

Study of Virtual Land Measurement and Influencing Factors of Cotton Trade in China

Leon Zhang

Department of Economics, Global Governance Institution, USA

ABSTRACT

Based on China's current cotton industry development situation, cotton trade scale and cotton trading partner countries, the researchers measure and analyze the total import and export volume of cotton on the virtual land between 1980 and 2021, calculate the virtual land content of cotton imported and exported to China from these countries based on their respective cotton yield per area, analyze the reasons for the net import of virtual land in China's cotton trade and use Multiple Linear Regression on Stata to discuss the factors that influence the net import of virtual land in China's cotton trade. The research results find out that China is the net importer of virtual land in the cotton trade and the trade is highly geographically concentrated. Domestic supply meeting demand tends to be the cotton consumption trend, and the net import of cotton virtual land is affected by both external and internal factors. Finally, the researchers suggest that China should promote the diversity of cotton import in the context of securing cotton import, raise global cotton trade efficiency through establishing standardized cotton tariffs, accelerate multilateral free trade, build premium global cotton value chain, establish friendly international relations, actively implement the cotton "go global" strategy and stimulate domestic market liberalization.

Corresponding author

Leon Zhang, Department of Economics, Global Governance Institution, USA. E-mail: zhang-bohan@outlook.com

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Introduction

As a crucial commercial crop and major staple agricultural product, cotton is not only one of the most important raw materials in the textile industry but also a major income resource for cotton farmers and the indispensable household material in daily life. China's cotton production holds one-third of global cotton production, possessing an important place in the global agricultural product trade. Cotton consumption in China is constantly increasing as production is increasing and accounts for over one-third of global cotton consumption. Since domestic cotton production cannot fully satisfy domestic demand, China is the largest cotton importer in the world and its import volume of cotton accounts for over one-fourth of global imports. Cotton production each year in China is 6 million tons, which is far from satisfying the annual market demand of over 8 million tons. What's more, China is the largest textile and garment exporter for which cotton is necessary for the industry and one-third of domestic cotton production is exported. While domestic demand has already exceeded supply under such situation, international trade becomes inevitable. Ever since attending World Trade Organization in 2001, China's cotton import volume has been constantly rising and gradually became the major net importer of cotton, reaching the peak of 5.13 million tons in 2012. The average annual import volume is 2 million tons. However, the global situation is becoming severe. Starting from 2018, the trade conflict between China and the United States has brought a huge impact on China's textile industry. COVID-19 bursting out at the end of 2019 impedes the international trade to some extent. These incidents affect the sustainable development

of cotton production in China and will indirectly influence the global cotton industry value chain as the rising of interdependency between nations in the international trade, which will eventually affect the sustainable development of the global cotton industry value chain.

Cotton is a land-intensive good. Land resource, as the most basic production factor, plays a decisive role in cotton production. China has the third largest national territory in the world but the arable land per capita does not reach even one-third of the world's average level due to the large population. By the end of 2020, China's total population has reached 1,411.78 million. In 2019, the population reached 1,410.08 million while the arable land area was only 127.8619 million hectares. The arable land area per capita was only 0.09 hectares. On the one hand, the fast population growth and rapid economic development have made arable land resources increasingly scarce; on the other hand, the No. 1 Central Document of 2018 and the report at the 19th National Congress of the Communist Party of China have repeatedly stated to strictly maintain the red line of ecological protection and accelerate ecological civilization establishment. The current rapid economic development and the obligatory demand for ecological protection of land resources have made the land resources available for cotton planting in China increasingly tight. The domestic cotton supply cannot meet the growing cotton demand and the shortage of land resources has seriously threatened domestic cotton industry security. How to solve the contradiction between shortage of land resources, economic and social development, and cotton industry security has become the focus of relevant scholars. Implementing the virtual land resources import strategy through cotton trade is

one of the effective ways to solve the contradiction. The article provides evidence for cotton policy formulation through analyzing China's current cotton industry development situation, cotton trade scale, cotton trading partner countries and the content of virtual land in the cotton trade. On the basis of scientifically measuring the content of virtual land in China's cotton trade, it is of certain theoretical significance to further analyze the reasons from the perspective of the cotton industry chain and to expand the research field to the entire cotton industry chain. Meanwhile, the article uses Multiple Linear Regression to empirically analyze the factors that influence the import of virtual land in China's cotton trade which will help solve the existing problems and provide evidence for the nation to make cotton trade policies. The virtual cultivated land strategy provides a new path to promote the effective allocation and management of land resources and alleviate the shortage of domestic land. It is also beneficial to the advancement of the construction of an environmentally friendly society and the sustainable development of ecological civilization.

Literature Review

Foreign scholars currently focus their studies on the aspects of cotton value chain, cotton supply chain and existed problems of cotton industry chain. On the aspect of cotton value chain, some scholars consider that price conducts through the value chain and a long-term equilibrium raw cotton price exists with exogeneity. Since the price is strongly related with cloth price, the policy should consider the influence to the whole value chain so that the cotton producers would gain benefit from value added [1]. Some scholars, however, suppose that information asymmetry exists in the price conduction on the cotton industry chain and puts farmers at a disadvantageous situation when selling raw cotton [2]. Some scholars have found that the value chain is disconnected by critically studying the obstacles in the value chain. The reason is that the raw materials have no value added and consumers rely on imports [3]. From the supply chain side of cotton industry chain, the influence of the increase of labor cost to supply chain is not obvious and is easily covered up by the increase of revenue [4,5]. Some scholars combine cotton supply chain and industrial cluster together [6]. There are also scholars concluding that entering WTO creates enormous influence on China's cotton textile and cotton cloth related industries both positively and negatively [7]. Some scholars have found through research that the cotton industry chain will lead to the emergence of products with low quality and high cost in production [8]. Domestic scholars' researches on the cotton industry chain mainly focuses on the characteristics, benefit distribution of the industry chain, existing problems and integration of the industry chain. Cotton industry chain is not only long and wide, but also has many related industries, large scale, and strong connection between industries [9,10]. The characteristics diversify the existing problems of cotton industry chain. Part of the scholars believe that there is a phenomenon of sufficient competition but insufficient cooperation among economic entities in the cotton industry chain, lacking core management concepts and core strength, and lacking ability to deal with natural risks and market risks [11]. The utilization rate of cottonseed hulls is low and there is information asymmetry between supply and demand [12]. The cotton futures market has problems such as low participation, defects in the futures mechanism, and the await improvement on the service industry policy [13]. The benefit allocation in the cotton industry chain is unreasonable [14,15]. Some scholars also focus on analyzing the problems in the cotton industry chain in Xinjiang, and find that labor costs accounted for a large proportion of cotton planting costs in the cotton planting process, and cotton farmers have small profit margins [16]. The

scale, standardization, mechanization, and intellectualization of cotton production need to be strengthened [17]. There are various problems in the industry chain. Some scholars in my China have made suggestions on the methods of optimizing the cotton industry chain vertically and horizontally, optimizing the layout of the cotton industry, effectively integrating each step on the industry chain [18] and optimize the benefits allocation on the chain [19].

Scholars in China mainly focus the study of China's cotton trade on the current trade situation, existing problems, influence factors and competition analysis. On the aspect of the current trade situation and existing problems, domestic cotton supply exceeds demand as textile industry develops rapidly, so that China needs to import large amount of cotton to ensure the supply and demand equilibrium. Under the factors of supportive cotton policies adjustment and changes in cotton prices at home and abroad, China's cotton trade has gradually stabilized from excessive imports but the sources of cotton imports are relatively concentrated [21]. The promotion of the "Belt and Road" initiative has accelerated the cotton trade process between China and the BRICS countries. Brazil and India have gradually become the main sources of cotton imports for China [22]. In the study of influencing factors, the demand factor is the most direct factor in China's cotton trade deficit and Chinese cotton is not a competitive factor in the world market [23]. The welfare effect of China's cotton import is mainly affected by the domestic cotton planting area, domestic cotton yield, China's cotton export volume, China's cotton import volume, domestic cotton consumption, domestic producer price, ratio of domestic producer price to import price, degree of marketization and international economic relations [24]. Competition analysis is studied from the angle of the entire industry chain to research on the cotton trade industrial competitiveness and trade potential. The characteristic of high geographic concentration of cotton trade threatens the security of cotton industry [25]. China's cotton trade is highly dependent on imports. The import source countries are relatively concentrated, and the domestic market lacks control over the supply of the international cotton market, which is not conducive to the downstream development of the domestic cotton industry chain [26]. However, due to the decline in the overall planting area, China's total cotton output cannot effectively satisfy domestic demand and the situation that China's cotton relies on foreign imports will still exist for a long time [27]. The implementation of the "Belt and Road" strategy has accelerated the flow of resources among countries, using methods of trade, culture, exchange policies and others to accelerate the formation of the development panorama of Afro-Eurasian economic cooperation [28].

The definition of "virtual land" origins from the concept of "virtual water". Professor Tony Allen at University of London first proposed the concept of "virtual water" in 1993. It refers to the amount of water consumed by tangible products in the process of being produced and served, which is the water "hidden" in the products, service and processes. LUO Zhenli proposed the new concept of "virtual soil" in 2004 by referring to the relevant research results of virtual water in China [29]. To scientifically define the land resource contained in the production, YAN Zhiqiang et al. proposed the concept of "virtual land" which refers to the virtual land resource content hidden in the products [30]. Zhang Yanlin et al. studied and improved the definition of virtual land trade [31]. He believes that the virtual land contains both virtual land content converted from agricultural trade between different countries and the land obtained from other places.

Domestic scholars' research on virtual land mainly focuses on the measurement of content and trade volume and virtual land strategy, and most of the researches are related to agricultural products. In the context of the Belt and Road, the virtual land import volume between China and the countries along the route is measured. It is found that the virtual land imported from seven countries mainly comes from cotton, cereals, fruits and oil plants [32]. The economic and trade agreement signed by China and the United States in the early 2020 during China–United States trade war has a profound impact on the follow-up agricultural trade between the two countries. Through the measurement of virtual land, it is found that China's virtual land area imports of American agricultural products have shown an overall upward trend, but the decline has been obvious since 2018 [33]. Other scholars have studied the factors affecting China's cotton import and found the cotton sown area, cotton yield per unit area, foreign demand, domestic demand and degree of marketization [34]. The research of virtual land strategy points out that in the international trade, it is necessary to alleviate the shortage of cultivated land resources through the virtual land import and the net import of grain is positively correlated to the sustainable use of land resources.

To sum up, previous scholars' researches on cotton industry chain and cotton trade focus on the current situation analysis, characteristic summary, existing problems, influencing factors, etc. and are all unilateral researches. There are not many researches combined with virtual land. The research on virtual land follows the basic idea of "concept definition - measurement of content and trade volume - influencing factors". This kind of research focuses on domestic scholars and exists few researchers in the international academic field. Their research field mainly focuses on content and trade instead of the influencing factors of trade volume.

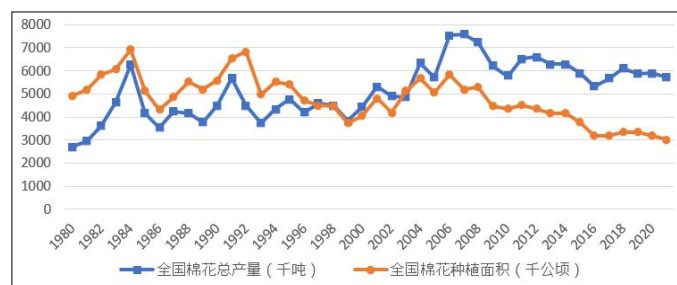
Accordingly, the contribution of this paper may be the following points: First, we combine the cotton industry chain with cotton trade, analyze the development of China's cotton industry chain from the perspective of cotton trade and then connect to the development of the global cotton industry chain. Second, we combine cotton trade with virtual land. Although some scholars combine cotton trade with virtual land resources, they basically focus on cotton imports. This article measures cotton virtual land import, virtual land exports and virtual land net export. Third, most scholars currently focus on the factors that affect cotton imports, not many on the factors of the net export of virtual land. This article uses the multiple linear regression model to combine the research on the influencing factors with the net import of cotton virtual land.

Cotton Industry and Trade Situation in China Cotton Industry Development in China

Cotton is crucial in the development of cotton industry as the raw material. Therefore, learning about the variation tendency of cotton sown area and cotton output is crucial. Since the Reform and Opening-up, China's cotton sown area has remained at more than 4,000 thousand hectares and the average annual sown area is about 5,000 thousand hectares (see Figure 1). 1999 and 2015-2021 are the two time periods in which the sown area is below 4,000 thousand hectares. In 1998, the State Council, in its decision on deepening the reform of the cotton circulation system, emphasized the need to adjust and optimize the layout of cotton production and maintain the existing cotton planting area without expansion to ensure cotton supply by increasing the yield per unit area and cotton quality. The sown area ever since gradually rose again but has never exceeded 6000 thousand hectares. The reason for the low cotton planting area during 2015 to 2020 may be

the reform of cotton target price in 2014 causing the reduce of cotton price. Moreover, the increase of the cotton planting cost due to the economic development causes the reduce of earnings of cotton farmers. Enthusiasm in planting cotton decreases. At the same time, the 18th National Congress of the Communist Party of China proposed "promoting green development and circular development, building an ecological civilization, building a beautiful China" for the first time. As a type of land-intensive products, cotton planting consumes a lot of land fertility. In order to allocate more fertile land to grain planting and ensure national food security, the area of cotton planting in China has decreased in recent years. The focus of increasing production is still concentrated in increasing the yield per unit area. Figure 1 shows that the overall trend of total output of cotton in China is fluctuating and rising. The average annual output is about 6 million tons. Since 2000, China's cotton production has been in a stage of rapid growth. At that period, the average annual output of cotton can still be maintained at about 5 million tons while the cotton planting area has decreased compared with the previous period and has been continuously decreasing. The situation indicates that the efforts to improve cotton yield per unit area have been effective.

Figure 1: Total Cotton Output & Total Planting Area in China

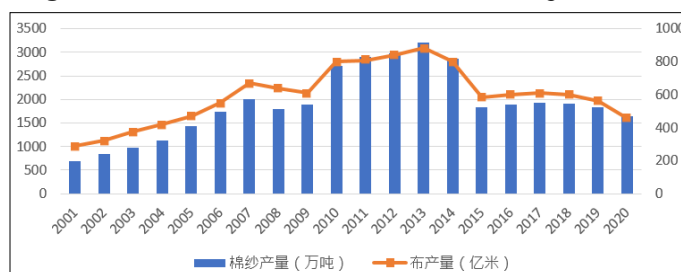


Domestic Total Cotton Output (1000 tons) Domestic Total Planting Cotton Area (1000 Ha.)

Cotton is the raw material of the cotton industry chain. The supply of cotton directly affects the development of the entire cotton industry chain. In the downstream of the cotton industry, cotton is used to make cotton yarn and cotton cloth. The quantity of cotton yarn and cotton cloth is directly related to the development of the upstream industry on the cotton industry chain. Therefore, understanding the output of cotton yarn and cotton cloth in the industry upstream will help us better understand the development of China's cotton industry. Figure 2 shows that the output of cotton yarn and cotton cloth had maintained a steady increase until 2013. Although it decreased during the global financial crisis, it has resumed the upward trend since 2010 and maintained the growth rate at about 10%. The output started to decrease in 2014 and decreased even more than before in 2015. The output of cotton yarn decreased by 10 million tons, a 4% year-over-year decrease. The output of cotton cloth decreased by nearly 28 billion meters, a 5% year-over-year decrease. In 2020, cotton yarn and cotton cloth decreased year-over-year respectively by 7.4% and 17.1%. To analyze the reason, it is necessary to combine the situation of the downstream industry, namely the textile and garment industry (see Table 1). The textile and garment enterprises process the upstream products into garments for sale, which are located in the final step of the cotton industry chain. The total output and export value of China's textile and garment has been increasing year by year after entering the WTO. Although the export value declined slightly in 2009, it recovered to the previous growth rate right after, reached its peak in 2014 and began to gradually decrease in 2015, with an average export value of around US\$160 billion.

There are three reasons for this phenomenon: first, the global economy recovered weakly in 2014. The economic growth of various countries was slow. The consumption of major economies was sluggish and the decrease in foreign demand led to a decline in the total export volume of China's textile and garment. Second, because of the rising costs of labor and land, the competitive advantage of low pricing in China's garment exports gradually reduced. Thirdly, the outbreak of the COVID-19 epidemic in 2020 has increased the domestic demand for medical resources such as cotton swabs, which has also increased cotton consumption. The cotton used in the textile and garment industry has decreased. At the same time, the epidemic led to the close-off management that delayed the work resumption and limited the production. Reasons above have led to a decline in export. Finally, under the global recession, countries have increased import tariffs to protect the domestic market. Trade protectionists continue to emerge. The intensification of trade frictions between China and other countries also affects the export of textile and garment.

Figure 2: Total Cotton Yarn & Cotton Cloth Output in China



Cotton Yarn Output (10,000 tons) Cloth Output (100 million meters)

Table 1: Total Textile & Garment Output & Export Value

Year	Total Output (hundred million pieces)	Export Value (hundred million US Dollars)	Year	Total Output (hundred million pieces)	Export Value (hundred million US Dollars)
2001	77.76	366.56	2011	254.20	1532.19
2002	87.7	413.06	2012	267.28	1601.55
2003	98.43	520.66	2013	271.01	1728.24
2004	118.33	618.57	2014	299.21	1818.16
2005	147.98	738.8	2015	308.27	1758.86
2006	170.02	951.92	2016	296.71	1612.06
2007	201.59	1150.74	2017	287.81	1588.08
2008	206.52	1197.90	2018	222.74	1576.33
2009	237.50	1070.51	2019	244.70	1534.50
2010	285.23	1294.78	2020	223.70	1373.80

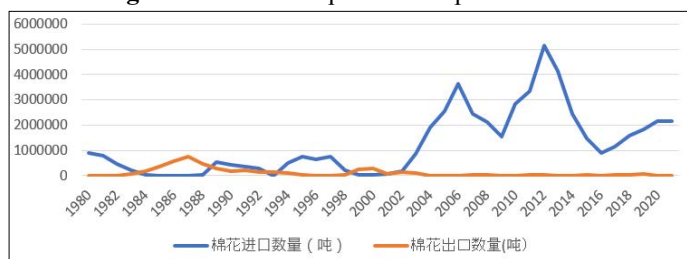
Import and Export of Cotton Trade in China

The prosperity of the cotton industry drives the supply and demand for cotton and stimulates the development of cotton trade. As a powerful global textile producer, cotton producer and consumer, China has closely related the cotton trade to the development of world economic trade. Therefore, it is necessary to learn and understand the status quo of China's cotton trade. According to the data from the National Bureau of Statistics and China Customs, China's cotton import generally shows a rapid growth trend from 1980 to 2020. The import volume in 1987 was the lowest with only 163 tons. The import volume in 2012 was the largest, reaching 5.13 million tons. As we can see from Figure 4, during the period from 1980 to 2020, cotton import trade in China can be roughly divided into two stages. Before entering the WTO, cotton import trade experienced a slow fluctuating growth and the import volume did not exceed 1 million tons. After entering the WTO, cotton import showed an explosive growth from 60 thousand tons in 2001 to 5.13 million tons in 2012. Although there were two major fluctuations during the period, the amount was never less than 1 million tons (except in 2016). The phenomenon may be related to the rapid growth of China's foreign trade volume after entering the WTO. Before 2001, China did not participate much in the international trade and most of the cotton was used for domestic demand rather than foreign demand. After entering the WTO, China is much

more involved in the process of international division of labor and exchange. With the rapid development of the textile industry, China has become a major exporter of textile and garment. The gap between cotton production and demand has widened and the dependence on imported cotton is increasing. Imported cotton grows rapidly in volume. Figure 3 shows that there are two sharp declines of cotton import in 2009 and 2016. From 2001 to 2007, China's cotton import experienced the first large-scale growth. Ever since 2007 the import volume continued to decline till 2009, which only had 1.53 million tons. It has been the only time that the volume is less than 2 million tons after 2004. It is strongly related to the decrease in cotton demand caused by the financial crisis around 2008. Since 2010, with the implementation of China's "four trillion" plan, the second large-scale growth has appeared. Since 2013, the import volume has gradually decreased and reduced to 900 thousand tons in 2016. Due to the implementation of the cotton target price reform pilot project in Xinjiang cotton area in 2014, cotton farmers' income was ensured to increase, improved the enthusiasm of cotton farmers in production, promoted the level of total cotton production and unit yield, eased domestic cotton demand, and reduced cotton import volume. With the outbreak of the COVID-19 epidemic in 2020, the demand for medical resources such as cotton balls, cotton swabs, masks, etc. has increased sharply, which has led to an increase in cotton import.

As we can see from Figure 3, China's cotton export volume is relatively small compared with the import volume and never exceeds 800 thousand tons at most. There are three peaks in total: 750 thousand tons in 1987, 292.5 thousand tons in 2000 and 149.5 thousand tons in 2002. In general, cotton import volume far exceeds export volume, but there are three special periods in which cotton exports are greater than imports. The first time period is from 1984 to 1988 in which the maximum net export volume is 744 thousand tons. At this stage, China was still in the traditional system of the planned economy period. The system unified purchase, sales and pricing and planned distribution. In addition, China's textile and garment did not export at a large scale at this stage and the supply of cotton was greater than the domestic demand. The remainder was used for export. The second time period is 1993. At this stage, the import and export volume were similar. The export volume was only 140 thousand tons more than the import. In 1992, the "three liberalizations" (market, price, operation) were piloted in Shandong, Henan, Jiangsu, etc. The original planned distribution system was liberalized and the market economy system stimulated the prosperity of the domestic cotton market. However, since the outbreak of Verticillium Wilt in cotton areas in 1993 resulted in a reduction in cotton production and serious quality problems, the pilot was announced to be suspended. The third period is from 1999 to 2002. Beginning in 1999, the State Council issued a decision on deepening the reform of the cotton circulation system. The notice pointed out that the government should introduce preferential policies to encourage the textile industry to use domestically produced cotton, increase the proportion of cotton export appropriately, adjust cotton production structure and scale to improve cotton yield per unit area. The introduction of this policy promoted the export of cotton at this stage.

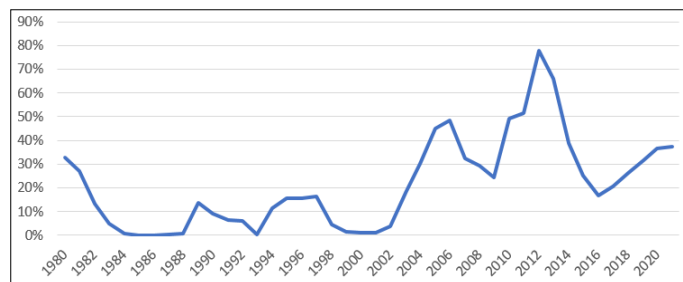
Figure 3: Cotton Import VS. Export in China



Cotton Import Quantity (ton) Cotton Export Quantity (ton)

The imbalance between supply and demand is the trading premise. Since the total domestic cotton production, that is, the total supply, cannot satisfy domestic consumption, it is necessary to import cotton from foreign countries to meet people's needs. We can see from Figure 4 that, in general, the changing tendency of China's cotton import as a percentage of total output from 1980 to 2018 is the same as that of cotton import. (See Figure 4). Among them, the highest proportion is 77.63% in 2012, and the lowest proportion is 0.01% in 1985. Taking the entry into the WTO as the division, the proportion of cotton import to total output before the entry is generally lower than that after the entry. Figure 4 shows that the change in the proportion of cotton import to consumption in

China can be roughly divided into four stages: decline (1980-1987), fluctuant rising (1988-2012), decline (2013-2016), slowly Rising (2017-present). Overall, China's cotton consumption tends more to meeting domestic demand with domestic supply, which corresponds to great support to the cotton industry in recent years.



Cotton Trading Partners Analysis

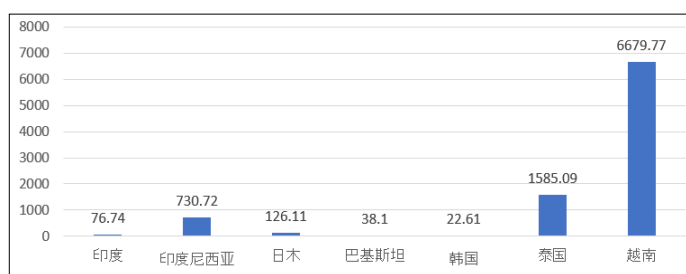
The shortage of cotton in China has become the norm which requires continuous import to make up for the vacancy in demand. Understanding the changes in China's cotton import and export is of great significance to the sustainable development of China's cotton. Table 2 shows that the United States, India, Australia, Uzbekistan and Brazil are the main sources of cotton import in China. The imports from these countries account for more than 80% of China's total cotton imports overall and more than 95% in the past two years (see Table 2). The imported cotton shows a high geographical concentration and has been increasing in recent years. Taking 2018 as an example, China's total cotton import volume was 1.57 million tons, and 528,000 tons were imported from the United States, accounting for 33.63% of the total imports. 172,000 tons were imported from India, accounting for 10.96% of the total imports. 424,000 tons were imported from Australia, accounting for 27% of total imports. 62,000 tons were from Uzbekistan, accounting for 3.96% of total imports. 186,000 tons were from Brazil, accounting for 11.85% of total imports. The countries above together accounted for 87.4% of the total imported cotton for that year. Before 2011, the United States had always been the largest source of cotton import in China. From Table 2, we can see that in 2010, China imported 1.0356 million tons of cotton from the United States, ranking the first on the list. India ranked second in 2010 and surpassed the United States and became the largest source of cotton imports from 2011 to 2014. Since 2015, the United States has once again surpassed India to become the largest source of cotton imports. From 2016 to 2018, Australia surpassed India to become the second largest source. After the China-US trade war in 2018, the tariffs on cotton in both countries increased and hindered the cotton trade between the two countries. In 2019, cotton import from the United States declined. China looked for another cotton importing country, India. The amount of cotton imported from India from 2019 to 2021 is increasing significantly. In 2020, the signing of the *Economic and Trade Agreement Between the Government of the People's Republic of China and the Government of the United States* in Washington, the United States, led to a significant increase in the amount of cotton imported by China from the United States. The relationship between the two countries will affect the structure of China's cotton import and export.

Table 2: 2010-2021 Major Import Sources of China (10 thousand tons)

	U.S.	India	Australia	Uzbekistan	Brazil	Total Proportion
2010	103.56	91.44	20.37	37.28	9.3	92%
2011	101.4	105.8	53	18.6	21.8	89%
2012	148	153.8	81.8	31.7	37.2	88%
2013	117.7	132.1	79.7	27.8	16.1	90%
2014	56.2	90.9	49.6	17.2	15.5	94%
2015	53.2	34.6	25.2	17.6	14.6	98%
2016	27.1	20.1	21.8	15.4	8.6	86%
2017	51.7	17.2	25.8	10.3	7.4	97%
2018	52.8	17.2	42.4	6.2	18.6	97%
2019	36.06	20.63	39.8	7.7	50.54	84%
2020	97.67	25.3	11.74	0.95	61.82	91%
2021	82.87	40.93	34.86	0.63	64.36	74%

China’s cotton is mainly exported to Southeast Asia, South Asia, South Korea and Japan, and the volume is small. As can be seen from Figure 5, Thailand, Vietnam and Indonesia are China’s major export countries. In 2018, China exported 16,370.98 tons of cotton to Vietnam and 15,265.46 tons to Indonesia with a total export volume of 47,349 tons. The export volume of the two countries accounts for 66.82% of the total cotton export. In 2021, China exported 6,679.77 tons of cotton to Vietnam, 1,585.09 tons to Thailand, and 730.72 tons to Indonesia, with a total export volume of 8,995.58 tons. The exports of the three countries account for 97.15% of the total cotton exports. Export volume for Indonesia and Vietnam account for 80.03% in 2021 and shows an increase compared with 2018, of which Vietnam’s export volume increased more. With China’s opening-up to globalization, more and more enterprises choose to go abroad to explore the world market. Most of the enterprises invest in countries in Southeast Asia, South Asia, Central Asia and Africa as host countries. Most of the exported cotton to Southeast Asia and South Asia is used for production and consumption by China’s multinational enterprises.

Figure 5: Cotton Export Volume in 2021 (ton)



India Indonesia Japan Pakistan South Korea Thailand Vietnam

Measurement and Analysis of Virtual Land in China’s Cotton Trade

Methodology and Data Processing

Referring to the method of Chapagain and Hoekstra (2003) measuring the trade content of virtual land from the supply and demand levels and in order to reflect the content of virtual land in China’s cotton trade more accurately, this paper measures China’s cotton import and export volume of virtual land in trade from demand side and supply side. The specific calculation formula is shown as follows:

$$NVL I_t = \frac{I_t - E_t}{W_t}$$

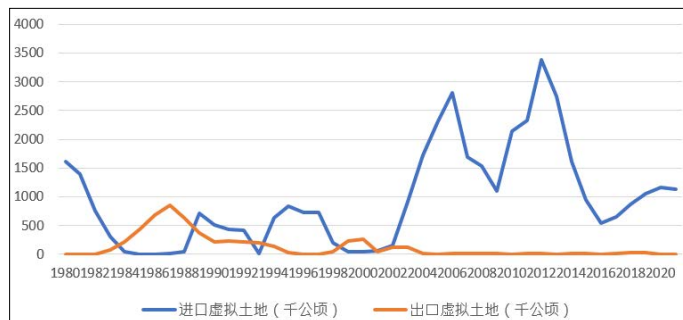
In the formula, $NVLI_t$ represents the virtual land content of China’s net import of cotton in year t, I_t and E_t represent the import and export volume of cotton in China in year t, and W_t represents the level of cotton yield per unit in year t.

Measurement of Virtual Land in Cotton Trade

China has great demand for cotton consumption. The large demand for cotton in the textile and garment industry and the relative scarcity of land resources brought by more people and less land have resulted in the short of domestic cotton supply. According to the analysis in Part 3, China has always been a net importer of cotton and the process of importing cotton means to import foreign virtual land, which is beneficial to alleviating China’s land shortage and helps the sustainable development of ecology. Figure 6 shows that, from 1980 to 2021, although the virtual land import volume fluctuated, it was generally on the rise. Figure 7 shows that the smallest virtual land import volume is 0.20 thousand hectares in 1985 and the largest is 3384.51 thousand hectares in 2012. The average annual growth rate of cotton land import is 45.37%. Corresponding to the import volume of cotton, the import volume of virtual land can be roughly divided into two stages: before and after China’s entry to the WTO. It can be clearly seen that before China’s entry, the domestic import volume was in a state of sluggishness. After the entry, it was in a state of expansion. Specifically, it can be divided into five stages: “decline, rebound, increase, decrease, and increase”. 1980 to 1985 was the first stage when the import volume decreased sharply, from 1608.76 thousand hectares in 1980 to 0.20 thousand hectares in 1985. Import volume entered the second stage from 1985 to 1998 when it rose slowly and fluctuated. Although the import volume in 1993 was only 13.33 thousand hectares, the average annual import volume in every other year was more than 200 thousand hectares. 1999 to 2012 was the third stage when the import volume rose rapidly, from 48.65 thousand hectares in 1999 to 3384.51 thousand hectares in 2012 with an average annual increase of 88.91 thousand hectares. From 2013 to 2016, imports gradually decreased till it dropped sharply to 538.76 thousand hectares in 2016. Since 2017, the import volume has increased slowly but has not exceeded 1,200 thousand hectares. The change of virtual land export volume is somewhat different from that of import volume. From 1980 to 1987, the export volume of resources increased year by year. In 1987, the export volume increased to 855.85 thousand hectares, which is the largest value so far. From 1988 to 1998, the export volume continued to decline. In 1997 the export volume was only 0.96 thousand hectares. There were two small fluctuations from 1999 to 2003. Except for the 47.31

thousand hectares in 2001, the amount was above 100 thousand hectares in the rest of the years. Since 2004, the export volume of resources has stabilized and gradually decreased. In 2021, the volume is only 4.89 thousand hectares.

Figure 6: 1980-2021 Virtual Land Content of China's Cotton Trade



Virtual Land Import (1000 Ha.) Virtual Land Export (1000 Ha.)

The results from section three suggest that the geographical concentration of China's cotton trade import is relatively high. The import source countries are concentrated in the United States, India, Australia, Uzbekistan and Brazil. On the basis of analyzing the total import and export of cotton virtual land, this section further analyzes the situation of the top five source countries of China's cotton imports. Tables 3 and 4 show the virtual land content of cotton exported to China from the top five cotton import source countries from 2003 to 2021. Table 4 is the virtual land import volume calculated according to the cotton yield per unit level of the source countries. Table 3 is the tested virtual land imports based on the cotton yield per unit level of China. From these two tables, we can see that the total amount of cotton virtual land imported from these five countries from 2003 to the present has shown a trend of increasing first and then decreasing, which is related to the total import volume of cotton in China. From the perspective of import structure, the United States was the largest source of cotton virtual land import before 2011, whose the amount was greater than the sum of the other four countries. Since 2011, India's export volume gradually caught up with the United States. Since 2011, India has surpassed the United States to become the largest import source of China's cotton virtual land. It was not until 2015 that the United States regained the first place. From the perspective of the proportion of imports from the top five countries, the proportion calculated by China's cotton yield per unit level remained above 80% overall, and even exceeded 95% in some years, indicating a high degree of geographic concentration which is not beneficial to the security of national cotton industry. Comparing the data in Table 3 and Table 4 can find that the latter is larger than the former. This is because the measurement standards are different. Table 4 is calculated by the yield per unit of the source country while the data in Table 3 is calculated by the level of yield per unit in China. Importing the same amount of cotton, the higher the yield per unit area of cotton is in the exporting country, the less the amount of virtual land is contained; the lower the level of yield per unit, the more the amount of virtual land is contained. China is the country with the highest cotton yield per unit in the world, so the data calculated by using China's yield per unit level is smaller than the virtual land content calculated using the cotton yield unit level of the source country. This also reflects indirectly that the implementation of the cotton virtual land import strategy is very beneficial to alleviate the shortage of land resources in China.

Table 3: Import Volume of Cotton Virtual Land from Source Countries Calculate by China's Cotton Yield Per Unit (1000 Ha.)

	U.S.	India	Australia	Uzbekistan	Brazil	Proportion
2003	537.17	2.10	24.15	119.33	8.74	75.58%
2004	949.82	39.56	91.16	177.12	15.79	74.06%
2005	1065.62	109.76	178.67	268.07	49.31	73.42%
2006	1319.00	458.36	173.54	280.94	38.15	80.78%
2007	874.61	492.00	85.24	167.69	18.01	97.28%
2008	758.73	466.58	59.04	129.47	18.67	93.03%
2009	490.16	244.67	79.52	108.89	41.09	87.64%
2010	820.67	706.28	166.72	280.57	71.80	95.22%
2011	748.64	774.34	404.18	128.04	163.98	95.17%
2012	1003.87	986.75	561.45	212.45	251.77	89.12%
2013	794.85	823.69	549.93	181.93	110.14	89.48%
2014	377.37	562.40	338.86	116.56	98.49	92.36%
2015	331.40	154.95	160.90	109.56	90.46	89.90%
2016	157.87	70.90	129.12	55.73	47.84	85.65%
2017	285.67	63.36	145.90	52.59	37.54	89.24%
2018	290.66	94.50	232.97	33.84	102.00	87.37%

2019	204.42	116.93	225.63	43.86	286.51	83.68%
2020	523.71	135.66	62.95	5.09	331.46	91.43%
2021	437.91	216.29	18.42	3.34	340.08	89.76%

Table 4: Import Volume of Cotton Virtual Land Calculate by Source Countries' Cotton Yield Per Unit (1000 Ha.)

	U.S.	India	Australia	Uzbekistan	Brazil	Proportion
2003	701.68	5.09	14.27	172.77	6.98	98.46%
2004	1153.14	93.39	59.70	24.57	15.98	78.32%
2005	1334.46	265.00	103.19	363.17	46.24	92.77%
2006	2248.10	1146.80	131.45	425.17	35.33	141.87%
2007	1179.43	1143.04	56.36	264.74	15.61	157.97%
2008	1357.00	1161.75	37.89	225.82	17.11	181.81%
2009	882.65	609.60	50.85	211.94	37.49	162.91%
2010	1134.65	1632.85	107.40	487.87	63.03	159.43%
2011	1726.17	1960.00	364.60	227.69	158.78	190.29%
2012	1928.62	2782.30	401.52	420.48	252.96	170.95%
2013	1727.18	2068.79	354.17	68.02	102.61	157.13%
2014	694.60	1646.10	241.71	235.92	94.04	180.09%
2015	642.47	528.94	103.40	238.87	105.44	171.79%
2016	292.01	218.64	95.15	135.50	49.18	146.72%
2017	571.40	223.68	144.70	140.18	39.05	170.68%
2018	755.04	382.60	188.92	90.39	107.52	176.66%
2019	462.70	445.45	250.36	115.80	281.34	148.38%
2020	1504.05	559.55	53.83	13.89	359.46	215.08%
2021	981.40	932.40	15.49	9.36	384.53	205.23%

Net Import of Virtual Land in Cotton Trade Reasons and Analysis

From the analysis in the previous section, we can see that the virtual land in China's cotton trade is net imported, showing a rising trend with fluctuation. Figure 7 shows that the virtual land content of China's net cotton trade import roughly presents a "W-shaped characteristic", with the minimum value of -849 thousand hectares in 1987 and the maximum of 3,372.93 thousand hectares in 2012. The trend is basically consistent with the changing trend of virtual land import volume. It can be roughly divided into four fluctuation cycles of "decline-recovery-increase-decline". Since the Reform and Opening-Up, China's cotton virtual land trade has a large trade deficit. There was a small surplus in only a few years, all of which appeared before China's entry to the WTO. Among them, there was the largest surplus in history in 1987, with a net export of 849 thousand hectares of virtual land. At this stage, China is still in the era of planned economy. Before 1999, cotton market was planned and allocated by the state. Before joining the WTO, foreign demand for domestic textile and garment was relatively small. Therefore, most of the domestic cotton is used to satisfy domestic demand. The increase in the cotton output creates a surplus after meeting domestic demand, so the export volume increases. In 2001, China joined the WTO and decided to deepen the reform of the cotton circulation system. These moves improved the marketization of cotton trading. The net import volume of virtual land rose rapidly. Due to the impact of the financial crisis in 2008, however, the net import volume fell to the bottom in 2009, rose to 1168.02 thousand hectares in 2012, and then declined again. In 2016, the import fell to a minimum of 534.12 thousand hectares. An important reason is that the cotton quality of China's two major cotton import sources (Brazil and the United States) was poor, which lowered the price of imported

cotton. After 2017, the net import of cotton virtual land began to rise again, probably because of the epidemic. The domestic demand for cotton increases.

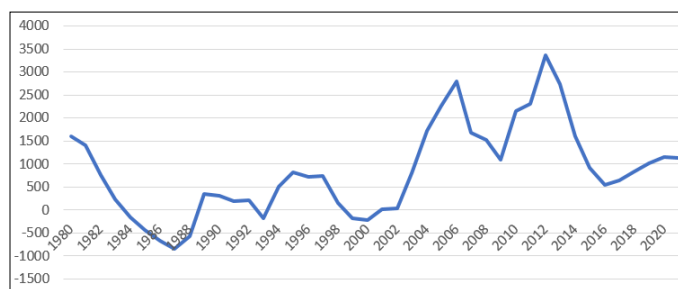


Figure 7: Net Virtual Land(1000 Ha.)

There are many reasons causing the net import of virtual land resources in China's cotton trade, mainly related to the relative scarcity of land resources, the rising cost of planting cotton for farmers and the rapid development of the textile and garment industry. Land resources are indispensable to the development of a country and are closely related to the economic and social development of a country. The world's land area is about 149.5 million square kilometers, and the land per capita is about 2.34 hectares. Although China has a vast area of about 9.6 million square kilometers, it has more people than land and the land per capita is only about 0.54 hectares, only 23% of the world average. With the rapid population growth and rapid economic development, the phenomenon of land waste and erosion has become more and more serious. With the use of agricultural fertilizers and agricultural films, soil pollution has become severe. Land resources have become increasingly scarce. Cotton is a

land-intensive product. Planting cotton requires a large amount of land resources. The scarcity of land resources inhibits the cotton planting. When domestic supply cannot satisfy demand, importing cotton becomes an inevitable choice.

The rising cost of cotton planting is another reason that leads to the net import of cotton virtual land in China. The yearly increase in cotton planting costs lowers the profit margins, resulting in a decrease in total revenue and a decrease in farmers' willingness to plant cotton. Cotton planting costs include the costs of labor, chemical fertilizers, pesticides, agricultural film, diesel oil, irrigation, seeding, etc. As prices rise, these costs increase accordingly, resulting in an increase in the total cost of cotton planting. Many cotton farmers can only earn less than 200 yuan per mu of land per year. In addition, natural disasters have occurred frequently, and pests and diseases have been rampant. Income is not enough to offset the cost. According to the cost-benefit principle, many cotton farmers are less willing to plant cotton and switch to other crops with higher economic value. As a result, the total output of cotton reduces and more demand can only be met by imports.

The prosperity of the textile and garment industry is another important reason for the net import of cotton virtual land. Cotton is the main raw material for textile and garment. The derived demand for cotton from the development of the textile and garment industry has formed the demand of the cotton market. The policy of accelerating the development of the FMCG industry causes the development of the textile industry entering a stage of rapid growth. As the world's largest exporter of textiles and garments, nearly one third of China's cotton is used for export production of textiles and garments every year. The rapid development of the textile and garment industry has driven a large increase in cotton demand, breaking the original supply and demand mode in domestic cotton consumption market. Since the domestic cotton supply is not enough to satisfy needs, textile and garment enterprises turn their attention to the world market. The import volume of cotton continues to increase accordingly and the corresponding cotton virtual land also increases.

Despite the internal factors above, cotton imports are also affected by external factors. Beginning from 1999, the State Council issuing the decision on deepening the reform of the cotton circulation system, increasing the yield per unit area of cotton, and China's entering the WTO in 2001 boosted cotton exports. The cotton target policy reform implemented in 2014 has lowered domestic cotton prices. The global economy recession causing lower demand has led to lower cotton imports. In 2018, the China-U.S. trade war caused the U.S. and China to increase tariffs on cotton imports. In 2020, China and the U.S. signed a first-phase agreement, which affected free trade between the two countries. Although it did not significantly lead to the change in total amount of cotton imports, it has affected the change in the structure of cotton imports. It is undeniable that after the disintegration of the Soviet Union, China's economic development was not as good as that of the United States. The world has formed a unipolar world centered on the United States. The global free trade was highly efficient. As the constant development of Chinese economy, the world has now formed a bipolar world centered on the United States and China. The establishment of the bipolar world has restricted free trade to a certain extent, causing turbulence in international trade. From 2018 to 2021, China's cotton import structure has experienced great fluctuations, which not only affects the economies of both countries, but also indirectly affects the stability of the global cotton industry chain.

Empirical Methodology

Model Construction:

To further explore the factors affecting the net import of virtual land in China's cotton trade, we use multiple linear regression model to analyze the relationship between dependent and independent variables. In statistics, the linear regression model is a kind of common model that can be used to explain quantitative relationships between variables. The linear regression model can be divided into simple linear regression analysis and multiple linear regression analysis. Its general format is:

$$y_i = a_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_k x_{ik} + \varepsilon_i \quad (i = 1, 2, \dots, n)$$

In this model, n is the sample size; the first subscript i of the explanatory variable x_{ik} denotes the i -th "observation"; the second subscript k of the explanatory variable x_{ik} denotes the k th explanatory variable ($k=1, 2, \dots, K$), with a total of K explanatory variables; a_0 is constant; $\beta_1, \beta_2, \dots, \beta_k$ are parameters to be estimated and called regression coefficients; ε is residual.

Variables Selection:

The dependent variable Y in this paper is the net import of virtual land in China's cotton trade. There are nine independent variables including arable land per person (Pland), cotton yield per unit (Poutput), cotton domestic consumption (Tc), total supply (Tsupply), per capita disposable income (PCDI), population size (GP), and total textile and garment exports (CE). The following are assumptions made about the relationship between the explanatory and explained variables.

(1) We choose arable land per person as an indicator to measure resource endowment and assume that arable land per person is negatively related to virtual land import. As suggested by H-O (Heckscher-Ohlin) theory, differences in factor endowments are the basis of the trade among countries. A country should export goods that use their relatively abundant and cheap factors of production and import the products that use the countries' relatively scarce factors. The appearance of virtual land trade is also largely determined by the degree of regional endowments of arable land resources, especially for trade in land-intensive agricultural products such as cotton, where the comparative advantage of arable land resources is a key factor affecting its trade advantage.

(2) We choose cotton yield per unit as a quantitative indicator of the technical level of cotton production and assumed that cotton yields per unit are negatively related to the virtual land resource imports. Qiuyin Ge et al. (2016) use quantile regression methods to explore how cotton production technology affects cotton virtual land resource imports. The technical level of cotton production is represented by the indicator of cotton yield per unit area. We find that the increase in cotton unit area yield has a negative effect on cotton virtual land resource imports, with a 1% increase in cotton yields reducing cotton virtual land resource imports by 2.23% to 4.31%. [37].

(3) We choose total domestic consumption and total supply as quantitative indicators of supply and demand and assumed that cotton consumption is positively related to cotton virtual land resource imports whereas cotton total supply is negatively related to cotton virtual land resource imports. Trade arises due to the imbalance between domestic supply and demand: in general, with the constant aggregate demand, the total domestic supply has negative effects on the total import volume, i.e., the more the total supply, the smaller the import volume. Similarly, with the

constant aggregate supply, the larger aggregate demand will lead to a higher import volume.

(4) We choose per capita disposable income as a quantitative indicator of national income and assume that it is positively related to virtual land resource imports. According to consumer choice theory, income is the primary factor affecting demand. In this paper, the increase in income of residents will increase the consumption of textiles and clothing, which will indirectly increase the consumption of cotton and affects virtual land imports.

(5) We choose the total population as a quantitative indicator of a country's population size and assume that the population size is positively related to the virtual land resource imports of cotton. H Tang et al. (2017) based on the vector autoregressive (VAR) model empirically analyze the relationship between population size, economic growth, resource endowment, and virtual land imports in China. They find that population size, economic development, and the rapid decrease in per capita arable land are driving factors for the continuous growth of virtual land imports in China. To be specific, the driving effects of all these three factors on the growth of virtual land imports lasted for a long time, and the contribution of the population to virtual land imports is becoming more and more significant [38].

(6) We choose the export value of textile and apparel as a quantitative indicator to measure the development of China's textile and apparel industry and assume that the export value of textile and apparel is positively related to the import volume of cotton land resources. Q Zhang (2007) using the linear regression model empirically analyzes the impact of the development of the textile and apparel industry on China's cotton import trade. The results show that demand is the main factor determining cotton imports in China, which are derived from the demand for cotton from the textile industry [39].

Regression Results Analysis:

We choose the sample for the empirical analysis from 2001-2021, in which the data of China's domestic consumption of cotton, production per unit area, total population, per capita disposable income, the export value of textile, and the total supply of cotton are obtained from the Customs of the People's Republic of China, National Bureau of Statistics of China database, China Cotton Net, Forward Business and Intelligence database and China Textile Industry Development Report. Moreover, the arable land per capita is calculated based on the ratio of the total arable land area to the total population. We use the econometric software Stata to do the empirical analysis.

Firstly, we do the VIF test for all the selected variables and find that the VIF test values of disposable income per capita and total population are too high, which indicates that these two variables have serious multicollinearity with other variables. So we removed these two variables when doing the regression results and do the stepwise regression for the remaining independent variables, as shown in Table 5. Lastly, we also conduct the VIF test on the remaining variables and show the results in Table 6.

Table 5: Regression Results

Variables	lny	lny	lny	lny	lny
lnPoutput	-8.449**	-10.68***	-20.52***	-14.05***	-12.01***
	(3.141)	(2.662)	(3.990)	(3.965)	(4.051)
lnPland		-45.43***	-53.86***	-39.44***	-43.63***
		(14.11)	(12.12)	(11.16)	(11.10)
lnCE			4.139***	1.726	0.0324
			(1.393)	(1.414)	(1.765)
lnTc				7.057***	6.702**
				(2.386)	(2.308)
lnTsupply					4.420
					(2.934)
Constant	111.4***	-18.86	10.60	-49.39	-108.7*
	(32.83)	(48.55)	(41.73)	(40.09)	(55.15)
Obs	21	21	21	21	21
Gof.	0.276	0.541	0.698	0.804	0.830

Note: ***, ** and * are statistically significant at the 1%, 5% and 10% levels, respectively; the values of t-statistics are presented in parentheses.

Table 6: VIF Test

Variable	VIF
lnPoutput	5.60
lnPland	1.50
lnCE	8.19
lnTc	1.63
lnTsupply	2.82

Table 5 indicates that the effects of cotton yield per unit area and arable land per capita on the net import area of cotton virtual land are significant and negative, which confirms the hypothesis. In other words, the larger the arable land per capita, the higher the yield per unit area of cotton, and the lower the virtual land resource imports of cotton. The possible reason is the larger arable land area per capita will lead to more land used for cotton cultivation. After the total cotton sown area is guaranteed, with the continuous improvement of cotton yield, the total cotton output will also increase. If domestic cotton supplies are sufficient, the cotton imports will decrease accordingly.

Moreover, total domestic consumption, total supply, and textile and clothing exports show a positive relationship with the net import area of cotton virtual land, among which total consumption has a more significant effect on the net import area of virtual land, which is consistent with our hypothesis, i.e., the more cotton consumption and the greater number of textile and clothing exports, will lead to the greater amount of cotton imports and the greater corresponding virtual resource imports.

China is a big cotton consumer consuming about 8 million tons of cotton every year. These consumptions are distributed in all aspects of the industry chain, from primary products such as raw cotton to cotton yarn, cotton cloth and other intermediate products and then to final products such as textile apparel. As a large exporter of textiles and clothing, nearly one-third of annual clothing production is for export to the international market.

With the continuous increase in world market demand on China's textile apparel, China's cotton consumption also increased. The combined effect of these two factors drives the increase in imports of virtual resources.

The reason why the total supply is contrary to our hypothesis may be the trend of the total supply increase is not as much as the increase in total demand. It causes that even though the total supply of cotton is increasing, the import of cotton is still in an increasing trend, causing it to show a positive correlation. Then, after doing the stepwise regression of the independent variables, we can find that the Goodness of Fit also shows an increasing trend and finally reaches 0.83, which is quite close to 1. This result indicates that the regression straight line fits the observed values relatively well. Finally, we can see that the VIF values of each independent variable are below 10 in Table6, which indicates that this equation passes the VIF test.

Conclusion and Insight

Conclusion

Through the research above, this article draws the following conclusions: First, affected by factors such as sluggish global economic growth, weak demand in various countries, rise of trade protectionism, and rise of production costs, China's cotton import structure has changed. Second, on the whole panorama, China's cotton import structure is basically in the state of net import and

has a high geographical concentration. China's cotton consumption tends to satisfy demand by domestic supply, which is consistent to China's strong support for the cotton industry in recent years. Third, China is a net importer of virtual land in cotton trade, which is related to internal factors such as the relative scarcity of land resources in, the rising cost of cotton planting and the prosperity of the textile and garment industry, as well as external factors such as national policies, international economic relations and China-US relations. Fourth, among the influencing factors, the arable land per capita and cotton yield per unit have a negative relationship with the import of cotton virtual land in China. The cotton demand and the export of textile and garment are positively related to the import of cotton virtual land.

Insight

First, build a unified cotton tariff to improve the efficiency of international cotton trade. Tariffs are very important in the international trade. The analysis in section 3 indicates that the main way of China-US trade friction in cotton trade is the change of tariffs. Tariff change is one of the reasons for the change of China's cotton import structure. Stable cotton tariff is also beneficial to the improvement of the efficiency of international trade. After joining the World Trade Organization, China's commitment to the tariff rate within the cotton quota of 1% has surpassed all WTO member countries. Therefore, it is impossible to promote China's cotton import trade by reducing the tariff within the quota [40]. As far as the current situation is concerned, the implementation of the cotton sliding scale tariff is of positive significance for the rational distribution of cotton in the domestic and international markets. The trade department should adjust the calculation formula of the sliding scale tariff on cotton according to the actual market conditions, replace the sliding scale tariff on cotton with a unified cotton tariff, and replace the sliding scale tariff with a unified import tax rate that exceeds the quota. This can improve the transaction efficiency of China's cotton international trade and stabilize China's cotton imports [41].

Second, ensure the security of national cotton imports and promote the diversification of cotton import. The research of the article shows that China's cotton has long been in a state of net import and the domestic cotton supply is in short. The import of cotton virtual land has alleviated the pressure of China's cotton supply and demand imbalance and arable land per capita to a certain extent. However, we cannot rely too much on it, especially when the source of import is highly concentrated. From the analysis in Section 3, we can see that domestic cotton import sources are mainly the United States, India, Australia, Uzbekistan and Brazil and the total amount of cotton imported from these countries accounts for 80% of the total cotton imports. High dependence on foreign countries is a hidden danger to China's cotton import security. Therefore, it is necessary to have less geographic concentration, disperse the high concentration of cotton import source countries and implement the strategy of diversification of the import market.

Third, promote multilateral free trade and build a high-qualified global cotton value chain.

Fourth, establish good international relations and promote international free trade. The research above finds that international relations will affect the import and export structure of China's cotton. With the deepening of international cooperation, the degree of dependence between countries continues to rise.

Fifth, actively implement the cotton “go global” strategy and promote the liberalization of China’s market. Continue to deepen the cooperation between China and other countries’ cotton industry, carry out multi-field and in-depth cooperation, and increase the degree of dependence with other countries’ cotton industry. The research above suggests that trade protectionism will affect international free trade and will somewhat have impact on the economy of other countries, which is not conducive to the sustainable development of the global economy. At the same time, although free trade can bring huge benefits to some countries, it can also make some countries pay the huge price. We have to look at free trade dialectically. As a responsible and powerful country, China should actively promote the development of global free trade and promote the liberalization of China’s market.

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