

COTTON TRANSPORTATION COST IN CHINA**Fangbin Qiao****China Economics and Management Academy, Central University of Finance and Economics****Beijing, China****Mechel S. Paggi****Director, Center for Agricultural Business, California State University****Fresno, CA****Abstract**

The objective of this study was to investigate cotton transportation cost in China. Using field survey data collected in the fall of 2008, we provide detailed information of the transportation cost for cotton from fields and ports to textile mills. Results indicate that policy reform has created a more market oriented transportation cost structure and increases in per unit cost have emerged. Additional research with an increased sample size would provide a more robust picture of the overall transportation system and future trends in the industry.

Introduction

The world cotton industry is greatly influenced by China's cotton market. China is the world's largest cotton producer and consumer. In 2008, China's total cotton production was 35 million bales, more than 30% of the world total, and total consumption was 51 million bales, 43% of the world total (USDA, 2008). Despite large stocks of cotton, China continues to import substantial amounts of cotton lending strength to world prices. As the largest cotton importer, China imported one third to one half of the world total in recent years (USDA, 2008). Hence, a comprehensive understanding of China's cotton competitiveness has important implications for the world's cotton market, especially to exporters (such as the USA – the largest cotton exporter).

However, this comprehensive understanding is incomplete due to the absence of a detailed understanding of transportation cost. On the one hand, the production cost of the cotton has been well documented (National Product Cost Survey, 2008). Paggi et al (2007) compared the cultivating costs between China and the United States and showed that competitiveness of China in cotton production cost comes mainly from the low labor cost. In addition, Qiao and Paggi (2008) conducted field surveys that allow for a comparison of the ginning costs in China and United States. However, these reports did not provide information on the transportation cost. The International Cotton Advisory Committee (ICAC) provides information on the transportation cost to gins in China, but the information is incomplete. On the other hand, there is almost no information on the transportation cost from gin to textile mills. And there is also no information on the transportation cost from the ports to textile mills, which is important to California exporters. The absence of a detailed understanding of the transportation cost impedes a comprehensive understanding of China's competitive position in world markets and hence the potential opportunities for exporting countries.

The objective of this report is to provide a more comprehensive understanding of the transportation cost of cotton in China. Specifically, we used field surveys to gain information and better understand a) transportation cost from fields to gin factories; and b) transportation cost from gin factories or ports to textile mills. We also discuss changes of transportation costs and factors that influenced these changes over decades. Finally, we discussed the future of China's cotton transportation system.

Materials and Methods

To meet our goal, a field survey was conducted in the fall of 2008. The field survey was conducted in Fugou county, the largest cotton production counties in Henan province (Henan is the second largest cotton production province in China after Xinjiang). During the survey, the authors visited peddlers who purchased cotton directly at farmer's door, managers of a private cotton ginning factories, and owners of small transportation business, and Henan Zhongfang textile mill. In addition, representatives from the China Cotton Association and Beijing Jingmian Textile Group were interviewed

Results and Discussion

Cotton production regions, textile industries bases and transportation

China's main cotton production regions are the Yellow River valley, The Yangtze River valley, and the Xinjiang Uyghur Autonomous Region. Traditionally, the Yangtze River valley is the largest cotton production in China. After the land reform policies were instituted, cotton production in the Yellow River valley exceeded that of the Yangtze River valley. The percentage of cotton production in the northwest was less than 5% of the national total until the middle of the 1980s. However, cotton production in Xinjiang Uyghur Autonomous Region increased dramatically over the last two decades and became the largest cotton production province in China since early 1990s. According to the estimation of National Cotton Market Monitoring System (NCMMS, 2008), the total planting area of cotton in 2008 is 5.78 million ha. Among them, 43% is in the Yellow River valley, 25% is in the Yangtze River valley, and 32% is in the northwest region.

The textile industry is based in the east coastal regions where ,except for Xinjiang Uyghur Autonomous Region, all the other main cotton production provinces (such as Shandong, Henan and Hebei in Yellow River valley, Anhui, Jiangsu, and Hubei in Yangtze River valley) are located Hence, most of the textile mills are also mainly in the coastal areas. According to the statistics, 923 cotton yarn enterprises in 9 coastal provinces (Tianjin, Shanghai, Liaoning, Shandong, Hebei, Jiangsu, Zhejiang, Fujian and Guangong) produced 60% of the whole country's total production in 2001 (Zhu, 2007; Wang, 2006).

The major domestic cotton transportation flow is from the Xinjiang Uyghur Autonomous Region to the coastal regions. As discussed above, most of the coastal regions are both cotton production regions and cotton consumption regions. The Xinjiang Uyghur Autonomous Region total cotton production was 2.7 million tons in 2007, with 83% being shipped to coastal region processing facilities (Tian, 2008).

Cotton transportation cost in China

From fields to farmers' storerooms

Handpicking is still the prevalent harvesting method in China. There are millions of cotton farmers among the estimated 800 million Chinese living in rural areas. Farm size is small, usually less than 0.5 hectare in China's main cotton production regions (Yangtze River valley and Yellow River valley). Hence, except for some areas in the Xinjiang Uyghur Autonomous Region, all the cotton in China is harvested by hand. In addition, even in the Xinjiang Uyghur Autonomous Region where machine picking is available, the share of cotton picked by machines is reported to be less than 5% (Gao and Hu, 2006).

Harvested cotton is carried home either by hand or by bicycle (or tricycle). Unlike in the United States, cotton is picked several times during the harvest season in China. Each time, only the ripe cotton is harvested. Usually, a farmer can harvest less than 50 pounds of seed cotton in a half day (then they go home to eat). Putting the harvested cotton into plastic bags, farmers usually walk less than 0.5 km from cotton fields to their homes. They can also use a bicycle or tricycle to carry the harvested seed cotton (Figure 2). This harvesting and transport pattern has not changed over decades.

Harvest cotton is stored for several months before being sold. Most farmers do not have a special separate storeroom for cotton. After being air dried for a couple of days, harvested seed cotton is pieced together either directly on the ground (protected by plastic clothes) or on a bed in part of farmer's house. In the 1980s when cotton was the only cash crop, farmers would sell seed cotton right after harvest because they urgently need to return the money they borrowed for purchasing agricultural inputs during the summer. However in recent years, farmers usually store seed cotton for several months and wait for the favorable prices to market their cotton.

From farmer's door to cotton processing plant

Historically China viewed cotton as a strategic commodity because of its importance in clothing its large population, especially when China was an isolated country during the 1950s through the 1970s. Since early 1950s, cotton production, consumption, and trade have been strictly controlled by the government. The government designated the All China Federation of Supply & Marketing Cooperatives (SMC), the quasi-state agency, to control the uniformed operation of the cotton industry and stipulated the price for the purchase and sales of cotton (Fang and Babcock, 2003).

In the 1980s and 1990s, farmers could only sell seed cotton to several procurement stations. Usually, there was only one procurement station in one main cotton production township (Shi and Xu, 2002). However, there were usually more than 10,000 households in one township (NBSB, 2007). Hence, during the harvest season, farmers had to spend a great deal of time to sell the cotton. On the day of sale, farmers typically get up very early in the morning, put all the seed cotton, usually 1000 pounds or more, in a wagon, and spend several hours to haul the seed cotton to the nearest cotton procurement station. At the procurement station, the farmer had to wait for one whole day or several days to get their cotton sold. These long waiting lines had been routinely reported in the middle 1980s.

Peddlers began to enter the market around the end of 1980s. In the middle of 1980s, cotton production reached more than 6 million tons (Hsu and Gale, 2001). Since there was surplus supply, the government began to loosen the control of the cotton market. As a result, peddlers began to enter the market at the end of 1980s (Shi and Xu, 2002). They purchased seed cotton at farmer's door and sold it to cotton procurement stations. Since then, even though the government has tried to stop the peddlers from entering the market in years when cotton production was low, it has never been fully successful (Shi and Xu, 2002).

Recently, peddlers have dominated the seed cotton purchasing market. The turning point for the cotton marketing system reform came in 1999 when the monopoly cotton marketing system was abandoned. Since then, private enterprises, as well as large or medium sized state-owned textile enterprises or cotton processing plants owned by local (county and province) agricultural bureaus have been allowed to purchase cotton directly from farmers (Shi, 2003). As a result, the former monopolist, procurement stations and ginning factories owned

by Cotton and Jute Company (CJC), which belong to SMC, have been forced to exit the market (Qiao and Paggi, 2008). Both peddlers and private cotton ginning factories purchase seed cotton directly at farmers' doors.

Peddlers purchased seed cotton locally, usually in villages several miles away from where they live. They usually hire 7-8 laborers and a small tractor (which can haul 2,500-3,000 kg). The hired laborers do the loading and shipping work. The peddlers pay 20 Yuan/ton for loading and 20-60 Yuan/ton for shipping depending on the distance to the cotton gin. According to our survey, peddlers can purchase 10 tons in one single day.

The transportation cost may have been underestimated in the data published by International Cotton Advisory Committee (ICAC). According to data provided by ICAC, transportation cost (to gin only) of production from one hectare of cotton in China was 1.82 US\$, which was 3.4% of that in Australia (Figure 3). At the same time, the transportation cost for production of one hectare of cotton in another developing country, Bangladesh, was 6.78 US\$, 3.72 times of that in China. However, according to our survey, the minimum shipping and handling fees from farmer's doors to gin is 40 Yuan/ton, or 5.88 US\$/ton. If we assume that the average yield is 3 tons per hectare and one USD equals to 6.8 Yuan RMB, we can get the minimum transportation cost (to gin only) of production of one hectare of cotton to be 17.65 US\$. Hence, we believed that transportation cost of cotton in China may have been underestimated in the data published by ICAC.

From ginning factories to textile mills

Under the central planned economy, like all the other products, lint was shipped from gin to textile mills according to the government's plan (Fang and Babcock, 2003). As the market was gradually opened in the middle of the 1990s, both cotton processing plants and textile mills can choose their own clients (Shi and Xu, 2002). During this time period, the transportation cost was fixed at 0.09 Yuan/ton/mile no matter how far the destination is. Considering the time spent on loading, most of the drivers preferred long distance to short distance shipping.

After the monopoly cotton marketing system was abolished at the end of 1990s, the shipping price of lint began to be market-oriented. According to the author's survey, short-distance shipping price increased after the market open. For example, the shipping price from Fugou county to Luohe city, 54 miles away, increased from 0.09 USD/ton/mile to 0.16 USD/ton/mile.

In contrast the middle-distance shipping price did not change much. For example, the shipping price from Fugou county to Anyang city (about 156 miles away) remained relatively stable. On average, the shipping cost is about 14.71 USD/ton. And the range is 11.76~17.65 USD/ton depending on backhaul opportunities. The unit price is reportedly 0.08 ~ 0.11 USD/ton/mile, similar to the price before the reform.

Finally, the long-distance shipping prices actually decreased. For example, shipping prices from Xinjiang Uyghur Autonomous Region to Fugou county decreased from 176 USD/ton to 66 USD/ton. In other words, the unit price decreased from 0.09 USD/ton/mile to 0.03 USD/ton/mile, more than two thirds.

Currently, gin operators would like to sell lint to peddlers, rather than textile mills. Textile mills, which had been the export engine of China, are fighting for their survival this year with rising costs and dismal overseas markets (Xinhua News Agency, 2008). Consequently, demand for lint declined dramatically this year. Hence,

most of the textile mills can not pay for lint on time. As a result, the ginning factories chose to sell lint to peddlers. Usually, the peddlers have connections with people in the textile mills so that they are confident of getting the money if they sell lint to textile mills.

From ports to textile mills

The four largest ports for cotton imports in China are Qingdao, Shanghai, Nanjing, and Tianjin. According to the statistics, the total amount of cotton imported from these four largest ports was more than 85% of all the cotton import (Zhu, 2007). 75% of these imports are processed in Shandong, Jiangsu, Shanghai, Beijing provinces and municipalities.

Imported cotton has a significant impact on the domestic cotton price. In May and June, when domestic cotton has been almost exhausted, the lint price increases 44-74 USD per ton. However this spring, the lint price declined from near 2,059 USD/ton to 1,838 USD/ton because of the large amount of imported cotton. As a result, some owners of gins who had stored lint this year lost money.

The shipping price of lint from ports to textile mills is significantly higher than that for domestic lint. As in domestic lint transportation, private enterprise dominates the transportation of imported cotton from ports to textile mills. Since cotton has been considered as a “flammable” commodity, trucks with special equipment are required for shipping. Even though this requirement is not strict for domestic cotton, it is strictly implemented in the port. As a result, the shipping price increased to 0.18 USD/ton/mile, which is significantly higher than the shipping price for domestic lint (Table 1).

Cotton from the United States is widely used in recent years. Lint exported from India and Pakistan, like domestic cotton, is mixed with “San Si” or “Three Types of Fiber” (hair, animal’s hair, and plastic fiber) which cannot be removed by the machines. Hence, the textile mills have to spend extra effort to clean the “San Si” from the cotton lint. Cotton from the United States has reportedly has little or no “San Si” and as a result, cotton from the United States typically commands a 44-74 USD/ton price premium over domestic cotton.

Trends of China’s cotton transportation market

China’s cotton transportation industry is facing great challenges. The cotton transportation market is increasingly competitive. Several years ago, transportation was a very profitable business. Hence, lots of people rushed into the market. Currently, there are several hundred small private transportation businesses in Fugou county. Intense competition has put downward pressure on shipping prices and narrowed profit margins. According to our survey, 30% of private transportation businesses were earning some profit; 30% of them were breaking even, and 40% of them were losing money. Hence, some businesses, especially those new entrants without experiences, are expected to exit the market soon.

Depreciation of the US dollar was a boost to US growers and cotton exporters. Since July 2005, the exchange rate between RMB and US\$ changed from 8.23 to 6.82. In about three years, the Chinese currency appreciated more than 17%. The depreciation of the US dollar provided a competitive advantage for US cotton growers and exporters. Currently, the US is the largest cotton importer in the China market. This competitive advantage may erode over time as the value of the US dollars shows signs of recovery in recent months.

US cotton growers and exporters are also facing increased competition from other exporters, especially India. As the largest importer, China has attracted the attention of all cotton exporters. Even though cotton from India has the same problem of “Three Types of Fiber” as domestic cotton, the low price makes India competitive in the international market. In addition, after the widespread adoption of the Bt cotton in recent years, cotton production in India had increased significantly. Hence, it can be expected that India will play a more important role in the international cotton market. The flow of cotton from India to China will be expected to have a transportation cost advantage over shipments from the U.S.

Table 1. Cotton transportation cost in China

	Distance (miles)	Transportation tool	Transportation cost		
			Handling (USD/ton)	Total shipping cost (USD/ton)	Unit shipping price (USD/ton/mile)
Domestic cotton					
From Farmers' door to ginning factory	1.2	Tractor	2.44	2.94	2.45
From processing plant to textile mill					
Short distance	54	Truck	2.74	8.82	0.16
Middle distance	156	Truck	2.74	11.76□17.65	0.08 □ 0.11
Long distance	2040	Truck	2.74	66.18□110.29	0.03 □ 0.05
Export cotton					
From port to textile mill	480	Truck with special equipment	0.39	88.24	0.18

Note: 1 USD = 6.8 Yuan RMB; 1 km =0.6 mile.

Source: author survey, 2008.

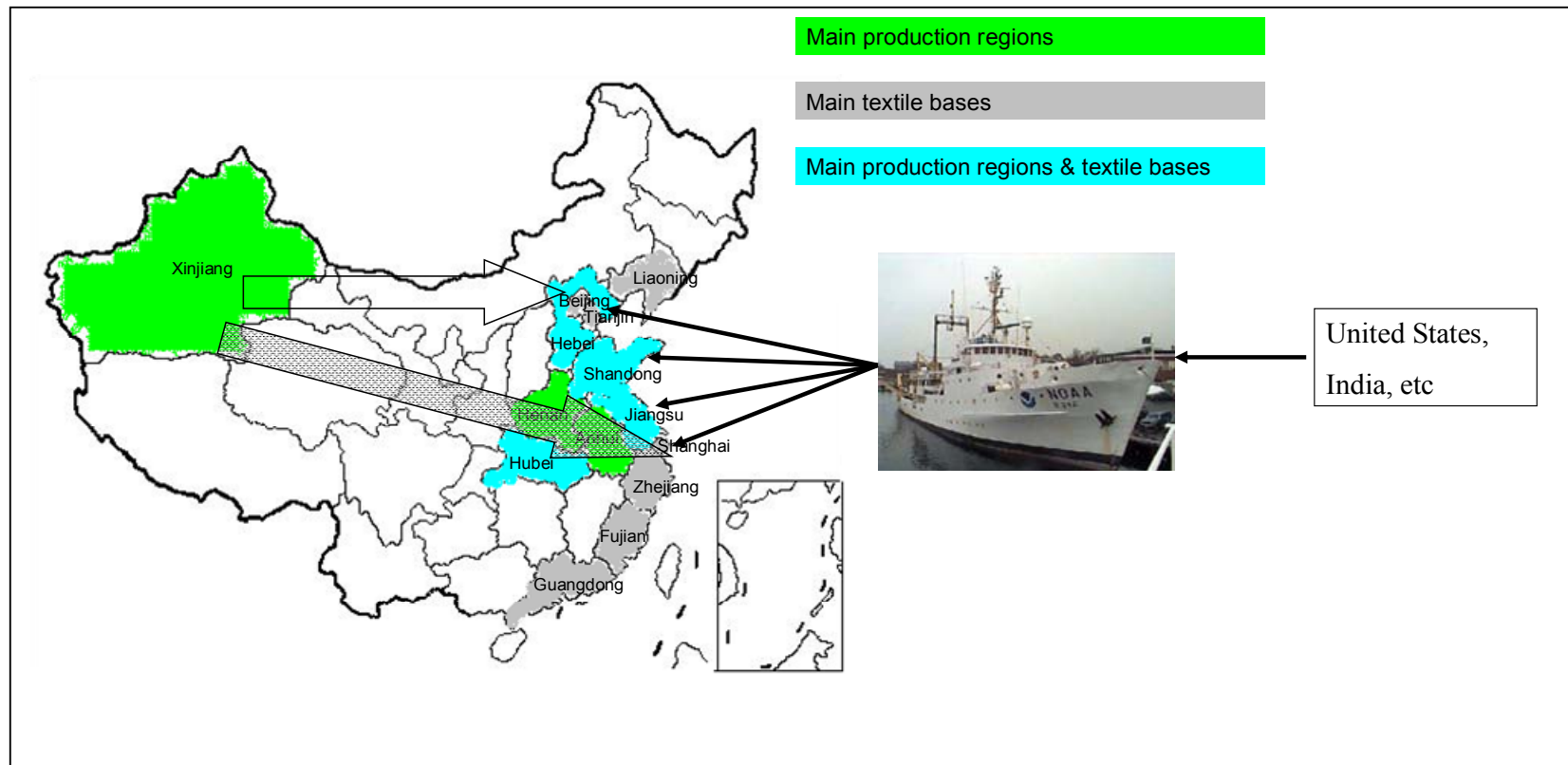


Figure 1: Cotton production regions, textile industries bases and transportation in China.

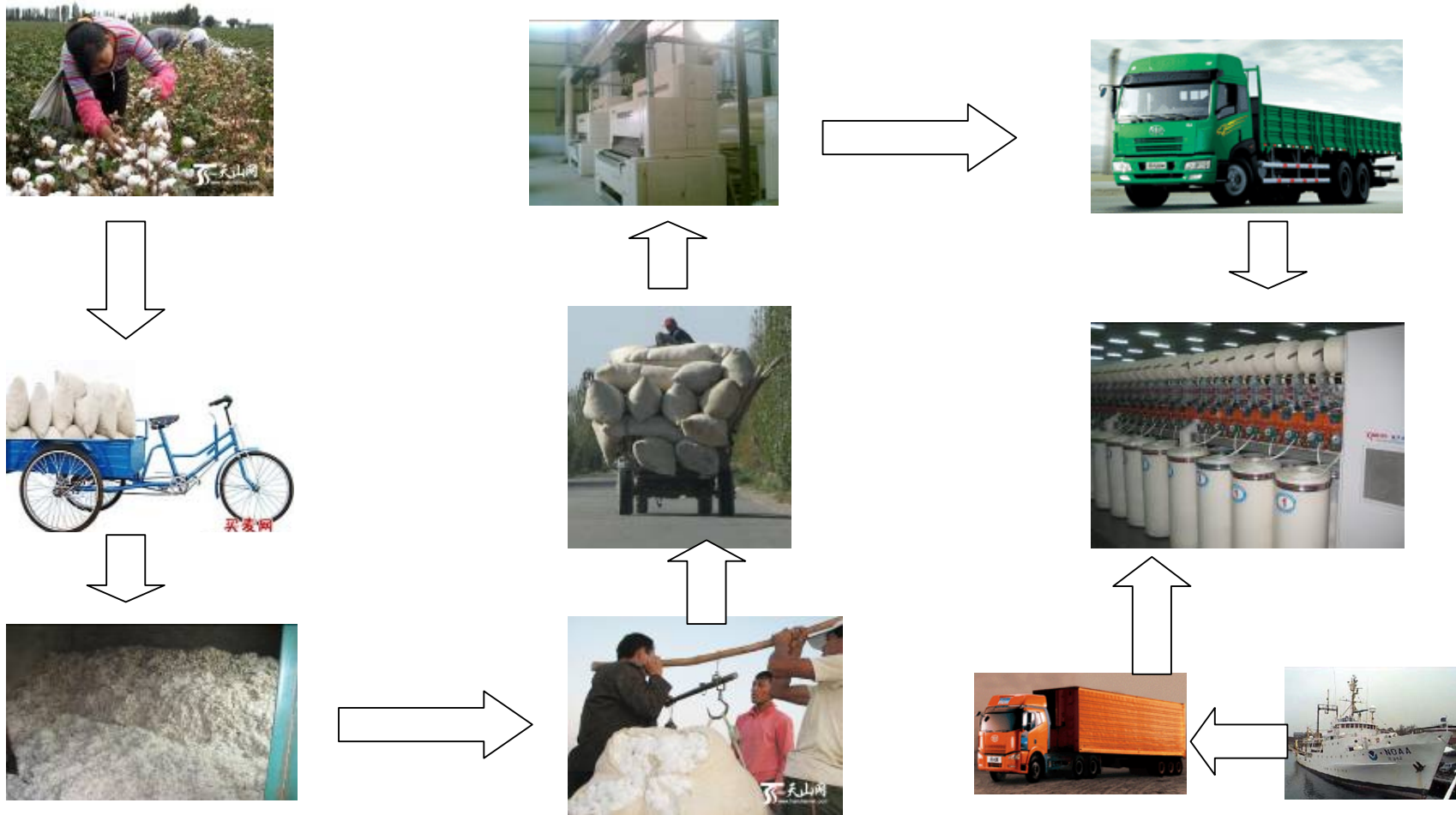
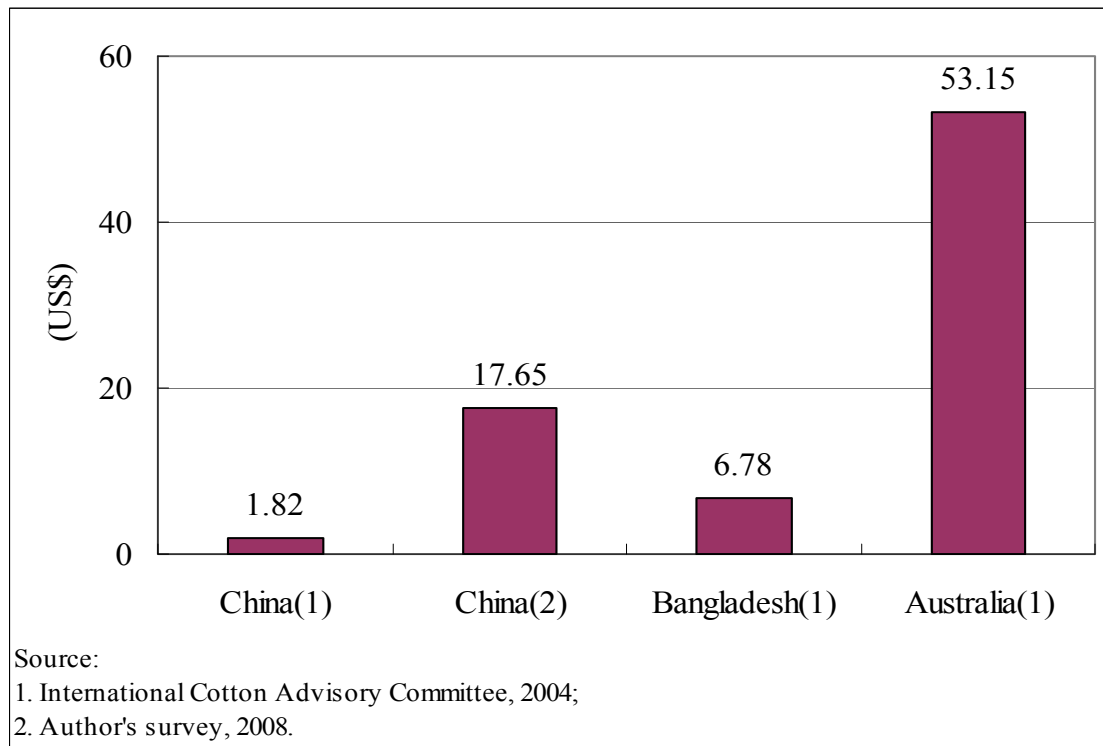


Figure 2. Cotton transportation in China



Note: transportation cost to gin factory of producing one hectare of cotton in 2008 is calculated according to author's survey of shipping and handing cost and following assumptions: a) production of one hectare is 3 tons; b) 1 US\$=6.8 Yuan RMB; c) shipping and handling fees are 40 Yuan/ton.

Figure 3. Transportation cost (transportation to gin factory) of producing one hectare of irrigated cotton.

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