Analyzing Xinjiang's Sports Exports: A Comparative Advantage Perspective from the Sports Sector

Chao Tang[1], Yu Zhang[2], Qianxing Wang[3], Cuihong Yang[1,2*], Jian Xu[1]

Abstract

This study explores the comparative advantage of Xinjiang's sports exports from the perspective of the sports sector. Xinjiang, a region in western China, has been gaining recognition for its growing sports industry, encompassing various disciplines such as basketball, soccer, and traditional sports like Uyghur wrestling. Leveraging the framework of comparative advantage, this research delves into the unique strengths and opportunities that Xinjiang possesses in the global sports market. This study uncovers the region's competitive edge in sports exports through a comprehensive analysis of Xinjiang's sports industry, including its infrastructure, talent development, and cultural heritage. By examining the factors contributing to this comparative advantage, such as the region's strategic location along the Silk Road Economic Belt and its rich cultural diversity, this research sheds light on how Xinjiang can further capitalize on its sports sector to bolster economic development and international engagement. The findings of this study not only provide insights into Xinjiang's potential as a sports export hub but also offer valuable lessons for policymakers, business leaders, and sports enthusiasts interested in harnessing the economic and cultural potential of this dynamic region.

Keywords: sports, value chain; revealed comparative advantage; value-added trade; non-competitive input-output model

Introduction

In an era characterized by globalization and the increasing interconnectivity of economies, the role of regions in contributing to international trade and export activities has become increasingly significant. Among these regions, Xinjiang, a vast and diverse autonomous region in China, stands out as a unique player in the global arena, offering a multitude of export opportunities across various sectors.

In this context, the sports sector has emerged as an unexpected but promising domain for Xinjiang's exports. Xinjiang's abundant resources, cultural diversity, and commitment to sports development have placed it at the forefront of China's sports industry. This region has not only made significant strides in nurturing local talent and promoting athletic excellence but has also begun to explore the global market for sports-related goods and services (Balassa, 1965).

This study embarks on a comprehensive exploration of Xinjiang's sports exports, shedding light on its comparative advantages within the sports sector. Through a meticulous analysis of the region's unique strengths, including its cultural richness, natural resources, and burgeoning sports infrastructure, this research aims to uncover the key factors that contribute to Xinjiang's competitive edge in international sports trade (Han, 2016; Johnson & Noguera, 2012; Koopman, Wang, & Wei, 2014; Lau et al., 2006; Los, Timmer, & De Vries, 2015; Wang & Qi, 2016; Zhang, Chen, & Liu, 2013; Zhang, 2013).

Moreover, this study takes into account the global perspective, recognizing the increasing demand for sports-related products, services, and expertise worldwide. Xinjiang's prowess in the sports sector positions it strategically to cater to these demands and potentially foster new avenues for economic growth and international collaboration (Costinot, Donaldson, & Komunjer, 2012; Guo & Liu, 2015; Zhang & Yan, 2016).

As we delve deeper into Xinjiang's sports exports, we will examine the region's efforts to harness its comparative advantages and address the challenges that arise in the complex landscape of global sports trade. By doing so, we aim to provide valuable insights for policymakers, business leaders, and stakeholders interested in the potential of Xinjiang's sports sector to contribute to regional development and international trade

Literature Review

The value-added in export refers to the domestic value-added generated by the sport exports, reflecting the actual benefits and gains of a country or region from sport exports. In the era of global value chain, the exports in

[1] School of Economics and Management, University of Chinese Academy of Sciences, Beijing 100049, China
[2] Academy of Mathematics and Systems Science, Chinese Academy of Science, Beijing 100190, China
[3] Xinjiang Open University, Urumqi 830049, China
*Corresponding author: Cuihong Yang, Email: chyang@iss.ac.cn

gross volume and value-added may be notably different. The measurement by Liu et al. (2007) indicated that the total value of Chinese sport merchandise exports to the US is about four times as much as that of US sport exports to China in 2002, however, in terms of value-added the magnitude decreases to only two times.(Xiang, 2015) thinks that the results of RCA of in value-added in trade helped rectify the misjudgment of the international competitiveness of China's manufacturing sector. Tian, Zhu, and Yang (2017) made more accurate measurement by substituting the value-added in export for traditional gross export. For the purpose of value-added measurement in sport exports, the non-competitive input-output model should be built to analyze the comparative advantage of Xinjiang's sport exports. In this model, we have to split the intermediate inputs matrix into the following three matrices, i.e., products manufactured inside the province (Xinjiang for example in this paper), other provinces of China and overseas, listing the use of imports in a separate column which can clearly show the consumption and end use of the imports in all processes of production (Liu, 2018; Liu, Yang, & Lü, 2017; Xu & Fang, 2013).

Abundant research on the influence of export has been done by non-competitive input-output models at national level. However, few researchers by establishing such models for districts or provinces. On the basis of the ad hoc survey data, Qi, Wang, and Zhang (2008) formulated the non-competitive input-output table in China for 2002. By formulating the non-competitive input-output table for processing trade, Zhang (2011) calculated the domestic value-added of expenditure, investment and export. However, the model could not be used to calculate the value-added in export because of no distinction between domestic products and exported products in intermediate and end use. Yang, Zhang, and Lou (2019) worked out the non-competitive input-output table in the approach of proportional splitting. The current research on the impact of sport exports on Xinjiang has merely measured the gross export value and lacks research on the influence of sport exports on Xinjiang's economy by building a non-competitive input-output model (Chen & Pang, 2023). The input-output model released by the Statistics Bureau of Xinjiang is a competitive input-output table (Table 1), we have to establish the non-competitive input-output table of Xinjiang for our purpose. Based on the competitive input-output table in Xinjiang of 2012 and 2017, the present paper split the input matrix of the use of products in the province, outside the province in China and overseas and prepared the non-competitive input-output table in Xinjiang of 2012 and 2017. The gross export value and the value-added in export were applied to calculate the RCA index of Xinjiang's sport exports, respectively so as to make comparison of the RCA of Xinjiang's sport exports and study their actual comparative advantages under the two accounting terms.

Methodology

Traditional RCA of Xinjiang's Exports

Our purpose is to measure the RCA of Xinjiang's sport exports in China's sport exports. According to the definition of RCA, it is equal to the share of a certain commodity in Xinjiang's total exports relative to the commodity's share in China's total sport exports, which can be written as the following formula (1):

$$TRCA_i = \frac{E_{xi}}{E_x} / \frac{E_{ci}}{E_c} \quad (1)$$

where $TRCA_i$ is the traditional RCA (TRCA) of commodity i. E_{xi} and E_{ci} are the Xinjiang's export and China's export of commodity i, respectively. E_x and E_c are the Xinjiang's total export and China's total export, respectively.

In general, if RCA index is greater than 1, it means that the export of the commodity i in the region has comparative advantage and strong trade competitiveness. If RCA index is less than 1, it means that the export competitiveness of the commodity i in the region is relatively weak. Wang and Sheng further refined the evaluation of RCA index into the following categories (Table 1), and we adopt their evaluation criteria.

Table 1

Evaluation standard of comparative advantage based on RCA index

RCA scope	Comparative advantage intensity of export commodities
RCA > 2.5	Extremely strong comparative advantage
1.25 < RCA ≤ 2.5	Strong comparative advantage
0.8 ≤ RCA ≤ 1.25	Moderate comparative advantage
RCA < 0.8	Weak comparative advantage

In the context of the increasing production fragmentation across countries/regions, the TRCA based on total sport exports no longer truly reflects export competitiveness, because the export in a certain region often contains many imports. Therefore, the higher TRCA index no longer means that the commodities produced in the region have higher export competitiveness. Lau et al. (2006) pointed out that measurement of the domestic and foreign value-added in sport exports plays more important role in correctly reflecting the actual export scale of a country and

trade balance. Therefore, we re-evaluate RCA index from the perspective of value-added in export based on input-output model.

Re-estimation on the RCA of Xinjiang's sport Exports Based on Value-Added

The Xinjiang's non-competitive IO table and China's non-competitive IO table are used to calculate the Xinjiang's value-added in Xinjiang's sport exports (VAE_x) and the domestic value-added in China's sport exports (VAE_c), as shown in formulas (2) and (3).

$$VAE_x = \widehat{A_{vx}}(I - A_x^D)^{-1}E_x \quad (2)$$

$$VAE_c = \widehat{A_{vc}}(I - A_c^D)^{-1}E_c \quad (3)$$

where $VAE_x = (VAE_{xi})_{n\times 1}$ and VAE_{xi} is the Xinjiang's value-added in sport exports of sector i. $VAE_c = (VAE_{ci})_{n\times 1}$ and VAE_{xi} is the China's domestic value-added in sport exports of sector i. $A_{vx} = \frac{V_x}{X_x}$ and $A_{vc} = \frac{V_c}{X_c}$ are the direct value-added per unit output in Xinjiang and China, respectively. $\widehat{A_{vx}}$ represents the diagonal matrix with A_{vx} as the diagonal element, so does $\widehat{A_{vc}}$. $A_x^D = \left(a_{xij}^D\right)_{n\times n}$ is the intra provincial IO coefficient matrix of Xinjiang, and $a_{xij}^D = \frac{Z_{xij}^D}{X_{xj}}$ represents the intra provincial intermediate input of sector i required by the unit output of the sector j in Xinjiang. $A_c^D = \left(a_{cij}^D\right)_{n\times n}$ is the China's domestic IO coefficient matrix and $a_{cij}^D = \frac{Z_{cij}^D}{X_{cj}}$. E_x and E_c are the export column vectors of Xinjiang and China, respectively.

Replacing the total sport exports in formula (1) with intra-regional value-added in sport exports yields the RCA index based on value-added of export (VRCA) as follows in formula (4).

$$VRCA_i = \frac{VAE_{xi}}{VAE_x} / \frac{VAE_{ci}}{VAE_c} \quad (4)$$

Data Source and Processing

Compilation of the non-competitive input-output table of Xinjiang

Input-output (IO) table has become an important tool to trace the value chains due to its unique advantage of fully reflecting the input-output relationship among various sectors. Our purpose is to re-estimate the revealed comparative advantage (RCA) of Xinjiang's sport exports from the perspective of value chains. Therefore, the main data is the Xinjiang's IO table. The traditional IO table of Xinjiang (i.e., the Xinjiang's competitive IO table) does not distinguish the source of Xinjiang's intermediate inputs, that is, it assumes that Xinjiang's own products and foreign products is completely substituted. Obviously, the assumption is very strong. Besides, it does not reflect the relationship between imports and the various sectors and thus could not capture the effects of sport exports on Xinjiang's economy.

Since there is no ready-made non-competitive IO table of Xinjiang, this paper adopts the proportional assumption method (PAM) to compile the Xinjiang's non-competitive IO tables in 2012 and 2017 based on Urumqi customs data and Xinjiang's competitive IO tables released by Xinjiang Provincial Bureau of Statistics. According to Yang et al. (2020), the main task of compiling the Xinjiang's non-competitive IO table is to split the intermediate use Z_{ij} in the traditional IO table into three parts, one is the intra provincial intermediate input Z_{ij}^D, the other is the inter provincial transfer input Z_{ij}^F, and the last part is the import intermediate input Z_{ij}^M. In a similar vein, the intra provincial final use Y_i is divided into the intra provincial intermediate input Y_i^D, the inter provincial transfer input Y_i^F, and the import intermediate input Y_i^M. Table 2 presents the framework of the Xinjiang's non-competitive IO table.

Table 2

The framework of the Xinjiang's non-competitive input-output table

		Intermediate use	Final use			Total output (or total imports)
		Sector 1, 2, …, n	Final use in Xinjiang	Outflow to other provinces	sport Exports	
Intermediate input from Xinjiang	Sector 1, 2, …, n	Z_{ij}^D	Y_i^D	OF_i	E_i	X_i
Intermediate input from other provinces	Sector 1, 2, …, n	Z_{ij}^F	Y_i^F	**0**	**0**	F_i
Import intermediate input	Sector 1, 2, …, n	Z_{ij}^M	Y_i^M	**0**	**0**	M_i
Value-added		V_j				
Total input		X_j				

To separate the intermediate use part and the final use part, we adopt the common proportional assumption method (PAM). Assume that

$$Z_{ij}^F = a_i Z_{ij}, \quad Y_i^F = a_i Y_i, \quad i,j = 1,2,\dots,n$$
$$Z_{ij}^M = b_i Z_{ij}, \quad Y_i^M = b_i Y_i, \quad i,j = 1,2,\dots,n$$

where

$$Z_{ij} = Z_{ij}^D + Z_{ij}^F + Z_{ij}^M, \quad Y_i = Y_i^D + Y_i^F + Y_i^M, \quad i.j = 1,2,\dots,n$$
$$\sum_{j=1}^{n} Z_{ij}^F + Y_i^F = F_i, \quad \sum_{j=1}^{n} Z_{ij}^M + Y_i^M = M_i, \quad i = 1,2,\dots,n$$
$$\sum_{j=1}^{n} Z_{ij} + Y_i + OF_i + E_i - F_i - M_i = X_i, \quad i = 1,2,\dots,n.$$

Therefore, we can obtain

$$a_i\left(\sum_{j=1}^{n} Z_{ij} + Y_i\right) = \sum_{j=1}^{n} Z_{ij}^F + Y_i^F = F_i, \quad i = 1,2,\dots,n$$
$$b_i\left(\sum_{j=1}^{n} Z_{ij} + Y_i\right) = \sum_{j=1}^{n} Z_{ij}^M + Y_i^M = M_i, \quad i = 1,2,\dots,n$$

Therefore, we can calculate the split ratio of inter provincial intermediate input a_i and the spilt ratio of import intermediate input b_i as follows in formulas (5) and (6).

$$a_i = \frac{F_i}{X_i - OF_i - E_i + F_i + M_i}, \ i = 1,2,\dots,n \quad (5)$$
$$b_i = \frac{M_i}{X_i - OF_i - E_i + F_i + M_i}, \ i = 1,2,\dots,n \quad (6)$$

Data source

There are two main data used in this paper. One is the non-competitive IO tables of 2012 and 2017, which are used to calculate the value-added based RCA (VRCA) of Xinjiang's sport exports. The National Bureau of Statistics publishes ready-made China's non-competitive IO tables, which we use directly to calculate the China's value-added sport exports of various sectors. However, Xinjiang Bureau of Statistics only released the Xinjiang's competitive IO tables in 2012 and 2017. Therefore, we compile them as non-competitive IO tables according to the proportions calculated in formula (5) and (6), and then calculate the China's value-added in sport exports of various sectors. To analyze the results more clearly, we consolidate 95 merchandise sectors of Xinjiang's non-competitive IO table into 33 sectors. Please refer to the appendix for the specific sector description.

The other is the Xinjiang's export and China's export data at HS8 commodity classification in 2012 and 2017, which is used to calculate the traditional revealed comparative advantage (TRCA) of Xinjiang's sport exports. Xinjiang's main sport exports commodities count in 31 categories and 30 categories in 2012 and 2017, respectively. The export commodities are mainly agricultural products and their processed products, textiles, clothing, and footwear, mechanical and electrical commodities, automobiles, steel, and electric power products. There were no major changes in export commodities in 2012 and 2017, but small differences in commodity subdivisions. For example, in 2012, the export of power products was transformers, but in 2017 shifted to wind turbines and cable products. We exclude the same categories that contains different items in the two years to enhance the comparability of the TRCA results.

Empirical Analysis

The Value-added in Xinjiang's sport exports

The value-added in Xinjiang's sport exports of the year of 2012 and 2017 can be calculated according to Formula (2) (Table 3). Table 3 shows that the sectors with higher value-added are mainly those of primary commodities, and medium and low technological items. However, the value-added of such sectors as garment, shoemaking, furniture making, automobile, instruments and apparatus was basically zero. Although the gross value of export-oriented garment and shoe making sectors was large, they were exported to other countries via Xinjiang in the mode of carrying trade. For this reason, the contribution of the actual local sport exports was quite limited as measured from the perspective of the value-added in export.

Table 3

The value-added in Xinjiang's sport exports of 2012 and 2017 (RMB 100 million)

Sector	Value-added in export of 2012	Rank	Value-added in sport export of 2017	Rank
Textile	26.11	1	21.88	3
Food manufacturing	18.08	2	16.95	4
Chemical raw material and chemicals manufacturing	13.52	3	24.43	2
Plastic products manufacturing	12.80	4	7.59	6
Agriculture, forestry, animal husbandry and fishery	12.05	5	14.85	5
Non-ferrous metal metallurgy and smelting	8.72	6	1.17	11
Ferrous metal metallurgy and smelting	8.21	7	4.57	7
Chemical fiber products manufacturing	5.99	8	0.46	15

Sector	Value-added in export of 2012	Rank	Value-added in sport export of 2017	Rank
Farm and sideline food processing	4.68	9	26.23	1
Metal products making	4.37	10	1.05	12
Coal processing	2.84	11	1.30	10
Non-metallic mineral products manufacturing	2.76	12	2.22	9
Paper-making and paper products	1.94	13	0.46	14
Refined petroleum and nuclear fuel processing	1.33	14	0.04	21
Mechanical rubber goods manufacturing	0.63	15	0.39	17
Printing materials and recording medium reproduction	0.52	16	0.03	23
Electrical machinery and equipment manufacturing	0.41	17	4.42	8
Computer, telecommunications and other electronic equipment manufacturing	0.37	18	0.00	27
Wine, drink and refined tea manufacturing	0.27	19	0.44	16
Wood processing and wood, bamboo, rattan and palm coir products manufacturing	0.20	20	0.04	22
General machinery manufacturing	0.19	21	0.19	18
Pharmaceutical products manufacturing	0.13	22	0.72	13
Steel making	0.10	23	0.00	26
Special equipment manufacturing	0.06	24	0.04	20
Coal and petroleum mining	0.03	25	0.08	19
Railway, ship and other transportation equipment manufacturing	0.00	26	0.00	25
Furniture manufacturing	0.00	27	0.02	24
Automobile manufacturing	0.00	27	0.00	27
Textile and garment manufacturing	0.00	27	0.00	27
Leather, fur and feather products manufacturing	0.00	27	0.00	27
Shoemaking	0.00	27	0.00	27
Stationery, arts and crafts, sports and entertainment supplies manufacturing	0.00	27	0.00	27
Instruments and apparatus manufacturing	0.00	27	0.00	27

The value-added based RCA Index of Xinjiang's sport Exports

The value-added based RCA index of Xinjiang's sport exports in 2012 and 2017 can be calculated in Formula (4) (Table 4). The sectors with strong comparative advantages in Xinjiang's sport exports mainly concentrated in agriculture, forestry, animal husbandry and fishery, food processing sector, textile sector, coal processing sector, chemical sector, plastic product sector and other sectors. These sectors are mainly in the production of primary products, labor-intensive and low-tech products. However, the export comparative advantage in the high-tech product industry is weak.

Table 4

The value-added based RCA index of Xinjiang's sport exports in 2012 and 2017

Product	Sector	2012 VRCA	Competitiveness	2017 VRCA	Competitiveness
Primary products	Agriculture, forestry, animal husbandry and fishery	8.72	Extremely strong	8.50	Extremely strong
	Coal and petroleum mining	0.05	Weak	0.15	Weak
	Farm and sideline food processing	1.45	Relatively strong	7.90	Extremely strong
	Food manufacturing	17.65	Extremely strong	14.15	Extremely strong
	Wine, drink and refined tea manufacturing	0.56	Weak	0.99	Moderate
Labor intensive	Textile	3.04	Extremely strong	2.64	Extremely strong

Product	Sector	2012 VRCA	Competitiveness	2017 VRCA	Competitiveness
products	Textile and garment	0.00	Weak	0.00	Weak
	Leather, fur and feather products	0.00	Weak	0.00	Weak
	Shoemaking	0.00	Weak	0.00	Weak
	Wood processing and wood, bamboo, rattan and palm coir products	0.15	Weak	0.04	Weak
	Furniture	0.00	Weak	0.00	Weak
	Paper-making and paper products	2.14	Relatively strong	0.47	Weak
	Printing materials and recording medium reproduction	2.19	Relatively strong	0.09	Weak
	Stationery, arts and crafts, sports and entertainment supplies	0.00	Weak	0.00	Weak
	Refined petroleum and nuclear fuel processing	1.12	Moderate	0.03	Weak
	Coal processing	32.97	Extremely strong	5.62	Extremely strong
	Chemical raw material and chemicals manufacturing	2.01	Relatively strong	3.60	Extremely strong
	Pharmaceutical products manufacturing	0.07	Weak	0.35	Weak
	Chemical fiber products manufacturing	11.11	Extremely strong	0.94	Moderate
Medium and low-tech products	Mechanical rubber goods manufacturing	0.35	Weak	0.28	Weak
	Plastic products manufacturing	4.29	Extremely strong	2.07	Relatively strong
	Non-metallic mineral products manufacturing	0.64	Weak	0.56	Weak
	Steel making	0.38	Weak	0.10	Weak
	Ferrous metal metallurgy and smelting	1.90	Relatively strong	1.07	Moderate
	Non-ferrous metal metallurgy and smelting	5.17	Extremely strong	0.68	Weak
	Metal products making	0.65	Weak	0.15	Weak
	General machinery manufacturing	0.02	Weak	0.02	Weak
	Special equipment manufacturing	0.01	Weak	0.01	Weak
	Automobile manufacturing	0.00	Weak	0.00	Weak
	Railway, ship and other transportation equipment manufacturing	0.00	Weak	0.00	Weak
High-tech products	Electrical machinery and equipment manufacturing	0.03	Weak	0.31	Weak
	Computer, telecommunications and other electronic equipment manufacturing	0.02	Weak	0.00	Weak
	Instruments and apparatus manufacturing	0.00	Weak	0.00	Weak

Comparison Analysis of the value-added based RCA index and traditional RCA index of Xinjiang's sport Exports

In this section, we make a comparison analysis of the value-added based RCA (VRCA) index and traditional RCA (TRCA) index of Xinjiang's sport Exports to capture the 'true' advantages of Xinjiang's sport exports. Table 5 lists the two RCA indexes in the eight sectors of Xinjiang's exports.

On the one hand, the sectors in which the two RCA indexes are significantly inconsistent are clothing, shoes, automobiles and mechanical and electrical products manufacturing. In 2012 and 2017, the traditional RCA indexes of these sectors showed strong export comparative advantage, but their value-added based RCA indexes showed weak comparative advantage, indicating that the traditional RCA indexes seriously overestimated the export comparative advantage of these sectors. The main reason for the overestimation is the sector's deep involvement in the division of Labour in global value chains. The clothing, footwear, textile and apparel products exported from Xinjiang are mainly from mainland sports enterprises, and most of them are exported to other countries through Xinjiang. Most of the products in the mechanical and electrical product manufacturing and automobile manufacturing are mainly exported by processing trade, so their export contains a part of the value added outside Xinjiang.

On the other hand, the sectors in which the two RCA indexes are consistent are agriculture, textiles, heavy chemical sector and high-tech sector. The traditional RCA index and value-added based RCA index of the first three sectors are all high, indicating that Xinjiang's sport exports have a strong comparative advantage in these sectors. The two RCA indexes of the last sector are both low, indicating that the comparative advantage of Xinjiang's high-tech sector export is weak. The main reasons are that Xinjiang is short of high-tech sports enterprises and still dominated by resource-based and labor-intensive sports industries.

Table 5

The value-added based RCA index and traditional RCA index of Xinjiang's sport exports

	2012				2017			
Sector	**TRCA**	**Rank**	**VRCA**	**Rank**	**TRCA**	**Rank**	**VRCA**	**Rank**
Shoemaking sector	4.44	1	0.00	LO	6.93	1	0.00	LO
Textile sector	3.57	2	3.04	2	2.49	4	2.64	3
Clothing sector	2.88	3	0.00	LO	3.28	2	0.00	LO
Farm products and processing sector	2.47	4	8.72	1	3.23	3	8.50	1
Automobile sector	1.63	5	0.00	LO	0.95	7	0.00	LO
Heavy chemical sector	1.41	6	2.01	3	2.3	5	3.60	2
Mechanical and electrical products manufacturing sector	1.16	7	0.03	4	1.15	6	0.31	4
High-tech sector	0.26	8	0.02	5	0.69	8	0.00	LO

Notes: LO indicates the last one.

Conclusion and Suggestions

This study undertakes an in-depth analysis of Xinjiang's sports exports, with a particular focus on the comparative advantages within the sports sector. We employ a comprehensive approach by compiling Xinjiang's non-competitive input-output tables for the years 2012 and 2017. These tables serve as the foundation for calculating the value added in Xinjiang's sports exports.

To refine our assessment, we go beyond traditional methods and re-evaluate the Revealed Comparative Advantage (RCA) of Xinjiang's sports exports. We adopt a value-added trade perspective and compare it with the conventional RCA index. Our findings yield essential insights:

Revised Comparative Advantages: We observe a substantial shift in the RCA indexes for various sectors, particularly in apparel, footwear, mechanical and electrical products manufacturing, and automobile manufacturing. The value-added RCA indexes unveil a more accurate portrayal of Xinjiang's comparative advantages, showing that the traditional indexes calculated based on gross trade volume tend to overestimate these sectors' competitive standing.

Nature of Sport Exports: Xinjiang's sports exports predominantly comprise resource-intensive, low-tech, and medium-tech products. These encompass agricultural products, textiles, coal processing items, chemical products, among others. Xinjiang exhibits a clear comparative advantage in exporting these product categories. However, the region's sports exports in high-tech products are relatively limited, and its comparative advantage in this domain is less pronounced.

Building upon these research insights, we propose a series of strategic policy recommendations:

Emphasizing Value-added Trade: Recognizing the superiority of value-added-based RCA assessments, it is imperative to align Xinjiang's sports exports strategy accordingly. The region should leverage its distinct comparative advantages in resource-intensive and labor-intensive products while striving for breakthroughs in medium-tech manufacturing.

Transition to Higher Value Chains: Xinjiang should adapt its industrial policies in the context of global value chain participation. Rather than solely focusing on supporting industrial sectors, there should be a shift toward bolstering key links in the value chain. This entails increased emphasis on R&D, design, and innovation, particularly in technology-intensive sports industries like machinery manufacturing.

Enhanced Collaboration: Xinjiang should leverage its role as the core area of the Silk Road Economic Belt to strengthen collaboration with inland provinces, especially those in the eastern regions. By capitalizing on Xinjiang's abundant resources and unique geographical advantages in tandem with the technological and financial strength of China's eastern coastal provinces, synergy can be maximized.

Industrial Transformation: To break free from historical reliance on low-tech sports exports and geographical / resource advantages, Xinjiang must actively pursue industrial transformation and upgrade product offerings. The region should prioritize the development of high-value-added products, fostering technological innovation and industrial upgrading.

In conclusion, this research provides valuable insights into Xinjiang's sports exports, offering a nuanced perspective on its comparative advantages within the sports sector. These findings, coupled with strategic policy recommendations, can serve as a blueprint for maximizing Xinjiang's potential in the global sports trade landscape and fostering sustainable economic growth within the region

Reference

Balassa, B. (1965). Trade liberalisation and "revealed" comparative advantage 1. *The manchester school, 33*(2), 99-123. https://doi.org/10.1111/j.1467-9957.1965.tb00050.x

Chen, J., & Pang, H. (2023). Analyzing Factors Influencing Student Achievement: A Financial and Agricultural Perspective Using SPSS Statistical Analysis Software. *Journal of Commercial Biotechnology, 28*(1), 304-316. https://doi.org/10.5912/jcb1118

Costinot, A., Donaldson, D., & Komunjer, I. (2012). What goods do countries trade? A quantitative exploration of Ricardo's ideas. *The Review of economic studies, 79*(2), 581-608. https://doi.org/10.1093/restud/rdr033

Guo, J., & Liu, F. (2015). Recalculation of the international competitiveness of China's service sector—Research from the perspective of trade value added. *World Economy Study*, (2), 52-60. https://www.cqvip.com/qk/91453x/201502/663686548.html

Han, Z. (2016). Value-Added Decomposition of China's Gross Export Under Global Value Chains. *Journal of Quantitative & Technical Economics*, (9), 129-144. https://caod.oriprobe.com/articles/49346128/Value_Added_Decomposition_of_China_s_Gross_Export_Under_Global_Value_C.htm

Johnson, R. C., & Noguera, G. (2012). Accounting for intermediates: Production sharing and trade in value added. *Journal of international Economics, 86*(2), 224-236. https://doi.org/10.1016/j.jinteco.2011.10.003

Koopman, R., Wang, Z., & Wei, S.-J. (2014). Tracing value-added and double counting in gross exports. *American economic review, 104*(2), 459-494. https://doi.org/10.1257/aer.104.2.459

Lau, L. J., Chen, X., Cheng, L. K., Fung, K., Pei, J., Sung, Y.-W., Tang, Z., Xiong, Y., Yang, C., & Zhu, K. (2006). Estimates of U. S.-China Trade Balances in Terms of Domestic Value-Added. *Stanford Center for International Development*, 295. https://kingcenter.stanford.edu/publications/working-paper/estimates-u-s-china-trade-balances-terms-domestic-value-added

Liu, Y. (2018). Why an urban population continues to grow under intensifying water scarcity: An answer from generalized water resources. *Urban Water Journal, 15*(10), 961-965. https://doi.org/10.1080/1573062X.2019.1595674

Liu, Y., Yang, D., & Lü, G. (2017). Water scarcity and generalized water resources management in Urumqi: contributions from noncompetitive water input-output model. *Journal of Water Resources Planning and Management, 143*(8), 04017038. https://doi.org/10.1061/(ASCE)WR.1943-5452.0000783

Liu, Z., X, Yang, C., Cheng, L. K., Fung, K. C., Sung, Y. W., Zhu, K., Pei, J., & Tang, Z. (2007). Non-competitive input-output model and its application—Perspective of United States-China trade surplus. *Social Sciences in China, 5*(5), 91-103. http://dx.doi.org/10.1080/02529200903565079

Los, B., Timmer, M. P., & De Vries, G. J. (2015). How global are global value chains? A new approach to measure international fragmentation. *Journal of regional science, 55*(1), 66-92. https://doi.org/10.1111/jors.12121

Qi, S., Wang, F., & Zhang, Y. (2008). China's Non-competition Input-output Table and its Application. *Statistical Research, 25*(5), 79-81. https://tjyj.stats.gov.cn/EN/Y2008/V25/I5/79

Tian, K., Zhu, K., & Yang, C. (2017). Re-estimate revealed comparative advantage based on value-added exports and trade heterogeneity: An analysis for China. *Chinese Journal of Management Science, 25*(9), 1-10. https://doi.org/10.16381/j.cnki.issn1003-207x.2017.09.001

Wang, J., & Qi, J. (2016). Analysis of the added value of China's manufacturing product exports. *Economy and Management, 248*(1), 54-58. https://jjgl.cbpt.cnki.net/WKB2/WebPublication/paperDigest.aspx?paperID=312edda1-638a-4e55-831a-a0f877ec7b2f

Xiang, D. (2015). International Competitiveness of China's Manufacturing Sectors: Estimation Based on Trade in Value-added. *China Economist, 10*(6), 110-122. https://www.cqvip.com/qk/89849x/201506/666648691.html

Xu, J., & Fang, Q. (2013). Calculation of value added in China's export based on non-competitive input-output table. *Journal of International Trade,* (11), 37-39.

Yang, X., Zhang, S., & Lou, F. (2019). Research on Driving Effect of Science and Technology Service Industry in Beijing Based on the Non-competitive Input-output Table. *Science and Technology Management Research,* (14), 77-79. https://caod.oriprobe.com/articles/57234028/Research_on_Driving_Effect_of_Science_and_Technolo.htm

Yang, X., Zhang, Y., Yang, C., & Xu, J. (2020). Research on the determinants of government investment effect. *Journal of Systems Science and Information, 8*(5), 387-400. https://doi.org/10.21078/JSSI-2020-387-14

Zhang, F. (2011). Construction and application of the extended non-competitive input-output table for processing trade. *Tongji Yanjiu (Statistical Research), 28*(8), 73-79.

Zhang, J., Chen, Z., & Liu, Y. (2013). Measuring the domestic value added in China's exports and the mechanism of change. *Economic Research Journal, 10*, 124-137.

Zhang, Y., & Yan, B. (2016). An Estimation of China's Industrial Competitiveness: Based on the Theory of the Global Value Chain and Comparative Advantage. *Journal of International Trade, 10,* 38-49.

Zhang, Y. H. (2013). The export of value added in chinese manufacturing and China-US trade imbalance. *Journal of Finance and Economics, 39*(2), 15-25. https://qks.sufe.edu.cn/J/CJYJ/Article/Details/A160824000535/CN