative advantage in HS61 and HS62 during the studied period (2017–2021). Though the advantage was reduced to some extent in 2020, the country still displayed a robust export performance, indicating little impact of the Zero-COVID policy (Fig. 3). To understand how the policy influenced China's apparel export performance, a micro-level

analysis was required to pinpoint the export trajectory of the micro-level apparel product categories. Therefore, the calculation was extended to four-digit levels of chapters 61 and 62, which disclosed some exciting insights regarding the policy's impact on China's apparel export Competitiveness.

The HS 4-digit levels of chapter 61 analysis depicted that 13 of the 17 sub-categories lost their advantages in 2020 compared to 2019. The categories are HS6102, HS6103, HS6104, HS6107, HS6109, HS6210, HS6211, HS6212, HS6213, HS6214, HS6215, HS6216, and HS6217 (Fig. 4). Two categories (HS6101 and HS6105) completely lost their advantages as the policy took place in 2020, resulting in a comparative disadvantage. It indicates that the policy impacted the export performance of these apparel product categories. These two categories continued to perform poorly in their exports, while most product categories regained their lost advantages in 2021. The long-term lockdowns brought upon by the Zero-COVID policy have made the workers reluctant to return to work. The workers still suffer from safety concerns and wage uncertainties due to their previous negative experiences, tremendously hurting apparel production in China (Wallace, 2022). This could be negatively impacting the export competitiveness of these product categories. HS6106 and HS6108 were the only exceptions, as the policy seemed to have little impact on their export performances. It was quite unexpected as our analysis found HS6108 to gain comparative advantage even during this adverse situation, while HS6106 stayed nearly identical, experiencing minimal alteration during the implementation of the Zero-COVID policy.

The NRCA analysis at four-digit levels in Chapter 62 pointed out 12 categories that lost their advantages due to the Zero-COVID policy in 2020. The categories are HS6201, HS6202, HS6203, HS6204, HS6205, HS6207,

Fig. 3 NRCA insights of HS61 and 62 at a two-digit level

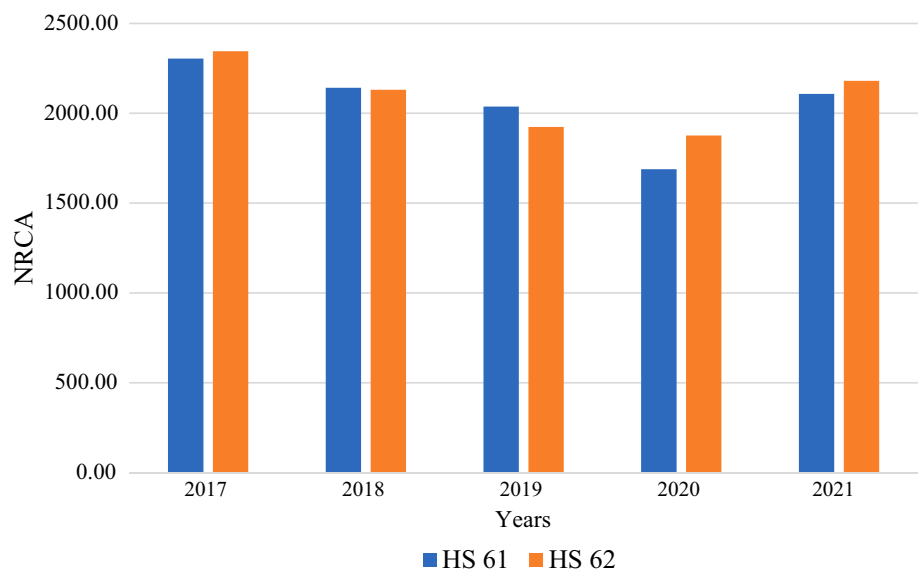


Fig. 4 NRCA insights of HS61 at the four-digit level: categories that lost advantages during the implementation of Zero-COVID policy

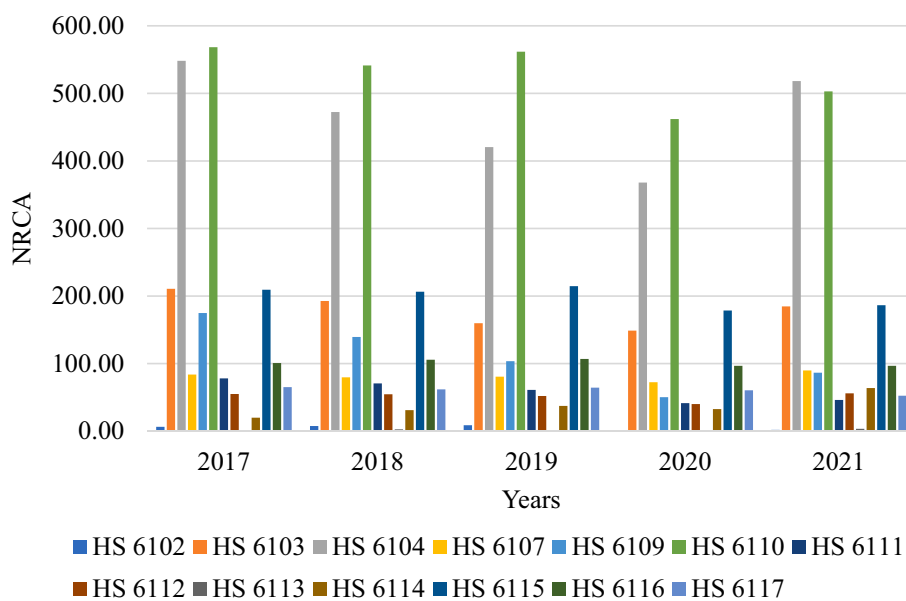
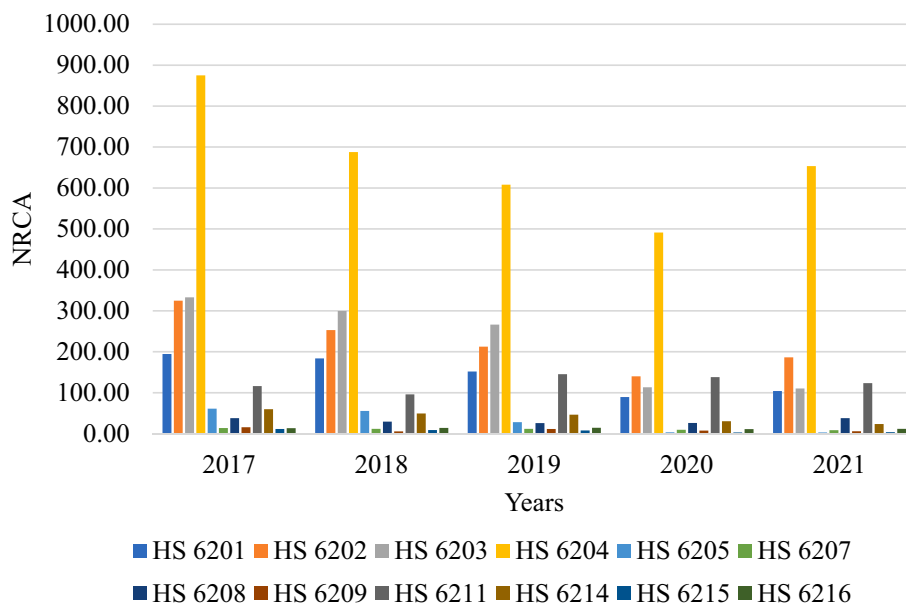


Fig. 5 NRCA insights of HS62 at the four-digit level: categories that lost their advantages during the implementation of Zero-COVID policy



HS6208, HS6209, HS6211, HS6214, HS6215, and HS6216 (Fig. 5). HS 6206 was the only category that experienced a comparative disadvantage as the policy was initiated. All three categories (chapters 61 and 62) that showed disadvantages are represented in Appendix Fig. A5.

Many fashion brands have reduced the amount of clothing they source from China. More often than not, China has been surpassed by other Asian countries like Vietnam as the top location for apparel sourcing. Western fashion buyers expect this uncertainty to be present in China for a while as the country is still experiencing a surge in COVID-19 infections. The policy has forced these brands to account for sales revenue and profit loss, making them look for other

possible alternative sourcing destinations (Lu, 2023). This could have negatively impacted the export performances of these categories.

Similar to Chapter 61, our analysis demonstrated HS 6210 as another category that gained competitiveness when the Zero-COVID policy was enforced. The categories (chapters 61 and 62) that gained advantages are represented in Appendix Fig. A6. Three other sub-categories (HS6212, HS6213, and HS6217) had little impact due to the policy sanctioning since they exhibited no significant change in their NRCA indices after the policy was legislated. All the categories (chapters 61 and 62) that remained unchanged

when the policy took place are represented in Appendix Fig. A7.

While there have been notable declines in specific product categories due to the Zero-COVID policy, the overall impact appears limited. Remarkably, numerous product categories have experienced a rebound, showcasing China's impressive and sustained export performance despite implementing the Zero-COVID policy. This resilience can be attributed to a combination of strategic factors that have allowed the country to navigate challenges and maintain a robust export trajectory. The rapid economic recovery showcased by China has played a pivotal role, demonstrating the nation's adeptness in quickly resuming economic activities following the initial setbacks of the COVID-19 pandemic. The resilient growth of China's luxury market, fueled by repatriation of Chinese luxury purchases, increased consumer demand, digitalization, and the allure of Hainan offshore duty-free shopping, has not only sustained the economy but also attracted global luxury fashion brands (Targon, 2022). The resilience of the Chinese luxury market is evident in the statistics, with approximately 21% of global consumer spending on luxury goods in 2021 originating from China (Targon, 2022). Additionally, China remains a crucial supplier of fashion goods and has proven resilient despite temporary disruptions caused by COVID-19 (UNCTAD, 2020). Notably, U.S. fashion companies have not significantly shifted away from China as a primary apparel-sourcing base, and China quickly regained its position as the top apparel supplier to the U.S. market, maintaining stable market shares. Despite challenges posed by the COVID-19 pandemic and disruptions in global value chains, China's sustained position as the top apparel supplier to the U.S. market since May 2020 (Lu, 2020) indicates a remarkable resilience in its export-oriented supply chains, which can also be noticed from the authors market share graph. Furthermore, Das et al., (2024a, 2024b, 2024c) disclosed that amid the COVID-19 pandemic, China's apparel exports to its main destinations, the U.S. and Japan, experienced distinct dynamics. Compared to 2019, China encountered only a 1.16% decrease in its share of exports to the U.S. However, the export share to Japan slightly increased during the pandemic year. This suggests the robust structure of China's supply chain despite the challenging circumstances.

Conclusions and Implications

The Chinese apparel industry assumes a pivotal role both domestically and globally, constituting a significant contributor to China's GDP and generating millions of jobs, thereby serving as a key driver of the national economy. Moreover, it has propelled China as the global leader in textile and apparel manufacturing, catering to a substantial

share of the worldwide market (Das et al., 2024b). Beyond its economic implications, the industry's importance extends to the global fashion ecosystem, influencing trends due to its ability to produce diverse goods at competitive prices (Lall & Albaladejo, 2004). However, the sector faced severe setbacks due to the Chinese government's implementation of the Zero-COVID policy to curb the virus's spread, resulting in disruptions across production and supply chains in the garment industry. This led to workforce shortages and factory closures, helping its competitors to emerge as alternative sourcing destinations (Hasan et al., 2024). Despite its success in virus containment and safeguarding worker and consumer health, the strategy precipitated an economic downturn in China (Castañeda-Navarrete et al., 2021). Given the industry's significance to the Chinese economy, it becomes imperative to assess the impact of the Zero-COVID policy on Chinese apparel export performance, a subject that has been relatively unexplored by researchers. This study addresses this research gap by pinpointing specific apparel product categories affected by the policy and analyzing its ramifications on China's apparel export competitiveness.

This research has revealed significant insights into the repercussions of the Zero-COVID policy on China's apparel exports. As per the insights derived from RSCA, 31 out of the 34 product categories at the HS four-digit level encountered a loss of comparative advantage in 2020, except for HS6106, HS6210, and HS6217. Correspondingly, findings from the NRCA analysis indicate that 28 out of the 34 categories experienced a loss of advantage due to the policy implementation. Interestingly, two product categories, specifically HS6108 and HS6210, exhibited an advantageous shift during this period, while the rest remained unaffected. Additionally, the CAGR examination revealed a positive trend of 4.75% in knitted apparel exports, contrasting with a negative CAGR of -1.15% in non-knitted apparel exports. A closer look at the market share analysis revealed that HS61 and HS62 maintained consistent market shares, except for a notable decline observed in February 2020.

The findings of this study carry substantial implications and contributions across various dimensions. They offer a comprehensive insight into China's comparative advantages and disadvantages in the realm of apparel exports, elucidating the impact of the Zero-COVID policy and associated factors on the nation's competitive advantages, impeding its incremental growth. The study introduces original data with educational value, potentially enriching students' learning experiences and contributing to global apparel-related educational programs. Moreover, the implications extend to a governmental standpoint, providing informative insights for governments and stakeholders of different apparel-exporting nations. These insights may prompt their considerations for formulating trade regulations and strategies that would facilitate their business operations and enhance preparedness for

potential future global crises of a similar nature. The findings also offer an opportunity for China to address its disadvantaged product categories and competitively position itself globally. From an economic perspective, the study assists worldwide investors and entrepreneurs in strategic planning for investments in China's apparel export sector, potentially attracting increased funding and ensuring the industry's sustained growth. Policymakers can find the study's results informative from a legislative standpoint, inspiring the development of more business-friendly policies. Lastly, the study fills the knowledge gap concerning the impact of the Zero-COVID policy on China's apparel export competitiveness. It could foster technological and other infrastructural advancements to enhance the resilience of the Chinese apparel industry in the face of future uncertainties.

Limitations and Future Research Directions

The study has notable limitations that warrant acknowledgement. While serving as a valuable initial exploration into understanding an exporter's proficiency, it overlooks crucial factors such as non-price determinants, trade barriers, and technological advancements, which play a significant role in trade competitiveness. Despite successfully pinpointing product categories affected by the Zero-COVID policy, there remains a need to delve into the reasons behind the comparative disadvantage experienced by these categories. Although the United Nations commodity trade database provides the most comprehensive trade data available, it is crucial to recognize the potential presence of export data anomalies influenced by political bias. Future competitiveness studies should adopt a more refined methodology, incorporating in-depth interviews and surveys with participants representing diverse stakeholders in the apparel industry. This approach would facilitate a nuanced understanding of various perspectives and thoroughly examine different elements influencing this competency, shedding light on the fundamental dynamics shaping the sector. Furthermore, it is essential to highlight that the present study exclusively focused on the export performance of a single nation. Its replication in other major apparel-exporting countries could enhance the generalizability of the study's findings.

Key Questions Reflecting Applicability in Real-Life

- 1) What specific policy adjustments can governments contemplate based on the study to support local industries and maintain a robust economic environment?

- 2) In view of the findings, how can businesses explore new markets or adjust their market strategies to stay resilient and explore growth opportunities?
- 3) Which countries are gaining economic advantages in the textile and apparel industry due to China's decline in implementing the Zero-COVID policy?
- 4) How are textile and apparel companies adjusting their supply chains to handle disruptions, and what practices help them keep going during times of crisis?

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References

- Babaoglu, C., & Kulaç, O. (2022). Government Initiatives and Responses to COVID-19 Pandemic: The Case of Turkey. In P. G. Aquino Jr. & R. C. Jalagat Jr. (Eds.), *Effective Public Administration Strategies for Global "New Normal"* (pp. 111–128). Singapore: Springer Nature. https://doi.org/10.1007/978-981-19-3116-1_8
- Babu, G. R., Khetrapal, S., John, D. A., Deepa, R., & Narayan, K. M. V. (2021). Pandemic preparedness and response to COVID-19 in South Asian countries. *International Journal of Infectious*

- Diseases*, 104, 169–174. <https://doi.org/10.1016/j.jiid.2020.12.048>
- Balassa, B. (1965). Trade Liberalisation and “Revealed” Comparative Advantage. *The Manchester School*, 33(2), 99–123. <https://doi.org/10.1111/J.1467-9957.1965.TB00050.X>
- Burki, T. (2022). Dynamic zero COVID policy in the fight against COVID. *The Lancet Respiratory Medicine*, 10(6), e58–e59. [https://doi.org/10.1016/S2213-2600\(22\)00142-4](https://doi.org/10.1016/S2213-2600(22)00142-4)
- Castañeda-Navarrete, J., Hauge, J., & López-Gómez, C. (2021). COVID-19's impacts on global value chains, as seen in the apparel industry. *Development Policy Review*, 39(6), 953–970. <https://doi.org/10.1111/dpr.12539>
- Chakraborty, S., & 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. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3762220>
- Chen, C., Jiang, Z., Li, N., Wang, H., Wang, P., Zhang, Z., Zhang, C., Ma, F., Huang, Y., Lu, X., Wei, J., Qi, J., & Chen, W.-Q. (2022). Advancing UN Comtrade for physical trade flow analysis: Review of data quality issues and solutions. *Resources, Conservation and Recycling*, 186, 106526. <https://doi.org/10.1016/j.resconrec.2022.106526>
- Das, S., Hasan, M. R., & Das, D. (2024b). Can there be a “Next China”? Comparative advantage analysis of top apparel exporters. In *International Textile and Apparel Association Annual Conference Proceedings* (Vol. 80, No. 1). Iowa State University Digital Press. <https://doi.org/10.31274/itaa.17433>
- Das, S., Hasan, M. R., & Das, D. (2024c). Zero Covid policy: Understanding its impact on China's apparel comparative advantage. In *International Textile and Apparel Association Annual Conference Proceedings* (Vol. 80, No. 1). Iowa State University Digital Press. <https://doi.org/10.31274/itaa.17435>
- Das, S., Hasan, M. R., & Das, D. (2024a). Who is the next China? Comparative advantage analysis from top ten apparel exporting nations. *Competitiveness Review: an International Business Journal*. <https://doi.org/10.1108/CR-06-2023-0143>
- Ghag, N., Acharya, P., & Khanapuri, V. (2022). Prioritizing the challenges faced in achieving international competitiveness by export-oriented Indian SMEs: A DEMATEL Approach. *International Journal of Global Business and Competitiveness*, 17(S1), 12–24. <https://doi.org/10.1007/s42943-022-00061-z>
- Guan, Z., Xu, Y., Jiang, H., & Jiang, G. (2019). International competitiveness of Chinese textile and clothing industry: A diamond model approach. *Journal of Chinese Economic and Foreign Trade Studies*, 12(1), 2–19. <https://doi.org/10.1108/JCEFTS-01-2018-0003/FULL/XML>
- Guinebault, M. (2022). *Could China's zero-Covid policy hamper textile industry's recovery?* Fashion Network. <https://us.fashionnetwork.com/news/Could-china-s-zero-covid-policy-hamper-textile-industry-s-recovery-,1387789.html>
- Hasan, M. R., Swazan, I. S., & Das, D. (2024). Beyond the seams: Evaluating competitiveness and comparative advantage in Vietnam's apparel industry. *Journal of Chinese Economic and Foreign Trade Studies*. <https://doi.org/10.1108/JCEFTS-10-2023-0050>
- Husband, L. (2022). *Financial loss, disruption for apparel under China zero-Covid policy*. Just Style. <https://www.just-style.com/news/financial-loss-disruption-for-apparel-under-china-zero-covid-policy/>
- Islam, S., Islam, R., Mannan, F., Rahman, S., & Islam, T. (2020). COVID-19 pandemic: An analysis of the healthcare, social and economic challenges in Bangladesh. *Progress in Disaster Science*, 8, 100135. <https://doi.org/10.1016/j.pdisas.2020.100135>
- Kathuria, L. M. (2013). Analyzing competitiveness of clothing export sector of India and Bangladesh: Dynamic revealed comparative advantage approach. *Competitiveness Review*, 23(2), 131–157. <https://doi.org/10.1108/10595421311305343/FULL/XML>
- Kathuria, L. M. (2018). Comparative advantages in clothing exports: India faces threat from competing nations. *Competitiveness Review: An International Business Journal*, 28(5), 518–540. <https://doi.org/10.1108/CR-01-2017-0010>
- Lall, S., & Albaladejo, M. (2004). China's competitive performance: A threat to East Asian manufactured exports? *World Development*, 32(9), 1441–1466. <https://doi.org/10.1016/j.worlddev.2004.03.006>
- Laursen, K. (2015). Revealed comparative advantage and the alternatives as measures of international specialization. *Eurasian Business Review*, 5(1), 99–115. <https://doi.org/10.1007/s40821-015-0017-1>
- Leggett, T. (2021). *Ningbo: Global supply fears as China partly shuts major port*. BBC News. <https://www.bbc.com/news/business-58196477>
- Long, Y. (2021). Export competitiveness of agricultural products and agricultural sustainability in China. *Regional Sustainability*, 2(3), 203–210. <https://doi.org/10.1016/j.regsus.2021.09.001>
- Lu, S. (2020). *COVID-19 and U.S. apparel imports (Updated: April 2020)*. FASH455 Global Apparel & Textile Trade and Sourcing. <https://shenglufashion.com/2020/04/10/covid-19-and-u-s-apparel-imports-updated-april-2020/>
- Lu, S. (2021). *Outlook for China's textile and apparel industry (2021–2025)*. FASH455 Global Apparel & Textile Trade and Sourcing. <https://shenglufashion.com/2021/06/25/outlook-for-chinas-textile-and-apparel-industry-2021-2025/>
- Lu, S. (2023). *What do fashion companies say about China as an apparel sourcing base? (Updated January 2023)*. FASH455 Global Apparel & Textile Trade and Sourcing. <https://shenglufashion.com/2023/01/19/what-do-fashion-companies-say-about-china-as-an-apparel-sourcing-base-updated/>
- Lu, S., & Langro, V. (2021). How has COVID-19 affected apparel exports from China, Vietnam, and Bangladesh? *International Textile and Apparel Association Annual Conference Proceedings*. <https://doi.org/10.31274/ITAA.13334>
- Ma, Y. (2022). *Apparel industry in China - statistics & facts*. Statista. <https://www.statista.com/topics/7494/apparel-industry-in-china/#topicOverview>
- Mandhana, N. (2022). How China's Zero-Covid Policies are disrupting cross-border trade. *The Wall Street Journal*. <https://www.wsj.com/articles/chinas-zero-covid-policies-cause-a-traffic-jam-in-vietnam-as-farmers-suffer-11642503601>
- Momaya, K. S. (2019). The past and the future of competitiveness research: A review in an emerging context of innovation and EMNEs. *International Journal of Global Business and Competitiveness*, 14(1), 1–10. <https://doi.org/10.1007/s42943-019-00002-3>
- Saki, Z., Moore, M., Kandilov, I., Rothenberg, L., & Godfrey, A. B. (2019). Revealed comparative advantage for US textiles and apparel. *Competitiveness Review*, 29(4), 462–478. <https://doi.org/10.1108/CR-03-2018-0025/FULL/XML>
- Shahbandeh, M. (2022). *Leading cotton producing countries worldwide in 2021/2022*. Statista. <https://www.statista.com/statistics/263055/cotton-production-worldwide-by-top-countries/>
- Tabish, S. A. (2020). Covid-19 Pandemic: Emerging perspectives and future trends. *Journal of Public Health Research*. <https://doi.org/10.4081/jphr.2020.1786>
- Tan, W. (2021). *Shipping: China partially shuts down port after one Covid case*. CNBC. <https://www.cnbc.com/2021/08/13/chinas-zero-covid-strategy-to-disrupt-shipping-as-ningbo-zhoushan-port-shuts-.html>
- Targon, G. (2022). *China: The luxury fashion industry in the Covid-19 era* [Università Ca' Foscari Venezia]. <http://dspace.unive.it/bitstream/handle/10579/21896/975280-1268706.pdf?sequence=2>

- The Japan Times. (2023). "Zero-COVID" broke the system that keeps China's factories running. The Japan Times. <https://www.japan-times.co.jp/news/2023/02/17/business/zero-covid-china-factories/>
- UNCTAD. (2020). *Textile and garment supply chains in times of COVID-19: challenges for developing countries*. UNCTAD. <https://unctad.org/es/isar/news/textile-and-garment-supply-chains-times-covid-19-challenges-developing-countries>
- Vollrath, T. L. (1991). A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Weltwirtschaftliches Archiv*, 127(2), 265–280. <https://doi.org/10.1007/BF02707986>
- Wallace, J. (2022). *Why protesters are targeting Xi Jinping for China's 'zero covid' failures*. The Washington Post. <https://www.washingtonpost.com/politics/2022/11/30/china-protest-zero-covid-xi-jinping/>
- WTO. (2022). *WTO stats*. World Trade Organization. <https://stats.wto.org/?idSavedQuery=6fc11703-f123-4c17-8d59-56761ec0dc51>
- Xu, H., Zhang, D., & Zhang, Z. (2023). The impact of Covid-19 on international trade in China- industry review in the YRD and the PRD. *Journal of Education, Humanities and Social Sciences*, 8, 1763–1769. <https://doi.org/10.54097/ehss.v8i.4579>
- Yu, R., Cai, J., & Leung, P. (2009). The normalized revealed comparative advantage index. *The Annals of Regional Science*, 43(1), 267–282. <https://doi.org/10.1007/s00168-008-0213-3>
- Yuan, P., Tan, Y., Yang, L., Aruffo, E., Ogden, N. H., Yang, G., Lu, H., Lin, Z., Lin, W., Ma, W., Fan, M., Wang, K., Shen, J., Chen, T., & Zhu, H. (2022). Assessing the mechanism of citywide test-trace-isolate Zero-COVID policy and exit strategy of COVID-19 pandemic. *Infectious Diseases of Poverty*, 11(1), 104. <https://doi.org/10.1186/s40249-022-01030-7>
- Zhang, Y., & Bai, T. (2014). A study on the international competitiveness of China textile and clothing industry. *WHICEB Proceedings*, 8. <http://aisel.aisnet.org/whiceb2014/8>
- Zhang, M., Kong, X. X., & Ramu, S. C. (2016). The transformation of the clothing industry in China. *Asia Pacific Business Review*, 22(1), 86–109. <https://doi.org/10.1080/13602381.2014.990204>

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Sudipta Das is a Graduate Student at West Virginia University, pursuing a Master's in Design and Merchandising. He holds a Master's in Textile Engineering from Wuhan Textile University, China, and a Bachelor's from Mawlana Bhashani Science and Technology University, Bangladesh. With over a year's hands-on experience in apparel and merchandising, Sudipta also has a year of teaching expertise on this track. His interests include competitiveness, fashion business, the fashion industry, and

the global apparel trade.



Md Rokibul Hasan is a Graduate Student at West Virginia University, pursuing his Master's in Design and Merchandising. He completed his Bachelor's in Textile Engineering from Bangladesh University of Textiles. He has an internship experience in a multinational apparel industry in Bangladesh. He is particularly interested in fashion trade analysis, issues within the clothing industry, fashion retail business, global apparel supply chain, and consumer behavior.



Debanjan Das Ph.D., is an assistant professor in the Fashion, Dress, and Merchandising Department at the School of Design and Community Development at West Virginia University. His research program focuses on social sustainability, small & micro fashion businesses, and the competitiveness of the fashion industry. He is also a director of the WV Fiber to Fashion lab with the goal of adding value to wool produced in West Virginia. He is a member of the NC1030 USDA multistate research group focusing on Sustainable and Resilient Systems and the Transformative Response to Disruptions by Families, Businesses, and Communities. Das's teaching focuses on the core fashion merchandising curriculum, covering omnichannel, promotion, retail math, sourcing, and technology.