

Chapter 2

Market Approaches to Dealing with Cotton Adulteration in Early Twentieth-Century China

Masataka Setobayashi

Abstract Regulations alone are not always effective in preventing dishonest practices in commerce. This chapter examines various methods to ensure quality in international trade through a case study of the trade in cotton fiber in early twentieth-century China. Dishonest practices, such as adulteration, emerged in raw cotton exports from Hubei Province. At the beginning of the twentieth century as demand for cotton increased in response to the growth of the spinning industry in Japan and Shanghai. The demand for cotton suitable for machine spinning was high and merchants stressed the importance of the quality of the cotton they purchased. Moisture content arose as a problem at the time that the Chinese cotton market was undergoing rapid changes in response to the increased demand. As adulterated cotton contributed to the rusting of machinery, this problem was a serious problem for buyers. The moisture content problem arose because of changes in transaction methods and the surfacing of differences in understanding of the trading methods. This problem was resolved when parties to the trade began to send and respond to clearer price signals. Through the emergence and resolution of the moisture content problem, trust relations were built between Japanese trading firms and Chinese merchants/farmers, based on the understanding that higher-quality goods could be sold for higher prices.

Keywords Product quality · Market · Adulteration · Information · Raw cotton

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1 Introduction

This chapter focuses on the problem of how to prevent deterioration in the quality of goods. The rapid growth of the contemporary Chinese economy and its central role in global trade has been accompanied by the emergence of what are sometimes seen as dishonest practices related to product quality. International traders have put pressure on the Chinese government to design rules to prevent such problems. However, as the contemporary situation clearly shows, regulations alone are not always effective. What other methods may help in ensuring quality in international trade?

Following the opening of East Asian ports around the middle of the nineteenth century, dishonest practices such as adulteration and imitation emerged in various transactions in the open ports in East Asia (Ho 1935, p. v). In particular, adulterations were frequently seen in the exports of goods from East Asia. Various problems were created by the production of inferior goods, including a rising incidence of short measures and the deterioration of quality. As a result, the exported goods often did not meet the demands of buyers.

Earlier studies identified two reasons for the production of inferior goods: confusion in commercial transactions resulting from the rapid growth of new entrants into the market, and issues arising from technical problems. These problems were resolved through an “institutional and organizational response” (Hashino 2007).

Recent research on the nineteenth-century Japanese export trade has identified several reasons for the emergence of adulteration. When raw silk transactions began during the Meiji era in Japan, it gave rise to transaction disputes between Japanese merchants and foreign merchants. Foreign merchants expected the export goods to match the samples, while Japanese merchants delivered raw silk that did not match the samples they had originally presented. The Japanese merchants were following indigenous trading customs regarding sales that had not always required the goods to strictly match the samples. When the goods delivered differed from the samples, or did not meet the stipulated standards, the issue was handled flexibly through discounts and other measures. This method of dealing with problems assumed that most of the sellers were not intentionally acting in bad faith. However, foreign trading partners did not share the same assumptions, and there was a great increase in what the foreign merchants considered as dishonest practices (Taniyama 2008).

What this example shows is that such “dishonest practices” were nothing new, and that participants in the trade were not necessarily actively trying to deceive the other party. Thus the troubles that emerged in the Meiji raw silk export trade were just one of the many cases where a behavior that was traditionally seen as a customary practice in one culture was regarded as a dishonest practice and strongly criticized by those from another culture. Worries among foreign merchants about such “dishonest practices” became an endemic problem in commerce in East Asia; they were not isolated cases.

Based on this understanding, this chapter will examine the emergence and resolution of the adulteration problem in transactions through a case study of the moisture content problem in the raw cotton export trade in China's Hubei Province from the end of the nineteenth century to the beginning of the twentieth century. Until the end of the nineteenth century, peasant households in China had produced hand-woven cotton cloth using short-staple native cotton. When the first mechanized spinning mills were established in Japan and China, they produced low-count yarn using the same material. However, from the 1880s, the sudden growth of the spinning industry in Japan and Shanghai increased demand in China's cotton market for cotton to supply the spinning industry (Yan 1963). The spinning mills demanded cotton suitable for machine production and merchants came to put decisive importance on the quality of the cotton they purchased. Moreover, along with the growth of the spinning industry in Japan, fine yarn (high-count yarn) production increased, and a mixture of long-staple cotton from the USA and short-staple cotton was used as the raw material. The market demand for long-staple cotton rose and efforts were made to introduce longer-staple varieties in China (Setobayashi 2006, 2008). In short, in addition to the previous short-staple cotton market, a new market for long-staple cotton was created within the cotton market in Japan and Shanghai.

The growth in demand for cotton in East Asia led to a steep rise in the price of cotton, providing incentives for Chinese farmers to produce cotton. Many rural households increased the land area planted in cotton or switched from the cultivation of other crops to cotton, increasing the total raw cotton supply. In addition, as a result of the emergence of demand for long-staple cotton and the cotton improvement policies, Chinese farmers also began to grow long-staple cotton (hereafter referred to as American cotton, or AC) in the 1890s. From this time on, the acreage dedicated to the production of AC increased and the volume exported to Japan also increased (Setobayashi 2006).

It was within this context of growing production that the moisture content problem emerged and was resolved. Previous research noted that this problem was overcome by establishing quality inspection systems at open ports and other organizational responses (Takamura 1971, p. 274), but this was only one part of the story. Thus, this chapter first aims to clarify the cause of the emergence of the moisture content problem in the middle Yangtze Valley, centered on the treaty port city of Hankou, which became a major center for the export trade in raw cotton after the Shimonoseki Treaty of 1895. In China, adding water or other substances to goods to compensate for short measure was not a new problem. For example, it is a well-known fact that since trade from Guangdong began around the middle of the eighteenth century, moisture was added to tea exported to Europe and the mixture of impurities in cotton and raw silk was also noted as a problem during the Ming-Qing period (Soda 1975, p. 51, 1991, p. 58). However, previous research has argued that such adulteration was simply a dishonest practice. As a result, the essential significance of the adulteration in transactions was not fully understood. Therefore, in section one, the factors that contributed to the emergence of the

moisture content problem will be outlined, and the significance of the moisture content will be considered.

Next, this chapter will discuss the factors that contributed to the resolution of the moisture content problem. As raw cotton was increasingly seen less as a raw material for use in hand-woven cotton materials and more as an industrial raw material, greater importance was placed on its quality and type. Accordingly, the Chinese merchants and farmers who were parties to the raw cotton trade needed to supply raw cotton that was suitable for machine production. Section two will show how Chinese farmers and merchants responded to the changes in the market and how they strove to overcome the quality problem. One major concern was a change in their awareness of the quality and type of raw cotton that was required for the spinning industry. Through this analysis, it will be shown how the nature of the cotton market played a role in the resolution of the moisture content problem.

2 Emergence of the Moisture Content Problem

2.1 Rising Competition and the Beginnings of Adulteration

During the Qing Dynasty, the region along the Yangtze River, known as Jiangnan, became China's major center for peasant production of hand-woven cotton cloth (native cloth); rural households grew cotton and the region was also the largest area for consuming raw cotton. Jiangnan became a major market center for native cotton from the middle Yangtze Valley and northern China, as well as for the cotton-producing areas in the Jiangnan region (Xu 1992). However, the production system began to change following a rise in the influx of machine-spun Indian cotton yarn at the end of the nineteenth century. Farmers in farm villages switched from hand-spun yarn to machine-made yarn to weave native cloth. However, despite this shift, the demand for native cotton did not experience a sudden decline. From the 1890s, as the modern spinning industries in Japan and Shanghai developed, the demand for cotton increased.

Beginning around 1885, as a result of the rapid development of the Japanese spinning industry, there was a new demand for Chinese cotton, which was virtually of the same quality as Japanese cotton but cheaper. In the 1890s, when the volume of Indian and American cotton imports increased, the share of Chinese cotton on the Japanese market dropped to less than 10%. However the absolute amount of Chinese cotton exported to Japan remained around 600,000–800,000 piculs before 1920. Until the end of the 1880s, Chinese merchants in Osaka handled most of the Chinese cotton imports with Japanese merchants handling only 20–30% of the total import volume. However, in the 1890s, the share handled by Japanese merchants exceeded 50% (Yamaguchi 1998, pp. 43–44), much of which was imported from Shanghai.

In the 1890s Shanghai was the main center for trade in raw cotton produced in the outskirts of Shanghai and the Jiangnan cotton-producing areas of Changshu, Taicang, Jiading, and Tongzhou. Raw cotton wholesalers from the cotton-producing areas bought raw cotton from farmers at local periodic markets, and sold it to Shanghai's raw cotton wholesalers through merchants assigned to remote dealing. In this manner, raw cotton buyers from spinning mills and Japanese trading companies procured raw cotton from the Shanghai wholesalers.

Japanese trading companies encountered several bottlenecks in buying raw cotton. The first was related to ginning. Raw cotton (seed cotton) contains both fiber (lint) and cottonseeds. Ginning is the process of separating cottonseeds from the fiber, producing a final product called ginned cotton. The ratio of the weight of the fiber and cottonseed is 1:2 or 1:3. Because the seeds that were separated from the fiber contain oil, farmers extracted oil from the seeds and used it for both cooking and fuel for lighting. The fiber is the raw material for cotton cloth. Originally, raw cotton had been ginned using hand-operated cotton gins. The technology was relatively backward and in the processing the fiber was often broken, and seeds and dregs were mixed with the ginned cotton, rendering it unsuitable for machine spinning (Takamura 1980, p. 156).

To overcome this problem, it was necessary for Japanese spinning companies to either construct cotton-ginning mills in Japan, or for Japanese trading companies to construct ginning mills in China (Takamura 1982, p. 45). To gin cotton in Japan would require the import of seed cotton, which was not a practical solution for several reasons. First, seed cotton weighs approximately two to three times more than ginned cotton, so its import would mean shipping a great deal of unneeded materials (i.e., seeds). Second, the oil that can be extracted from the seeds was an important staple item in farm villages in China.

These two constraints led Japanese firms to decide to import ginned cotton rather than seed cotton. One of the results of this decision was a rising demand for the export of Japanese-made cotton gins (Hatano 1958, p. 65). With Mitsui & Co., Ltd. taking the principal role, the construction of cotton-ginning mills was planned, and in 1889 the Shanghai Cotton Co., Ltd, was established with the joint participation of companies from England, the United States, Germany, France, and Japan.

Although the export demand for Chinese raw cotton had been created earlier, the establishment of the first modern cotton-ginning mill was delayed because of treaty restrictions in China. Until the signing of the Shimonoseki Treaty of 1895, foreign businessmen were not allowed to engage in any manufacturing activities in China. Frequent disputes with the Chinese government even had hindered the import of cotton gins needed for the expansion of facilities.

Nonetheless, imported cotton gins played a major role in overcoming the ginning problems. The import of cotton gins intended for use in mills was restricted, but it was possible to import cotton gins for the purpose of sale. Japanese-made cotton gins were well received in the Chinese market, and were quickly adopted. Ginning mills in both the open ports as well as in local periodic markets began to convert from hand-operated cotton gins to foot-operated cotton gins made by Japan's Nakagiri (Zhongtong) Company (Dai Nihon Bōseki Rengōkai (DNBR)

1904, p. 25; Oyama 1992, Sect. 2). While the Japanese-made gins had high productivity, they were of simple construction, and so it was not long before imitations and improved versions appeared, and thus began the manufacturing of cotton gins bearing the Zhongdong, Zhongdeng and other trademarks (Rinji Sangyō Chōsakyoku 1918, p. 34). Most of the brand names for cotton gin brands owned by Chinese capitalists were similar to the name of those made by Nakagiri (Zhongtong). The import substitution of foot-operated cotton gins took place overnight, and at the beginning of the twentieth century, ginning mills in Shanghai and Hankou had switched to foot-operated cotton gins (Tsunoyama 2001, p. 54).

In addition, after the Shimonoseki Treaty made it possible to construct mills in the treaty port settlements, the construction of Japanese-capital ginning mills moved forward in open ports so that there was no longer any worry about this operation. However, this also created competition for raw cotton purchase, which led to the moisture content problem.

2.2 *Emergence of the Moisture Content Problem*

The moisture content problem involved the deliberate addition of water to the cotton: this was done to increase the weight since raw cotton was sold by weight, and adding weight thus added to the total purchase price for buyers. Ordinarily, Chinese cotton had a natural moisture content of approximately 8–10%, but after deliberate adulteration, this could rise as high as 25% (Shina Keizaisha 1920, p. 86).

Although the moisture content problem existed from the commencement of raw cotton trading in 1885, it was not a serious problem, due to the fact that the Chinese cotton naturally contained moisture. However, after the Shimonoseki Treaty, the moisture content problem became the most serious problem in raw cotton trading.

The problem was triggered when Japanese trading firms, in response to the rapidly rising demand for cotton, began to enter the Chinese domestic cotton market in inland areas like Hankou. Hankou, which was a major trading port in the mid-Yangtze region, located at the intersection of the Yangtze River which connected east and west China, with the Han River which linked to northern China, and the Dongting Lake which linked to southern China.

After the Shimonoseki Treaty, Japanese shipping in Chinese ports underwent rapid expansion (Kokaze 1995; Katayama 1996, Chap. 6). With a transportation network established between the Yangtze Valley and Japan, Japanese trading companies began to establish branches in Hankou. Mitsui & Co., Ltd. opened a branch in 1900 and Nippon Menka Kabushiki Kaisha (Japan Cotton Trading Company, Limited) opened a branch in 1904, and their procurement of raw cotton increased. Competition for raw cotton purchase developed in the middle Yangtze Valley as well as the lower Yangtze Valley, and, as we will see, the center of the competition shifted from Shanghai to Hankou.

The number of spindles in the Shanghai spinning industry shot up from tens of thousands in 1894–886,000 in 1919 (Zhongguo jindai fangzhi shi bianji

weiyuanhui 1997, p. 444). This development created a demand for raw cotton, and most of the raw cotton produced in Jiangnan was supplied to the spinning industry in Shanghai. Then, in the 1900s, Japanese capitalists began to build their own spinning mills in Shanghai and began purchasing raw cotton for these mills. For example, of the Shanghai cotton procured by Mitsui's Shanghai branch, the volume sold to the Shanghai spinning mills was approximately 93,000 of 110,000 piculs in 1910, 63,000 of 88,000 piculs in 1912, and 63,000 of 76,000 piculs in 1913 (Mitsui Bunko 2004a, p. 154). Mitsui Bussan and other Japanese trading companies in Hankou started purchasing raw cotton for the Japanese-owned mills in Shanghai around 1910 (Mitsui Bunko 2004b, p. 71), and by 1915 most exports of raw cotton to Japan came from Hankou (Ōkurashō Shuzeikyoku 1915, p. 541). For these reasons, Hankou became the center of competition in the raw cotton trade. The emergence of the moisture content problem accompanied this shift in the center of competition (Katō 1917, p. 336).

Excessive moisture was a problem for several reasons. First, when the moisture content of raw cotton was very high, the water contributed to the rusting of spinning machinery. Second, the sheen inherent in Chinese cotton was destroyed when adulterated raw cotton was dried a second time. In addition, mold spots would appear, and the fiber would lose its tensile strength and snap easily.

Adding water to the raw cotton obstructed normal operation of spinning machines (Yan 1963, p. 303), which was an extremely important problem for the mills as well as for the Japanese trading companies that purchased raw cotton for the spinning industry. At the beginning of the twentieth century, each Japanese trading company had special contracts with specific spinning companies, i.e., when the spinning companies commissioned trading companies to buy raw cotton, they also commissioned them to sell machine-spun yarn. As a result of this dual contracting, cotton-producing areas, especially those in Hubei Province, became important areas of competition for the Japanese trading firms because they could both purchase raw cotton and at the same time sell Japanese-made cotton yarn. Meanwhile, in Jiangnan, more Shanghai-made cotton yarn was consumed, so that it was difficult for Japanese trading companies to sell Japanese-made cotton yarn. The middle Yangtze valley had a well-developed system for production of native cloth using raw cotton as the material; Japanese trading companies thus could target the home weaving industry, promoting a shift to a system in which raw cotton was sold and machine-spun yarn was purchased for hand weaving. Thus purchasing raw cotton in the middle Yangtze Valley was an important part of the business of Japanese trading companies.

In 1893 the government-managed Wuchang Cotton Cloth Mill and Spinning Mill were opened in Hankou. When they first opened, these plants used Tongzhou cotton (Shanghai cotton) as raw material, but from 1902 onward, they used Hubei-produced raw cotton (Mizuno 1907, p. 119). This increase in demand for raw cotton in the Hankou market resulted in heated competition among merchants engaged in the raw cotton trade.

A source from 1905 reported that, "The raw cotton buyers in Hankou were the merchants from Shanghai, Sichuan, Yunnan, and Guizhou, and Japanese companies

such as Nakagiri, Nisshin, Tōkō, Mitsui, and Yoshida” (Negishi 1906–1908, p. 312). Hubei merchants provided raw cotton for the Wuchang Spinning Mill. The entry of these new merchants into the market led to extremely fierce competition for raw cotton, and as we will see later, the ratio of moisture content increased as a result.

2.3 Causes of Adulteration

The root cause of adulteration stemmed from the competition for cotton purchase. Therefore, let us look at Fig. 1 to see the impact of intensified competition on the raw cotton trade. Farmers brought the cotton to the nearest local periodic market and sold it to the local raw cotton wholesalers (Komai 1919, p. 91). Numbers in parentheses refer to labels on Fig. 1: (1) Many of the wholesalers in the cotton-producing areas did the ginning business on the side and most of the raw cotton was ginned with foot-operated gins in the producing area. The ginned cotton was then sold to the raw cotton wholesalers in Hankou through brokers dispatched by the wholesalers or traveling merchants who engaged in long-distance commodity transactions (2). Of course, there were cases where the wholesalers in Hankou would directly purchase raw cotton produced in their vicinity. Many of these wholesalers performed cotton ginning on the side, and much of their ginned cotton was sold to domestic markets (3). When farmers had no production capital, they received advance payment from native banks (*qian-zhuang*) (4). And raw cotton was sometimes sold to *qian-zhuang* or the wholesalers (5, 6) (Tōa Jishinsha 1918, pp. 38–39). This advance payment had a crucial meaning: a feature of this advance payment was that the date of sale was not specified. This meant that the farmer could wait for the market price to rise, before selling raw cotton.

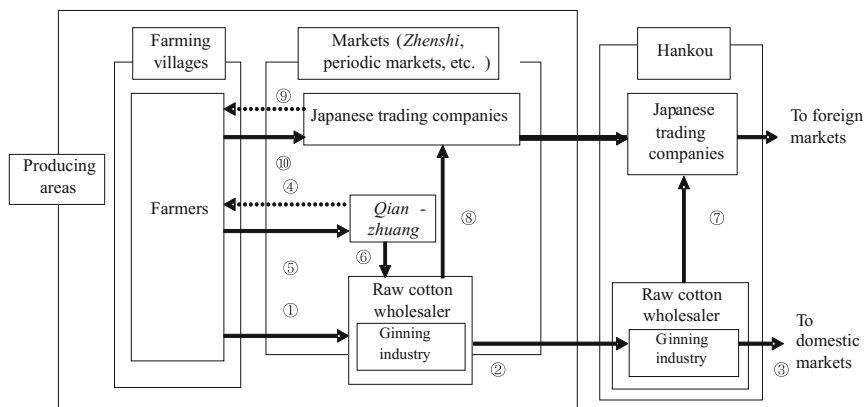


Fig. 1 Flowchart for distribution of raw cotton

Under these circumstances, after the enactment of the Shimonoseki Treaty, Japanese trading companies expanded their business to the middle Yangtze Valley, especially Hankou and commenced the purchase of raw cotton in the Hankou market (7). Initially, wholesalers in Hankou and Japanese merchants engaged in spot transactions; that is, Japanese merchants paid the wholesalers in cash for the cotton they bought. If the merchants wanted to purchase a large quantity of raw cotton in the short term, they consigned the purchase of raw cotton to the wholesalers, and the price would be set according to the quality of the raw cotton. Payments would be made in advance for the funds required to make the appropriate purchase.

However, as the trade volume increased and competition in purchasing intensified, futures transactions became the norm for large purchases of raw cotton. In futures transactions, the parties agreed on a contracted price and also a date for delivery. If the transaction value was small, the buyer paid the entire sum in advance, but if the transaction value was substantial, only around 50% needed to be paid in advance. For the purpose of futures transactions, Chinese merchants investigated and forecast the quality and total production of raw cotton for a cotton-producing area in that particular year. Then, in the eighth month of the lunar calendar they would either make an oral or written contract with the merchants in Hankou regarding the delivery of a certain amount of cotton—produced in a given area, bearing a specific trademark, and at the previously agreed-upon price—by October 30. If the raw cotton did not meet the agreed quality standards, the buyer could demand a cash refund or cancel the agreement (Tōa Dōbūnkai 1908b, p. 580). Futures transactions spread in the open ports and their surroundings, and by around 1910 futures transactions were the preferred method of transaction even in Shashi, which was one of the most important suppliers of raw cotton (Gaimushō Tsūshōkyoku 1916, p. 4).

Further, beginning around 1905, Japanese trading companies began to go directly to the cotton-producing areas and began to purchase cotton directly from the local markets and the farmers (8). Futures transactions were seen even in the cotton-producing areas, and there were times when the farmers were allowed an advance payment (9, 10). However, this was decisively different from the advance payment by *qian-zhuang*, since the Japanese trading companies set a date for delivery of cotton and the farmers had to sell their raw cotton regardless of the market price of that day.

The moisture content problem emerged together with these changes in transaction methods (futures transactions and advance payment). The parties who added water were both the farmers who produced the cotton and the wholesalers. The method used here was spreading the ginned cotton up to a thickness of around 15 cm on a rug placed indoors; then, mist was sprayed over the cotton using a vaporizer, moistening it evenly for one night (Tōa Dōbūnkai Shina Keizai Chōsabu (TDSKC) 1908b, pp. 16–17). In addition to showing an increased weight as a result of adding water, the moisture gave the raw cotton a gloss, temporarily enhancing its appearance.

How did these changes in transaction methods contribute to the cotton adulteration problem? We can identify two patterns. First, in the case of spot transactions, water was added when the market price fell significantly at the time of transaction. Second, in the case of futures transactions, when the market price at the time of transaction fell below the contract price, they did not add water, since they feared that the contract would be cancelled. But they did add water when the market price rose sharply at the time of transaction (Tōa Dōbūnkai 1908b, p. 566).

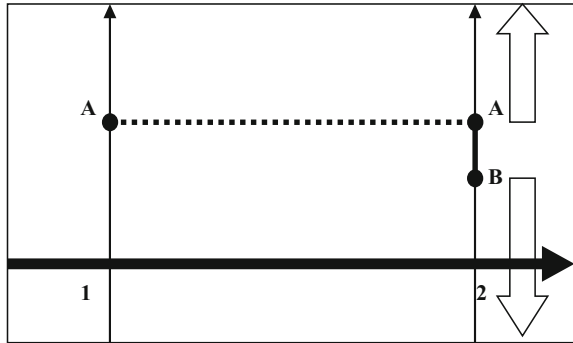
It is a widely known fact that adding water (or other substances) to goods was customary in China. In the first pattern, when the market price fell below the price desired by the seller, the addition of water offset the loss that arose from the drop in price of raw cotton. This suggests that the act of adding water was a customary method to ameliorate the loss as a result of price fluctuations.

However, at the beginning of the twentieth century the trading methods switched from spot transactions to futures transactions, and reports stress the second pattern. That is, wholesalers added water when the market price at the time of transaction rose well above the contract price (Rinji Sangyō Chōsakyoku 1919a, p. 125), “to compensate the loss incurred in futures transactions” (TDSKC 1908b, pp. 16–17).

It is very interesting that the wholesalers regarded the amount of increase in price at the time of transaction as a “loss”. This is because the futures transactions is an institution to guarantee an agreement to buy or sell a specific amount of a commodity at a particular price on a stipulated future date. Generally, both the seller and buyer seek to use futures transactions to avoid the risk of price fluctuations in the future. However, the futures transactions of raw cotton was not started to avoid the risk of price fluctuations, but was rather introduced to overcome the difficulties in large raw cotton purchases that accompanied the intensification of competition. Therefore, the wholesalers recognized the futures transactions as a means to set the (contract) price of raw cotton, not a means to avoid the risk of price fluctuations. Wholesalers regarded an increase in market price at the time of the transaction as a “loss” arising from price fluctuations, and compensated for this “loss” by adding water to increase the weight of the cotton. In fact, the act of adding water, whether in a spot transaction or futures transactions, was a method of avoiding the risk of price fluctuations.

Futures transactions had been widespread in China beginning in the Qing Dynasty (Kishimoto 1997, p. 111), but it is not known whether the contract price was set. There were also differences in the magnitude of fluctuations in prices, that is, price fluctuations in the Ming and Qing Dynasties were not very substantial over the short term. In contrast, at the beginning of the twentieth century raw cotton was a global commodity, and fluctuation of market value of raw cotton during this period was significant. Therefore it is assumed that the wholesalers had never before experienced a drastic difference in price between the contract price and the market price at the time of the transaction. As a result, the conventional futures transactions between Chinese merchants used since the Qing Dynasty and the futures transactions that took place between Japanese trading companies and Chinese merchants were not the same. At the very least we can see that Chinese merchants and Japanese trading companies had different understandings of the

Fig. 2 Chronic problems of moisture content



differences between the contract price and the market price at the time of the transaction in futures transactions. In addition, Chinese farmers and Japanese trading companies did not share the same understanding of advance payment. It was these changes in transaction methods and the surfacing of these differences in understanding that led to the addition of water to raw cotton. And the act of adding water was a method to compensate for what were perceived as losses due to the fluctuation of market price.

Thus we can see that it was the introduction of futures transactions that led to the moisture content problem becoming chronic. This mechanism is represented in Fig. 2. Let us say that at time 1, contract price A is written into a futures transaction. In this case, if the market price is higher than contract price A at time 2 when raw cotton is delivered to the purchaser, water is added to the cotton. When the market price is lower, moisture would not be added in a futures transaction, but if the market price falls, the number of spot transactions would increase as buyers seek cheap cotton in the market.¹ In a spot transaction, if we set B as the price limit where the seller feels he is suffering a loss, water would be added if the market price falls below B. Adulterations will not occur while the market price remains between A and B. This means that the institution of futures transactions has created a mechanism that made adulteration a virtually chronic problem in raw cotton trading.

It was possible for a buyer to respond to adulterations by canceling the contracts. However, demand for raw cotton kept increasing and when competition among merchants was escalating at the beginning of the twentieth century, even raw cotton containing up to 15% water was being sold (Shanghai Shuppan Kyōkai Chōsabu 1925, p. 340).

Finally, let us consider the moisture content ratio and price of exported raw cotton. Figure 3 shows the moisture content ratio of Chinese cotton shipped to Kobe

¹The amount of moisture content increased as the prices were reduced (Tōa Dōbūnkai 1908a, p. 866).

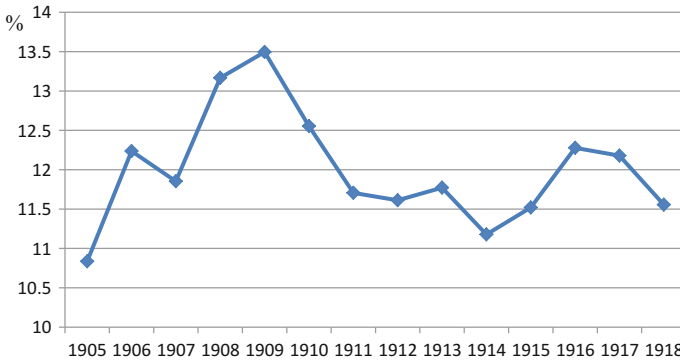


Fig. 3 Ratio of moisture content in Chinese cotton (Unit: percent). *Source* Dai Nihon Bōseki Rengōkai 1905–1919, vol. 52-316. Data correspond to “raw cotton year” (picking season extends from September of one year to August of the following year)

and Osaka by year of raw cotton harvest. We would expect that some of the moisture would naturally evaporate during the trip; for example, after transporting from Shanghai to Japan, raw cotton showed a decrease of 3–9% from natural evaporation during the voyage (Gaimushō Tsūshōkyoku 1903, pp. 2–3). Therefore, Fig. 3 shows the minimum change in moisture content after natural evaporation. In addition, the 1910s saw raw cotton imports not just from the Yangtze Valley, but also from Tianjin (Setobayashi 2008, p. 31). Because northern China is arid, the moisture content of Tianjin cotton was low, and Fig. 3 gives the content numbers for this type of raw cotton. If we take into consideration the above points, we see that the content ratio grew to almost 14% by 1909 and then decreased suddenly, falling to the 12% by 1915. The content ratio rose slightly in the next 2 years, but fell again in 1918 to less than 12%. These trends in content ratio will be discussed later.

Figure 4 shows the ratio (between market price and future contract price) for each month of the minimum average future contract prices and the maximum average market prices for Hankou cotton and Tongzhou cotton (Shanghai cotton), respectively, for 1913–1918. When the figures were above 1 (the market price was greater than the future contract price), adulteration in futures transactions was committed. When figures were below 1 (the contract price was greater than the market price), adulteration in futures transactions would not be committed, but if the price difference exceeded a certain standard (as shown in B in Fig. 2), adulteration was committed in spot transactions.

The change in price comparison from Fig. 4 shows that the conditions for the emergence of adulteration content due to price fluctuations existed even during the 1910s. On the other hand, as seen in Fig. 3, the content ratio was on a decreasing trend in the 1910s. In the next section, the reason for the resolution of the moisture content problem is investigated.

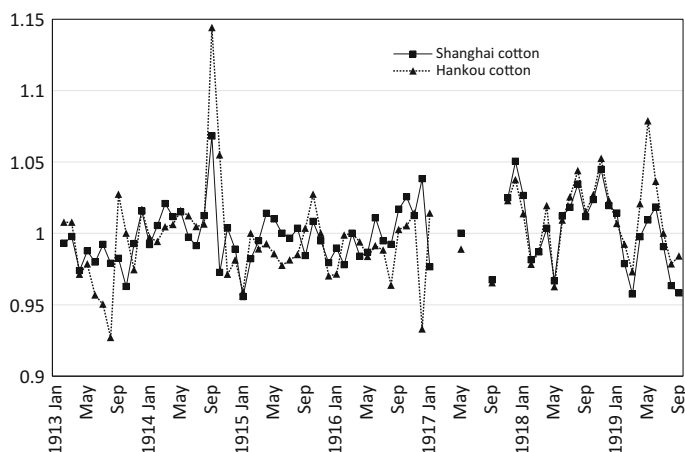


Fig. 4 Price comparisons between minimum average future contract prices and maximum average market prices for May, September, and January from 1913 to 1919. *Source* Nihon Menka Dōgyōkai (1913–1919), vol. 20–231

3 Mechanism for the Resolution of Adulteration

3.1 Limits of an Institutional Response

Previous research has focused on institutional responses as a major factor in the resolution. Therefore, let us first look at the institutional response.

Japan was the first to try and respond to this problem. The Japan Cotton Spinning Federation established an organization known as the Mizuke Shinkokumen Haijokai (Organization to Solve the Moisture Content Problem) in 1896, after the signing of the Shimonoseki Treaty, when the problem first surfaced. Japanese firms refused to purchase raw cotton with added water. The organization established inspection stations at four ports—Yokohama, Osaka, Kobe, and Nagasaki—and attempted to solve the moisture content problem and limited the sales of raw cotton to spinning mills that did not belong to the organization.

Meanwhile, in China, some independent regulatory bodies to prevent adulteration were created by officials, foreign companies, and merchants in Shanghai. Raw cotton exported from the Yangtze Valley was transferred from riverboats to steamers at Shanghai; some of the raw cotton from Hankou was stored temporarily in warehouses in Shanghai, while some was directly transshipped.² As a result, inspection stations and organization were established in Shanghai, not in Hankou.

In 1901, Jiashui Mianhua Fange Xiehui (Organization to Solve the Moisture Content Problem) was established by the Shanghai Circuit Intendant (*daotai*) in

²For example, only 10% of the raw cotton was shipped directly to Japan from Hankou during the 1916 fiscal year (Imura 1917, p. 189).

response to a petition presented by spinning mills in Shanghai (Dai Nihon Bōseki Rengōkai 1901a, p. 42). This organization aimed to prevent adulteration. In addition, the *Huangzuluo* and *Yuanshuxun*, officers who belonged to the office of the Shanghai *daotai*, decided to proclaim a ban on the sale of raw cotton with added water, and established a national inspection station (DNBR 1901b, p. 50). They also decided to respond to complaints of adulteration by foreign merchants with the imposition of fines on violators who purposely added water to raw cotton (Tōa Dōbūnkai 1908b, pp. 565–567).

After the establishment of the national inspection station, the inspection stations at each Japanese harbor became re-inspection facilities for moisture content, and it appeared that an inspection system was developed between Shanghai and each harbor in Japan. However, the moisture problem was in a state where, “Since futures transactions were common, it was impossible to witness satisfactory results and the moisture content increased each year, as if there was no stopping” (Rinji Sangyō Chōsakyoku 1919b, p. 48), and the inspection system did not function effectively.

Exporters of raw cotton, such as Mitsui Bussan and other companies, organized the Shanghai Menka Yushutsu Kumiai (The Organization) in 1906 and established a new inspection station because the national inspection station did not function. This was an agency established to hold the same inspection ability as the inspection stations established in respective Japanese harbors and to cooperate with the inspection stations established by the Japan Cotton Spinning Federation while supplementing the inspection system in Shanghai. In September 1907 it was decided that raw cotton that failed the moisture ratio test would not be traded or would trade at a suitable discount, and these new regulations were officially announced to the Chinese merchants through publication in newspaper advertisements. Also, starting November 1, any raw cotton intended for Japan was required to have a seal of approval and an inspection certificate guaranteeing the quality of the raw cotton.

However, despite the above decisions, it was not possible to solve the moisture content problem in the 1907 fiscal year. The reason for this was the poor raw cotton crop of that year. The price of raw cotton rose sharply, water was added to much of the raw cotton in futures transactions, and additionally, Japanese trading companies were forced to purchase raw cotton that exceeded the promised ratio due to the decrease in supply as a result of the poor crop.

On March 20, 1908, the Japan Cotton Spinning Federation reached a new decision regarding the moisture ratio. Raw cotton with a content ratio of 12% or less was acceptable, cotton with a ratio between 12 and 13% would be sold at a discount and cotton exceeding 13% was banned from sale. Also, seizure of the money held in deposit was established as a penal regulation for any members who violated these decisions. However, the moisture problem could not be solved, and on March 31, 1909, the inspection stations were closed (DNBR 1909, p. 1). The main cause for the failure of these inspection stations was the failure to include the Chinese-owned spinning companies in Shanghai as members of the organization that established these stations. Many of these companies chose not to become

members owing to the complicated procedures needed to trade raw cotton (DNBR 1917, pp. 80–81), and instead purchased raw cotton that did not pass through the inspection stations. They also bought raw cotton that had been rejected at the inspection stations at a cheap price. For these reasons, the effectiveness of the inspection stations was limited.

When the inspection stations closed, the moisture content ratio increased. As a result, the spinning companies and exporters suffered a loss and they came to share a common perception of the problem. This common perception of the problem created new opportunities for concerned action to solve this problem among all those involved in the cotton industry.

On March 6, 1911, those involved in the cotton industry assembled at Jardine Matheson. They decided on the establishment of an organization, a public inspection station, rules for moisture ratio, and penal regulations for those who violated the rules. The representative parties that participated included Mitsui Bussan, Nippon Menka Kabushiki Kaisha, Duanji Textile Company, Hongyuan Textile Company, and foreign-owned spinning companies in Shanghai. The members decided that they would not export nor use raw cotton with a moisture content ratio of over 15%; they set 12% as the standard, determining that cotton sellers had to provide a discount for raw cotton that had a moisture content ratio of 12–15% (Katō 1917, p. 336). As a result, the percentage of cotton that failed to pass the inspection declined to about 10% of the whole. Also, in late August, the Shanghai customs house announced that it would not permit the export of raw cotton that did not possess an inspection certification from the Shanghai moisture inspection station (DNBR 1911, p. 30).

The establishment of the inspection station prevented the transactions of adulterated cotton and it is thought to have been a crucial factor in preventing adulteration (Imura 1917, p. 186). The situation surrounding moisture content of the 944,000 piculs of raw cotton inspected by the same inspection station in 1914 was that 387,000 piculs (41%) had less than 12% moisture content, 538,000 piculs (57%) had between 12 and 15% and 19,000 (2%) had more than 15% (Komai 1919, p. 171). On this basis, this organization sought additional improvements, and in October 1914 they revised the standard for the content ratio, setting the standard to 11%, and classifying as adulterated anything over 14% (DNBR 1914, p. 48).

The effects of the inspection stations established in 1911 can be seen in Fig. 3; from fiscal 1911 the ratio remained around 12% and it appears that the moisture content problem had subsided. However, is this the end of the story? Did the institutional response resolve the problem after 1911?

When investigating once more the moisture ratio from 1914 using Fig. 3, the ratio decreased temporarily during the 1914 fiscal year but rose again during the 1916–1917 fiscal year. This indicates that the institutional response alone was not sufficient to resolve the moisture problem. In addition, the Chinese merchants were consistently opposed to the rules determined by the buyer (Shanghai Nihonjin Jitsugyō Kyōkai 1914, p. 158). The reason for this opposition was the fact that decreasing the amount of moisture did not in any way add to the profits of the Chinese merchants because the institutional response to resolve the adulteration

problem relied only on penal regulations (Shina Keizaisha 1920, p. 80).³ This fact may suggest that some type of incentive to reduce the amount of moisture might result in greater cooperation in resolving the adulteration problem. Therefore, let us now turn to the next stage of development.

4 Market-Oriented Resolution Efforts

4.1 *Establishment of Cotton-Ginning Mills*

At the beginning of the 1900s raw cotton traded in Hankou commonly contained high levels of water. A report of the time noted that: “Of the raw cottons exported, almost 70 to 80% contained moisture. Regardless of how much attention is paid at the time of delivery, it is virtually impossible to conduct strict inspections on each ship. Naturally, there were increasing cases where inferior products containing moisture were traded. Although such scams were rampant, the government did next to nothing to prevent this, and as a result there were times when the moisture content ratio reached 14–15%. It is impossible to prevent adulteration” (DNBR 1904, p. 25). Also, there were Japanese trading companies that suffered a heavy loss after purchasing raw cotton that contained more than 16% moisture (TDSKC 1908a, p. 48).

Under these circumstances, each of the Japanese trading companies opened a branch and established cotton-ginning mills. Consequently, the main strategy for the resolution of adulteration was to turn to these cotton-ginning mills. Cotton-ginning mills were constructed in Shanghai during the 1880s, but there were many problems to overcome before foreigners in China were allowed to build and manage mills under the Shimonoseki Treaty. Previous research points out that “Concerning the construction of cotton-ginning mills, the regulation from the Shimonoseki Treaty passage 6, item 4, [‘cotton mills’ added by the author] had already become unnecessary at the point earlier than the claims made by Mr. Hatano, which is at the point of treaty negotiations” (Takamura 1971, p. 238; Hatano 1961, p. 402). In addition, after the Shimonoseki Treaty, Japan aggressively pushed for the construction of spinning mills and not cotton-ginning mills. Therefore, the significance of constructing cotton-ginning mills was neglected. However, cotton-ginning mills played a decisive role in the export trade in raw cotton after the 1900s.

From the 1890s the foot-operated cotton gin produced by the Nakagiri Company spread rapidly in China. In the 1900s, the Nakagiri Company opened a cotton-ginning mill in Hankou and additionally carried out sales promotion of the cotton gin. In addition to the spread of the cotton gin, Japanese trading companies

³Because there was no incentive for raw cotton containing less than 11% moisture, the lower the standard moisture content ratio, the higher the losses for the vendors (Nongshangbu 1918, p. 4).

also constructed ginning mills. Nippon Menka Kabushiki Kaisha opened a branch in Hankou on July 25, 1904, and the founding branch manager, Yoshioki Baba, attempted to establish a cotton gin press mill to remove the extra moisture from the purchased Chinese cotton and export it to Japan. Baba either loaned the machines to ginning merchants in Hanyang or established the ginning mill in the name of a Chinese citizen (DNBR 1905, p. 19). This attempt succeeded and Hankou cotton handled by Nippon Menka Kabushiki Kaisha became predominant as high-quality export raw cotton (Nichimen Kabushiki Kaisha shashi hensyū iinkai shashi henshyūbu 1994, 28). Similarly, Mitsui Bussan, also constructed ginning mills (Mitsui Bunko 1971, pp. 593–594).

Ginning mills bought seed cotton, ginned it to separate the seeds, attached each store's name and brand name to the packages, and sold it. As a result, the following statement came to be used "It is acknowledged that the raw cotton from here ['ginning mill in Hankou' added by the author] has a minimal amount of moisture content and the raw cotton from this ginning mill was sold to customers up to their satisfaction" (Tōa Dōbūnkai 1918, p. 479). Thus we can see that the construction of the cotton-ginning mills had three major results.

According to one report, "First, the ginning mills will increase and supply a fixed amount of cotton. Second, unadulterated raw cotton will be traded. Third, selling such ginned cotton at a high price will show the farmers and merchants that finer raw cotton can be sold at a higher price" (DNBR 1904, p. 25).

The third point explains why the ginning mills became the main actors in the resolution of the moisture content problem. Namely, the mills showed the Chinese merchants in Hankou what type of raw cotton the mills required as well as what type of raw cotton could be sold at a higher price. As a result, Chinese merchants were provided with information on product quality and price for raw cotton suitable for machine production. Previously, such information had not been available in the Hankou market. In other words, the ginning mills became a medium to share information between the Japanese and Chinese merchants. However, the influence of the ginning mills in Hankou was limited to that vicinity, as we will see in the following discussion.

4.2 Direct Purchasing and Resolution of the Moisture Content Problem

It was possible to gin seed cotton produced in the suburbs of Hankou at the ginning mills. But it was difficult to transport seed cotton produced at a distant location to Hankou and gin it there because oils could be extracted from the seed and farmers needed the seed after ginning. Therefore, seed cotton produced at a distant location had to be ginned in each production area. Because of this, while the moisture content problem was solved in the Hankou vicinity through the construction of

cotton-ginning mills in Hankou, the problem still existed in the raw cotton brought to Hankou which had been produced and ginned at distant locations.

Direct purchasing in the production areas overcame this problem. From the last half of the 1900s, Japanese trading companies began to establish branch offices in more distant growing regions and at the same time constructed ginning mills. They used these as bases and pushed into production areas, beginning to purchase cotton in local markets (Setobayashi 2006, pp. 640–641).

While the main aim of constructing ginning mills was for ginning, the establishment of ginning mills in local marketing centers produced unintended effects. Most importantly, two types of information (A and B) were disseminated among the Chinese merchants and farmers in the interior: First (A) was the information that low-quality cotton was unacceptable and would not be purchased, and second (B) was that higher-quality cotton could be sold for premium prices.

These types of information spread smoothly among Chinese merchants and farmers via the mechanism for circulation of information in the rural markets. Since the Ming and Qing Dynasties, Chinese farmers had acquired various types of product information from town markets or local periodic markets, which were then reflected in their production decisions. Local markets functioned as places where farmers could search for information (Furuta 2004, p. 215). Japanese trading companies, through their purchasing decisions, transmitted both types of information (A and B) in local markets. Over time, Chinese farmers and merchants responded to these information signals and changed the type of cotton they grew and customs in the trading process.

The information was further transmitted to nearby producing areas through Chinese merchants who handled trade between local markets, and this allowed farmers and Chinese merchants to share information on the quality of raw cotton and prices.

As described above, through the provision of two types of information (A and B), the moisture content problem was gradually resolved. However, information (B) had two aspects. In light of this, let us consider the role of the two types of information in the resolution of the moisture content problem using two case examples in the next section.

4.3 Purchasing in the Producing Areas and American Cotton

Japanese trading companies aimed to purchase from producing areas so that they could procure American cotton. Until Japanese trading companies entered into the middle Yangtze Valley, short-staple cotton was more expensive than American cotton. Moreover, as American cotton was not suitable for manufacturing native cloth, farmers preferred to produce short-staple cotton. However, as the Japanese spinning industry began to increase production of higher-count yarns, the demand

for American cotton increased and the Japanese trading companies began to purchase American cotton directly from the producing areas. Hubei and Shaanxi provinces were particularly targeted as areas for purchasing.⁴

Nippon Menka Kabushiki Kaisha was the first Japanese company to purchase raw cotton directly from producing areas in the Yangtze Valley. Nippon Menka Kabushiki Kaisha purchased raw cotton from the producing areas near Hankou and was the first company that went all the way to Shaanxi Province, which subsequently became the largest American cotton-producing area in China in the 1910s. In 1912, the company sent its agents to Shaanxi Province, conducted field research, and established local offices in Weinankou, Xianyang, and Sanyuan and ginning mills in those areas. They made advance payment to the farmers or provided seeds and fertilizer in order to encourage the farmers to produce American cotton, and this led to a situation where “After we engaged in purchasing their raw cotton (i.e., American cotton), the ignorant farmers became aware of the advantages of producing American cotton, which established the foundation for today’s prosperity” (Ōshima, date of publication unknown, p. 2). Owing to the fact that the price for American cotton was higher by 10% compared to short-staple cotton in the Hankou market during the 1910s, and such price information was transmitted through direct purchasing, the farmers had ample incentive to produce American cotton and its production became widespread. This implies that the above-mentioned “raw cotton with a higher quality” from information (B), referred to raw cotton that was not adulterated as well as to American cotton.

Another firm, the Takebayashi Company, increased its business into Fancheng, which is located in the middle basin of Han River and had not been an important supply area until the 1900s. Takebayashi was known as the first trading company to purchase American cotton and short-staple cotton separately and created the American cotton market in Hankou. Takebayashi established its local office in Fancheng in 1917 and began purchasing raw cotton. However, the company almost immediately suffered a loss due to the fact that water was added deliberately to the raw cotton collected there. To overcome this problem, the strategy that Takebayashi decided upon was to build a ginning mill. The raw cotton ginned at Takebayashi’s ginning mill was traded at a price that was one *liang* per picul higher as compared to other raw cottons in Hankou. In addition, according to contemporary records, “The ginning mill contributed much to improve the quality of the raw cotton in Fancheng and took further steps to promote better seeds through the ginning mill; the business mentioned below (gin business) became something much more meaningful” (Rinji Sangyō Chōsakyoku 1919a, p. 50). This shows that the mill contributed to the resolution of the moisture content problem and also played a role in transmitting information on the benefits of growing American cotton.

⁴The Japanese traders who expanded their business into China in the 1910s are as follows: Takebayashi, Nippon Menka Kabushiki Kaisha, Abe, Yoshida in Shashi, Hubei; Nippon Menka Kabushiki Kaisha, Takebayashi, Yoshida, Mitsui in Laohekou; Nippon Menka Kabushiki Kaisha, Takebayashi, Yoshida, Yuasa in Fancheng; Mitsui in Changde and Jinshi, Hunan; Nippon Menka Kabushiki Kaisha in Shaanxi.

While Takebayashi established a ginning mill in Fancheng, they engaged in the following activities in Yichang: “In order to improve the quality of raw cotton, Takebayashi Company purchased American cotton’s seeds (produced in the Yichang area) of 50 piculs last year (i.e., 1917 or 1918) and distributed them to the native cotton-production area in Yichang, where American cotton was produced as a test production. They asked their business partners, especially raw cotton wholesalers, to provide the seeds to the farmers and promised to purchase the raw cotton produced from the seeds at a certain price.... The results proved that the production of American cotton was advantageous and a significant achievement was accomplished” (Rinji Sangyō Chōsakyoku 1919a, p. 142). From this, it can be seen that Takebayashi provided the seed to encourage a shift to the production of American cotton in Yichang, but did not establish a ginning mill. This is because of the fact that, through the merchants in Hankou or Shashi, two types of information had already spread to Western Hubei, which included Yichang by the mid-1910s. For this reason, it was not necessary in areas where the information had become common knowledge to establish ginning mills to transmit the information.

In light of these examples, let us look at Table 1, which shows the moisture content ratio and prices of raw cotton collected at Hankou during this time. Shaanxi cotton had a low moisture ratio and was traded at a high price followed by Laohekou and Shashi cottons (Setobayashi 2009), which included both American and short-staple cotton. It can be understood that the Jiaxiang and Lihe cottons, which were for domestic markets, had relatively high moisture ratios. The moisture ratio was lower in the orders of American cotton; short-staple cotton for foreign markets ranked second, and short-staple cotton for the domestic market ranked

Table 1 Moisture ratio of raw cottons and their prices. *Source* Imura 1917, pp. 191–192; Tōa Dōbūnkai 1918, pp. 456–460; Dai Nihon Bōseki Rengōkai 1918–1919, vol. (314–316)

Producing area	Type	Intended use	Moisture ratio (%)	Price at the end of 1918 (per picul)
Shaanxi	US	Foreign markets: Fine yarn/coarse yarn	Below 10	32.8 liang
Laohekou (including Fancheng)	US & indigenous	Foreign markets: Fine yarn/coarse yarn	Below 10	29.7 liang
Shashi	US & indigenous	Foreign markets: Fine yarn/coarse yarn	12–13	29.5 liang
		Domestic markets: Spinning industry, hand-woven cotton material		
Jiaxiang	Indigenous	Domestic markets: Spinning industry in Hankou	12–13	28.1 liang
Lihe	Indigenous	Domestic markets: Futon and clothes, hand-woven cotton material	13–16	26.5 liang

third. This shows that an inverse relationship was established between the moisture ratio and price.

Table 1 and the two case samples suggest that two types of information were transmitted to the producing areas and that this information was reflected in the prices.

Finally, let us consider the influences of information on the resolution of the moisture content problem. It is clearly evident in the fluctuations after 1916 as shown in Fig. 3. As we have seen, the fact that moisture ratios increased again after 1916 indicates the limitations of institutional responses (inspection stations). The reason for this increase lay in the increase in export demand after 1916, as a result of the expansion of the mechanized spinning industry and the effects of the First World War. Until 1915 the export volume was less than 500,000 piculs; this figure reached 800,000 in 1916/17 and over one million in 1918. The sharp increase prompted buyers to purchase raw cotton in new areas. Takebayashi's move into the Fanchang market was an example of this. Cotton purchased in the new areas had a higher moisture ratio, boosting the overall average moisture ratio. As a result, the ratio started to increase in 1916. However, the ratio was even decreasing in the 1910s and despite the fact that export volumes doubled after 1916, the moisture ratio witnessed only a slight increase. This may be due to the fact that farmers and merchants gradually became aware of the information on raw cotton demanded in the market. In fact, the ratio decreased again to 12% in 1918 and the moisture cotton problem headed for its resolution.

5 Conclusion

Along with the increase in the demand for raw cotton, control over the moisture ratio became a major issue. Adulteration took place because of the changes in transaction methods (from spot transaction to futures transactions) and the surfacing of differences in understanding of the trading methods (futures transactions and advance payment) and this led to a chronic problem with adulteration as a means of avoiding the risk of price fluctuations.

In order to eliminate such adulteration, inspection stations were set up. However, they were not enough to guard against defective goods. Therefore, it cannot be said that this problem was resolved only by means of institutional responses. In addition, the Chinese merchants who were the sellers objected to the rules established by the organizations. Another factor in the resolution of the moisture content problem was the spread of information. Japanese trading companies provided information on the quality of raw cotton demanded in the market and two types of information were transmitted to the producing areas through the merchants who traded between local markets. As a result, farmers, Chinese merchants, and Japanese trading companies came to share two types of information. This led to the resolution of the moisture content problem.

The reason for the emergence of the moisture content problem discussed in this study was the difference in perception between buyer and seller (Chinese merchants and Japanese trading companies) towards the trading methods as well as the changes that occurred in the trading method. This implies that adulteration occurred because asymmetry existed in the perception towards the trading methods rather than the theory that the problems of asymmetric information on the trading methods existed between the seller and buyer. Further, the moisture content problem was resolved by replacing the practice of punishing those who conducted dishonest practices with the practice of indicating that trade with good conditions can be realized through the transmittance of information.

In other words, when common practices came to be considered as dishonest practices, punitive measures were unable to resolve the situation. Conversely, the provision of positive incentives played a major role in controlling so-called dishonest practices.

Through the emergence and resolution of the moisture content problem, trust—based on a common understanding that if the quality was better, the merchants would buy the raw cotton at a higher price—began to take shape between the Japanese merchants and Chinese merchants/farmers involved in the raw cotton market, giving rise to a trust-oriented raw cotton market.

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