

Chapter One: Canal Transport And The Scope Of Market Integration

In 1686, after three centuries of continuous construction, the Grand Canal was completed. The 1,700-kilometer canal ran through four provinces, linking Hangzhou in the south to the imperial capital at Beijing in the north.¹ The Ming Yongle emperor (r. 1403-1424) had begun the canal after moving the capital from Nanjing to Beijing, to supply his new capital with grain from the Yangzi delta via inland waterways.

When Ming collapsed in 1644, the Qing government continued work on the Grand Canal until its completion. Jane Kate Leonard noted that the Qing emperors took even greater responsibility than the Ming emperors for managing and maintaining the canal. By then the empire of Greater China had vastly expanded; Qing emperors saw the canal as a way to connect the borderlands to China proper. As a result, canal management carried much greater strategic weight than had been the case in the previous dynasty. The Grand Canal served as the major transport route between northern and central China until the gradual shift of the Yellow River in its bed caused the ecological degradation of the canal system in the nineteenth century.²

Construction of the Grand Canal substantially reduced transport costs between northern and central China, but even in the eighteenth century canal transportation remained risky and difficult. Qingkou, where the Huai River, the canal, and the Yellow River met, was especially hazardous, while north of

¹ For more detail on the canal construction, see Cen Zhongmian, *Huanghe bianqian shi* (Beijing: Shumu wenxian chubanshe, 1957); Tani Mitsutaka, *Mindai kakōshi kenkyū* (Kyoto-shi: Dōhōsha, 1991); and Cai Taibin, *Mingdai caohe zhi zhengzhi yu guanli* (Taipei: Shangwu yinshuguan, 1992).

² Jane Kate Leonard, *Controlling From Afar: The Daoguang Emperor's Management of the Grand Canal Crisis, 1824-1826* (Ann Arbor: Center for Chinese Studies, The University of Michigan, 1996), p. 2.

Canal Transport and Market Integration

Qingkou the canal ran through uneven terrain, which made the canal expensive to maintain as well as to travel on. To guarantee water deep enough to float the grain boats the government had installed locks; to get through these locks, boatmen had to hire trackers to pull their boats upstream. When the water level in the canal fell during a drought, boatmen had to transfer their goods to small boats called lighters, which could carry one hundred *shi* of grain and navigate in the shallower water. The government allowed each large grain boat from Hubei, Hunan, and Jiangxi to be accompanied by a small lighter in case it was needed.³

Because of the high cost, local official Lan Dingyuan (1680-1733) opposed transporting the grain tribute by way of the canal. In a memorial to the Yongzheng emperor, he wrote:

According to your servant's observation, along the Canal in Shandong and Zhili, as water is insufficient, [grain] transport is difficult. [Because of the shallow water, transport soldiers] have to pay fees for transshipment and spend time at grain depots. They have their boats hauled for a whole day, but can only travel a few dozen *li*.⁴ That requires a lot of labour and incurs financial expense. Generally speaking, the delivery of a *shi* [of grain tribute] to the capital costs more than ten *shi* of grain.⁵

Since canal transport was expensive, and the difficulties were many, the question arises as to why merchants bothered to use it to transport their goods. What made the Grand Canal the major long-distance trade route in the eighteenth century was not convenience (relative, for instance, to coastal shipping), but other factors. A major factor in canal use was its subsidy from the state.

³ *Caoyun quanshu* (1736; repr., Beijing: Shumu wenxian chubanshe, 1987), pp. 167, 872.

⁴ One *li* equalled approximately 558 metres. See Liang Fangzhong, *Zhongguo lidai hukou tiandi tianfu tongji* (Shanghai: Renmin chubanshe, 1980), pp. 526, 542.

⁵ Lan Dingyuan, "Caoliang jianzi haiyun shu" (n.d.; in *Qing jingshi wenbian*, Beijing: Zhonghua shuju, 1992; repr. from He Changling, ed., *Huangchao jingshi wenbian*, 1886, first printed in 1827), 48/19a-21b.

Canal Transport and Market Integration

The Role Of The State In The Canal Trade

The grain tribute tax, levied in the provinces of Henan, Shandong, Jiangsu, Anhui, Zhejiang, Jiangxi, Hubei, and Hunan, was used mainly to pay the wages of officials and Eight Banners soldiers (*baqi*)⁶ in the metropolitan areas. By the early eighteenth century, the annual grain tribute tax (to the Capital Granaries and the Tongzhou Granaries) totalled 3.2 million *shi* of grain. With the addition of “wastage grain” (*haomi*), which was extra grain, collected to replace whatever might spoil or be lost in transit, the total annual grain tribute amounted to 4.5 million *shi*. (See Table 1.1.) About 7,000 boats were used to ship the grain from various water depots along the Grand Canal to Tongzhou, twenty-eight kilometres southeast of Beijing.⁷ These boats were manned by transport soldiers called “bannermen” (*qiding*), selected from military households.⁸ As well as being paid a small salary to transport the grain tribute, bannermen were permitted to carry an allowance of private goods for trade on their journey, and these goods were exempt from customs duties. In effect, the Qing government sponsored the bannermen’s trading activities.⁹

⁶ The Eight Banners was a multiethnic institution, composed of Manchu, Mongols, and Hanjun (frontier Han Chinese). For a detailed analysis of the formation and evolution of the Eight Banners in the Qing dynasty, see Mark C. Elliot, *The Manchu Way: The Eight Banners and Ethnic Identity in Late Imperial China* (Stanford: Stanford University Press, 2001).

⁷ A quota of 7,120 grain tribute boats was set by the Qing government in 1726. See *Caoyun quanshu*, p. 115.

⁸ These bannermen were not soldiers of the Eight Banners in the Qing dynasty. The word “banner” (*qi*) to refer to a company of soldiers was in use by the Ming dynasty. (See *Mingshi* [Beijing: Zhonghua shuju, 1974], p. 2193.) The bannerman (*qiding*) who transported the grain tribute was simply a soldier.

⁹ The duty-free allowance began in the early Ming, as documented by Hoshi Ayao. In 1502, the Ming government set a maximum quota of 10 *shi* of duty-free private goods that could be carried by each grain boat on each journey. The quota increased in the Ming period, to 40 *shi* in 1571, and to 60 *shi* in 1603. This increase gave transport soldiers more income, and according to Hoshi, that accounted for their willingness to continue

Canal Transport and Market Integration

Although the imperial favour of a duty-free allowance of private goods was granted to bannermen in principle, in practice these men were too poor to engage in long-distance trade themselves. Many of them privately sold their benefit to merchants, who could then send their cargo duty-free. As a consequence, bannermen earned portorage fees, while nearly all of the private cargoes carried on the grain tribute boats belonged to merchants.¹⁰

The merchants' involvement was illegal but connived at by the Qing government. The Qianlong emperor made this quite clear in an edict of 1785. In that year, fearing that the grain transport would be behind schedule, Director-general of Grain Transport Yuqi ordered bannermen to reduce the weight of their grain boats by unloading timber and other bulky goods at Huaian before moving northward. But the Qianlong emperor did not appreciate this dutiful measure, and replied:

The bannermen of each fleet are mostly poor, how can they have the capital to purchase goods? These local products carried by them are probably entrusted to them by the merchants. The bannermen can only share a little profit [from the merchants in the form of] portorage fees. If now [the goods] are sold on the way, the merchants will lose both their capital and interest; and the bannermen will find no way to seek compensation. How can they earn money from it to pay for the transshipment [of grain from large grain boats to small lighters in shallow water]?¹¹

Furthermore, the private trade tagged onto the grain transport affected commodity prices in Beijing. The Qianlong emperor said in the same edict:

the grain transport, despite the meager salary. See Hoshi, *Mindai sōun no kenkyū*, pp. 195-200.

¹⁰ Nakahara, "Shindai sōsen ni yoru shōhin ryūtsu nitsuite."

¹¹ *Da Qing Gaozong Chunhuangdi (Qianlong Emperor) shilu* (repr. Taipei: Hualian Chubanshe, 1964), 1233/16b (QL 50.6) (hereafter cited as *Gaozong shilu*).

Canal Transport and Market Integration

If the goods are sold on the route [and thus] cannot be taken to the north, when the merchants [in the capital] hear this news, they will hoard goods and raise prices. [As a consequence of] the order of unloading all merchandise [from grain boats], the merchants have to rent boats again [for their goods] to Beijing. As this multiplies the [original] transport cost, how can the prices of the goods in the capital not gradually become higher?¹²

From the above, it is clear that the Qianlong emperor understood how important private cargoes were for financing his grain transport, as well as for bringing other goods to the capital, and keeping down their costs.

Throughout the eighteenth century, although the legal limit of private goods on the grain boats was maintained at 60 *shi* on the southbound journey, it was expanded three times for the northbound journey: to 100 *shi* in 1729, to 126 *shi* in 1730, and to 150 *shi* in 1799.¹³ The tacit approval of the state made the grain tribute boats a means whereby merchants could transport goods cheaply between central and northern China. Contemporaries knew this well. Wang Qisun (1755-1817), a Jiangsu scholar who worked as a private teacher in Beijing for many years, noted: "The capital relies on the grain tribute boats to bring in a hundred kinds of goods."¹⁴ A similar remark was made by another notable scholar, Bao Shichen (1775-1855):

Besides the grain tribute, all sorts of daily necessities consumed by the people in the capital depend on supplies from the southeast. Eight or nine out of ten of

¹² *Gaozong shilu*, 1233/16b (QL 50.6).

¹³ *Qinding Da Qing huidian shili* (1899; repr. Shanghai: Shanghai guji chubanshe), 207/2b; *Da Qing Renzong Ruihuangdi (Jiaqing Emperor) shilu* (repr., Taipei: hualian chubanshe, 1964), 56/6b-7b (JQ 4.11) (hereafter cited as *Renzong shilu*). See also Xu, "Ming-Qing shiqi yunhe de shangpin liutong"; and Zhang, "Qingdai caoyun yu nanbei wuzhi jiaoliu."

¹⁴ Wang Qisun, "Zhuanban siyi" (n.d.; in *Qing jingshi wenbian*, 47/19b).

Canal Transport and Market Integration

[these southern products] are carried by grain tribute boats.¹⁵

In short, thanks to the grain transport, Beijing was supplied with southern products at a lower price than what they would have cost had the transport route and the boats not been paid for by the state, either directly or indirectly. In this regard, state intervention was a positive factor in the development of long-distance trade. At the same time, state intervention distorted prices, therefore the development of long-distance trade on the Grand Canal did not necessarily lead to the emergence of a single market serving northern and central China.

Market Integration Of Rice

As a consequence of a de facto state subsidy, southern products could be transported via the canal to the north at a relatively low cost. These southern products, according to a study by Nakahara Teruo, included tea, timber, cloth, copper coins, millet, and rice.¹⁶

Rice, as Wu Chengming and other historians have pointed out, was the most important long-distance trade commodity in south China during the eighteenth century.¹⁷ Its destinations are

¹⁵ Bao Shichen, *Zhongqu yishao* (1825), 3/23b; in Bao Shichen, *Anwu sizhong* [xu dated 1844, 1872]; repr. *Zhongguo jindai shiliao congkan* (Taipei: Wenhai chubanshe, 1968), vol. 294, no. 1.

¹⁶ Nakahara, "Shindai sōsen ni yoru shōhin ryūtsu nitsuite," pp. 74-7.

¹⁷ Wu suggested that grain, raw cotton, cotton cloth, raw silk, silk cloth, tea, and salt were the seven chief commodities, in both local and long-distance trade in China by the mid-nineteenth century. He estimated that the total market value of these products amounted to 350 million taels of silver. Among them, grain, which amounted to 139 million taels and accounted for nearly 40 per cent of the total market value, was the most important commodity. (See Wu Chengming, *Zhongguo ziben zhuyi de mengya* [Beijing: Beijing renmin chubanshe, 1985], pp. 282-4.) Other scholars, like Guo Songyi and Abe Takeo, stress that among the different kinds of grain in the trade, rice from south China occupied a major role. See Guo Songyi, "Qingdai de liangshi maoyi," *Pingzhun xuekan*, vol. 1 (Beijing: Zhongguo shangye chubanshe, 1985), pp. 293-314; Abe Takeo, "Beikoku jukyū no kenkyū: 'Yōseishi' no isshō to shite mita," in Abe Takeo, *Shindaishi no kenkyū*

Canal Transport and Market Integration

quite clear, and they are often referred to in official documents. For example, in 1724, the Yongzheng emperor stated: "I observe that the food supply in Jiangsu and Zhejiang relies on Huguang [i.e., Hunan and Hubei], and also that Huguang relies on Sichuan."¹⁸ In 1726, a military official also noted:

The rice [consumed] in Fujian is supplied by Taiwan; the rice [consumed] in Zhejiang and Guangdong is supplied by Guangxi, Jiangxi and Huguang; and the rice [consumed] in Jiangsu and Zhejiang is entirely supplied by Jiangxi and Huguang.¹⁹

One might think that wherever rice was shipped, it would have been part of an integrated market. Scholars give the impression that a market in rice extended from the Yangzi to the north, as if the rice shipment to the north was being undertaken partly as grain tribute and partly as trade.²⁰ But what impact would a substantial shipment of tribute grain have had on the rice trade between the Yangzi provinces and north China? How integrated the rice market was between the Yangzi delta and the north depends very much on the answer to this question, which no one has asked yet.

Because market conditions and government involvement differed in each of the northern provinces of Henan, Shandong, and Zhili, their trade relationships with the lower Yangzi will be examined separately.

1. Henan Province

In the eighteenth century most of Henan province produced wheat, millet, and sorghum. Only the people in Guangzhou prefecture in southernmost Henan grew and ate rice. Throughout the century, Guangzhou was the only prefecture in Henan that listed rice prices

(Tokyo: Sōbunsha, 1971), pp. 411-531.

¹⁸ *Gongzong dang Yongzhengchao zouzhe* (Taipei: Gugong bowuyuan, ed., 1977-80), vol. 3, p. 399 (YZ 2.11.2) (hereafter cited as *GZD-YZ*).

¹⁹ [*Yongzheng*] *Zhupi yuzhi* (n.p., 1738), 8/31b (YZ 4.7.20).

²⁰ See Wang, "Secular trends of rice prices in the Yangzi delta, 1638-1935," pp. 38, 52.

Canal Transport and Market Integration

in its monthly grain reports to the imperial government. In 1724, when the lower Yangzi had had a bad harvest, the Henan governor purchased rice from Gushi county, Guangzhou prefecture, and transported it, even to the normally rice-rich Jiangsu.²¹ (See Map 2.) In 1755, after another bad harvest in the lower Yangzi, the Jiangsu Governor Zhuang Yougong complained to the throne that the Governor-general of the Grand Canal was obstructing the flow of commercial rice from Henan to Jiangsu:

On the 15th day of the eleventh lunar month, I reached Shaobo market town in Yangzhou prefecture. Hearsay circulated extensively there to the effect that some brokers in that town had rented boats to trade rice from Guangzhou and Gushi in the Southern River [i.e., Huai River] region with Yangzhou. Unexpectedly, the Governor-general of the Grand Canal hindered [the transport]. He ordered that the rice be sold in Qingjiang [i.e., Qinghe county] and was not to pass Huaian [for transporting down the canal to Shaobo]. No rice had been transported to the market town for half a month.

This memorial shows that the market in Shaobo relied heavily on Guangzhou for rice. As Zhuang Yougong stated in the same memorial about the rice supply in Jiangsu province, "The region south of the Yangzi River depends on Jiangxi, Hunan and Hubei, while the region north of the Yangzi River obtains its supply from Henan."²² For the prefectures in northern Jiangsu, rice was imported from Henan province and shipped on the Huai River.²³ The rice boats from Henan province first paid their duty

²¹ *Zhupi zouzhe* (microfilm, Beijing: Number One Historical Archives), reel no. 54, pp. 2320-2 (QL 3.9.5). This 1738 memorial recalled the administrative measure for famine relief in 1724.

²² *Gongzhong dang Qianlongchao zouzhe* (Taipei: Gugong bowuyuan, ed., 1982-89), vol. 13, p. 152 (QL 20.12.3), (hereafter cited as *GZD-QL*).

²³ A 1768 report from the Fengyang customs in northern Anhui province confirms that the Huai was the transport route between Guangzhou and Yangzhou. See *GZD-QL*, vol. 29, pp. 249-50 (QL 33.1.3).

Canal Transport and Market Integration

at the Fengyang customs house in Zhengyang town, then travelled downstream to Hongze Lake, and then on to Shaobo.²⁴

This account of the trade relationship between Yangzhou and Guangzhou is supported by a comparison of their price data. As Figure 1.1 shows, rice prices in Yangzhou, though higher, coincide with those in Guangzhou from 1751 to 1800. A Pearson correlation analysis gives a high coefficient (0.69) between the two price series, demonstrating a high degree of association between the two prefectures, evidence that Guangzhou was a rice supplier to Yangzhou and that it was integrated in the lower Yangzi rice market.

In short, in the eighteenth century, rice was often sold from Guangzhou in Henan to Yangzhou in Jiangsu. The flow of rice from Henan to Yangzhou, however, was of a relatively small amount. Throughout the century, Jiangsu imported much more rice from the middle Yangzi provinces, a subject which will be dealt with in Chapter Four.

2. Shandong Province

Rice was not a principal staple in Shandong, any more than it was in Henan. But since Shandong was just north of Jiangsu, it seemed likely that merchants would trade rice between the two provinces. To investigate this possibility I compared the prices of rice in Suzhou, the largest rice market in Jiangsu, and in Jining and Linqing, the largest grain markets in Shandong.²⁵ If there was a rice trade from Jiangsu to Shandong one would expect to see: first, that the movements of the three price trends were synchronic; and second, that prices were lowest in Suzhou, higher in Jining in southern Shandong, and highest in Linqing in northern Shandong.

I found that Linqing did not import rice from Suzhou. As shown in Figure 1.2, the price trends in the two cities were not parallel. The Pearson coefficient of correlation is only 0.44,

²⁴ *ibid.*

²⁵ The following contemporary official documents demonstrate the status of Jining and Linqing as the two major grain markets in Shandong: *Zhupi zouzhe*, microfilm, reel no. 54, pp. 1709-12 (QL 2.9.18); *Gaozong shilu*, 5/1b-2b (QL 3.3); *Lufu zouzhe* (microfilm, Beijing: Zhongguo diyi lishi dang'anguan), reel no. 49, pp. 1028-32 (QL 3.4.4).

Canal Transport and Market Integration

indicating a low level of market integration. The correlation coefficient between Linqing and Jining is similarly low (0.44), which is shown also in the lack of parallel movements in the price trends of the two Shandong cities in the figure. In other words, rice did not move from Suzhou to Linqing, nor was there an integrated rice market within Shandong province.

However, merchants did transport rice to Jining from Suzhou. Again in Figure 1.2, except for a short period between 1785 and 1787, the trend of rice prices in Jining is about one tael (0.95 tael on average) per *shi* higher, but moves synchronically with that in Suzhou. The correlation coefficient is 0.85, which is high enough to demonstrate a close market relationship.

The problem is that the degree of market integration, no matter how high, does not reflect the actual trade volume.²⁶ In the Qing documents I found only one case in the whole eighteenth century that showed a significant amount of rice trade between Shandong and Jiangsu. It occurred in 1703, when the harvest failed in Shandong and grain prices rose. Then Shandong merchants purchased rice in Jiangsu where a bumper crop assured them of far lower prices.²⁷ In the fourth lunar month of 1704, Cao Yin, the Director of the Jiangning Imperial Silk Manufacturing (*Jiangning Zhizao Langzhong*), reported on this to the Kangxi emperor: "... recently, many Shandong people have come [to the lower Yangzi] to buy rice."²⁸ Transport soldiers (bannermen) also participated in this northbound trade. In the fourth lunar month of 1704, both the Director-general of Grain Transport and the Director-general of the Grand Canal suspected that the bannermen had stolen a large quantity of tribute grain and had sold it illegally along the Grand Canal north of Huaian.²⁹

²⁶ Carol H. Shiue, "Transport costs and the geography of arbitrage in eighteenth-century China," *The American Economic Review*, 92, no. 5 (Dec. 2002), p. 1408.

²⁷ *Da Qing Shengzu Renhuangdi (Kangxi Emperor) shilu* (repr. Taipei: Hualian chubanshe, 1964), 212/26b (KX 41.9) (hereafter cited as *Shengzu shilu*); and *Kangxichao hanwen zhupi zouzhe huibian* (Beijing: Dang'an chubanshe, 1984-85), vol. 1, p. 109 (KX 43.4.1).

²⁸ *Kangxichao hanwen zhupi zouzhe huibian*, vol. 1, p. 109 (KX 43.4.1).

²⁹ *Caoyun quanshu*, pp. 918-9.

Canal Transport and Market Integration

But the 1704 sale of Yangzi rice to Shandong was a rare event. Kōsaka Masanori's study of customs duties, based on reports from Huaian customs (on the canal between Suzhou and Jining), showed that the major southern commodities shipped along the Grand Canal were silk, cloth, sugar, and paper; rice was seldom included.³⁰ The rarity of rice in the trade record implies that, though the rice markets of Suzhou and Jining were highly integrated, the volume of trade was insignificant. Merchants did not transport much rice from Jiangsu to Shandong unless the latter suffered an extremely poor harvest.

The major obstacle to inter-regional trade between Jiangsu and Shandong was certainly high transport costs, but the marketability of southern rice in Shandong was also affected by local harvest conditions. Few historians notice that Shandong produced rice, even though rice was so widely grown that local officials in Jining and Linqing had to submit monthly reports of rice prices to the court. In the early eighteenth century the province's heavy use of water for rice irrigation even threatened navigability on the Grand Canal. In 1721 the Kangxi emperor noted that:

The Grand Canal in Shandong relies [for its water] mostly on the lakes such as Weishan, where several streams meet and make possible [the water for] tribute grain transport. Nowadays, more paddy rice has been grown in Shandong, and the upstream currents are used for irrigation. As the upstream [water supply] is blocked, the lakes have become shallow. How can they still be used to provide water for the tribute grain transport?³¹

Since Shandong was a rice producer, its local price determined whether or not southern rice would be imported. Southern rice was cheap in the Yangzi, but after travelling via the Grand Canal to Shandong, it became so expensive that much of its

³⁰ Kōsaka Masanori, "Shindai ni okeru daiunga no bushi ryūtsū: Kenryū nenkan Waiankan o chūshin to shite," *Tōhōku gakuin daigaku ronshū: rekishigaku, chirigaku* 15 (1985): 1-64.

³¹ *Shengzu shilu*, 292/6a (KX 60.5)

Canal Transport and Market Integration

market was lost in the competition with local rice. We have no information to indicate the transport costs from Suzhou to Jining, but it appears that the additional one tael of silver per *shi*, which was roughly the difference between the two price trends shown in Figure 1.2, was mostly due to transportation costs.

We may conclude that merchants would not carry rice from Suzhou to Jining and adjacent southern Shandong cities unless there was a price difference greater than one tael. That was the case in 1704, a famine year in Shandong. It would also explain why, when the lower Yangzi experienced crop failure (between 1785 and 1787), Jining remained unaffected by price fluctuations in Suzhou. The rice markets between Suzhou and Jining were integrated, but this integration was actually weak.

On the canal north of Jining, increasing transport costs diminished the marketability of Yangzi rice down to nothing. Both the absence of trade records and the unparallel trends between Linqing and Suzhou show that northern Shandong cities did not import rice from the Yangzi delta.

Farther north on the Grand Canal, in Zhili province and Beijing, the situation was different.

3. Zhili Province And Beijing

Like Shandong, Zhili grew its own rice. Xu Daling has shown that the early development of rice cultivation in Zhili resulted from the imperial decision to move the capital from Nanjing in the lower Yangzi, north to Beijing in Zhili in the early fifteenth century. The Yongle emperor, attempting to increase the grain supply in the new capital, encouraged officials to take the lead in opening rice fields around Beijing.³² Though it is difficult to tell how many paddies were opened, it appears that, especially where water was available for irrigation, farmers did plant rice. Timothy Brook, quoting a Ming official, stated that rice cultivation in Zhili spread on a large scale during the later half of the sixteenth century.³³

³² Xu Daling, "Mingdai Beijing de jingji shenghuo," *Beijing Daxue xuebao* 1959.4, p. 50.

³³ Timothy Brook, "The spread of rice cultivation and rice technology into the Hebei region in the Ming and Qing," in *Explorations in the History of Science and Technology in China*, ed. Guohao Li, Mengwen

Canal Transport and Market Integration

In the mid-seventeenth century a Zhejiang scholar named Tan Qian (1594-1658), while travelling to Beijing, noted the following:

In the metropolitan area [of Beijing], there are rice fields scattered about and the price of rice is twice that in the south... The lunch and dinner of northern people consist mainly of cakes and cooked millet made of broken wheat, millet, buckwheat, and beans. Except when they invite guests for a meal they do not cook rice. They purchase it only in small amounts of *dou* and *sheng*.³⁴ The price is very high.³⁵

Tan Qian's account showed that in the seventeenth century there was rice production in Zhili, and that rice was a luxury food.

As Timothy Brook has pointed out, rice cultivation in Zhili was not easy. Climatic factors like temperature and precipitation imposed physical conditions that had to be accommodated for paddy to grow. The minimum average temperature throughout the life of the rice plant should not go below 20°C. (68°F.), yet in the northern half of Zhili the average temperature stayed above 20°C. only in June, July, and August, shortening the growing season. Even if rice farmers introduced an early-ripening variety, they encountered a second obstacle in the insufficiency of rainfall. In a normal year Zhili did not get more than ten days a month of rain until June, and no heavy rains until July and August. Thus the early-ripening rice was dependent on irrigation, and irrigation required a great deal of capital investment.³⁶

Zhang and Tianqin Cao (Shanghai: Shanghai guji, 1982), p. 659.

³⁴ *Dou* and *sheng* were small measures. Ten *sheng* equaled one *dou*, and ten *dou* equalled one *shi*. (See "Table of Weights and Measures".) It was then common to use *dou* and *sheng* as synonymous with a "handful" of rice.

³⁵ In 1642, Tan Qian (1594-1658) went to Beijing as a high official's private secretary. He stayed there for thirteen years, recording what he saw. See Tan Qian, *Beiyou lu* (n.d., repr. Beijing: Zhonghua shuju, 1960), p. 314.

³⁶ Brook, "The spread of rice cultivation," pp. 662-3.

Canal Transport and Market Integration

Despite the difficulties of growing rice in Zhili, from the Ming dynasty onwards the imperial government never stopped encouraging farmers to do so. The motive was a strategic one. Food production in the unfavourable climate had been too little to support a court that included not only officials but huge numbers of soldiers. The Grand Canal was a lifeline, bringing additional grain from the Yangzi provinces, but its length made it vulnerable: if enemies blocked the canal, the court would disintegrate. Converting the barren land around Beijing into rice fields was a backup plan on the part of the Ming and Qing governments. Officials and landlords from the Yangzi provinces supported the plan as well, hoping that rice production in Zhili finally would reduce their tribute grain tax.³⁷

Owing to vigorous support from the Kangxi and Yongzheng emperors, more paddy fields were opened in Zhili in the early Qing. In 1704, with approval from the Kangxi emperor, Nan Li, the Regional Commander of Tianjin, recruited 200 farmers from Fujian in the south to come to Tianjin in Zhili, to open 10,000 *mu* of rice paddies. These southern farmers were given land, subsidies to buy cows and seeds, and exempted from taxes for six years. In 1725, the Yongzheng emperor even approved a grand project of water control and paddy construction in Zhili, and appointed his beloved brother Yinxiang, or Prince Yi, to supervise it. The work began on a small experimental scale in 1726, but expanded dramatically in 1727 with the establishment of the Paddy Construction and Water Control Department (*Yingtian Shuili Fu*). Because of the close relationship between Prince Yi and the emperor, the Paddy Construction and Water Control Department obtained state revenues and land, mostly at riverside and seaside, for the project. The Department improved the water supply to this land and then rented out the land to local farmers for rice farming. In one sense the program seemed to be extremely successful; contemporary records estimated that the

³⁷ For details, see Zhang Fang, "Qingdai Yongzheng nianjian jifu diqu de shuili yingtian," in *Zhongguo shi yanjiu* 1993.2, pp. 72-80; Tō Takehiko, "Min Shin kiho suiri-ron no isō," *Tōyō Bunka kenkyūjo kiyō*, 125 (1994), p. 123-76; Morita Akira, *Shindai suiri shakaishi no kenkyū* (Tōkyō: Kokusho kankōkai, 1990), pp. 321-53.

Canal Transport and Market Integration

total paddy acreage from the project was from over 6,000 to over 7,000 *qing*³⁸ between 1727 and 1729.³⁹

We lack information on the development of Nan Li's paddy conversion scheme, but the success of the Paddy Construction and Water Control Department was certainly an illusion. To construct 7,000 *qing* of paddies between 1727 and 1729, the Paddy Construction and Water Control Department spent over a million taels of state revenue, but this huge input of capital did not produce any good result. For fear that northerners, who were not used to eating rice, would not buy it, and that its sudden over-production would harm the rice farmers, the Yongzheng emperor allotted revenue to buy all the rice grown by the Paddy Construction and Water Control Department on the three consecutive years, after every autumn harvest. Because of this special favour, "the farmers made a great profit" (*minhuo houli*).⁴⁰ In essence, however, the Paddy Construction and Water Control Department was operating outside the market. When it obtained state financial support, it operated well and could even enlarge its operating scale. But such support was built solely on the relationship between Prince Yi and the emperor, and the death of Prince Yi in 1730 was a heavy blow to the department. Morita Akira noted that Prince Yi's absence left a hole in management. In addition to the problem of rice farmers blocking rivers in order to have more water for their own fields, he noted that many of the new rice paddies became barren land again soon after the prince's death.⁴¹

The failure of the paddy conversion project did not imply an absence of private rice paddies in Zhili. Tan Qian's travelling account (cited earlier) proved that rice fields existed in Zhili in the seventeenth century. Recently, Lillian M. Li used the contemporary reports of price data stored in the Number One Archive Library in Beijing to show that, in the Qing, among the

³⁸ Each *qing* equalled 100 *mu* (one *mu* was about 0.15 acre). See the "Table of Weights and Measures".

³⁹ Brook, "The spread of rice cultivation," p. 674; see also Morita, *Shindai suiri shakaishi no kenkyū*, pp. 332-4.

⁴⁰ See Morita, *Shindai suiri shakaishi no kenkyū*, pp. 335.

⁴¹ *ibid.*, pp. 335-6.

Canal Transport and Market Integration

major three food staples in Zhili the price of wheat was highest, followed by millet and then sorghum.⁴² If we add the price data for rice from the same official reports to her figure, taking Tianjin prefecture and Baoding prefecture between 1739 and 1748 as an example, it is clear that rice was even more expensive than wheat. (See Figures 1.3 and 1.4.)

In the Qing dynasty Zhili people called their local rice *jingmi* (capital rice), but scholars studying the grain market there found puzzling notations in the official documents for *laomi* (old rice), *suomi* (shuttle rice), and *cangmi* (granary rice). Pierre-Etienne Will was mystified by the term *suomi*, which official documents used to refer to all the tribute grain from the middle-Yangzi provinces of Hunan, Hubei, and Jiangxi.⁴³ Lillian Li and Alison Dray-Novey suggested that tribute rice from the lower Yangzi was divided into four grades, which were, from high quality to low, *baimi* (white rice), *gengmi*, *xianmi*, and *suomi*.⁴⁴

I'd like to suggest that *laomi* (old rice), *suomi* (shuttle rice), and *cangmi* (granary rice) were actually different names for *gengmi* (lower-Yangzi rice), *xianmi* (mid-Yangzi rice), and millet respectively. My argument is based on the following evidence.

We know that the Qing government collected two major grains for the tribute tax, millet and rice; and levied the rice tax from provinces in the lower and the middle Yangzi. (See Table 1.1.) We also know that at this time the strain of rice grown in the lower Yangzi was called *gengmi*, while rice from the middle Yangzi was called *xianmi*.⁴⁵ Since *laomi*, *suomi*, and *cangmi* were names for tribute grain, they exist in the official documents. But these documents sometimes cite *gengmi*, *xianmi*, and millet in

⁴² Lillian M. Li, "Grain prices in Zhili province, 1736-1911: a preliminary study," in Thomas G. Rawski and Lillian M. Li ed., *Chinese History in Economic Perspective*, pp. 66-99.

⁴³ Will, *Bureaucracy and Famine in Eighteenth-Century China*, p. 153, n. 7.

⁴⁴ Lillian M. Li and Alison Dray-Novey, "Guarding Beijing's Food Security in the Qing Dynasty: State, Market and Police," *The Journal of Asian Studies* 58, no. 4 (Nov. 1999): 997.

⁴⁵ Norimatsu Akifumi, "Yōzeiki ni okeru beikiku ryūtsū to beika hendō: Sōshū to Fukken no kanren o chūshin to shite," *Kyūshū daigaku tōyōshironshū* 14 (1985): 160-1.

Canal Transport and Market Integration

their stead. *Gengmi* darkened in colour with age,⁴⁶ making it look "old"; *xianmi* was an early-ripening strain of rice that was shaped like a shuttle, long and pointed at both ends. On this basis, and after cross-examining other Qing documents, I suggest that *laomi* (old rice) was *gengmi* (the lower Yangzi rice that darkened with age); that *suomi* (shuttle rice) and *xianmi* (middle Yangzi rice that was shaped like a shuttle) were the same strain of rice; and that *cangmi* (granary rice) was another term for millet.⁴⁷

It is not clear why Beijing officials invented such terms for the tribute grain. Presumably they hoped to differentiate the tribute grain, at least in official records, from grain grown locally or transported (and sold in Beijing) by merchants from other regions. When the tribute grain flowed from metropolitan granaries to local grain markets, the official designations of *laomi*, *suomi*, and *cangmi* came with it, and were used in the Beijing marketplace as well.

As we have seen, the grain tribute made its way into Beijing's grain market when the Eight Banners soldiers sold their rice salaries to local grain merchants. Both metropolitan officials and soldiers were paid in tribute grain. The grain that went to officials was called "stipend grain" (*fengmi*), with each official receiving grain in proportion to his rank⁴⁸ from the Tongzhou Granaries (*Tongcang*) in Tongzhou.⁴⁹ The total payment to

⁴⁶ See Qi Rushan, *Beijing sanbai liushi hang* (1941; repr. Beijing: Baowentang shudian, 1989), p. 68.

⁴⁷ In 1737, an imperial decree on the grain salary for Banner soldiers stated: "Calculating the whole amount of grain salary in ten shares, *gengmi* was to be 5 shares, *suomi* was to be 3.5 shares, and millet was to be 1.5 shares." (*Qinding Hubu caoyun quanshu*, 1766 edition; repr. Taipei: Chengwen chubanshe, 1969, 60/6a.) In this decree *gengmi* was used to denote *laomi* and millet to denote *cangmi*. The remaining *suomi* would then refer to *xianmi*.

⁴⁸ In the Qing dynasty, each official in the metropolitan area received an annual salary of 16.5 to 90 *shi* of husked grain. See Li and Jiang, *Qingdai caoyun*, pp. 70-1.

⁴⁹ When the stipend grain was issued, each metropolitan official was given a certificate to present at assigned granaries at Tongzhou to collect his grain. The stipend was distributed twice a year, in spring and in autumn: *Caoyun quanshu*, p. 416.

Canal Transport and Market Integration

officials was small compared to the amount that went to soldiers – over 92 per cent of the annual salary payment in the metropolitan area⁵⁰ – and this portion was called “armour grain” (*jiami*). The Capital Granaries (*Jingcang*) in Beijing took charge of this payment. Each Eight Banners soldier could collect 20 *shi* of grain, composed of *laomi*, *suomi*, and *cangmi*, as his annual stipend.⁵¹ When armour grain was distributed, company commanders (*zuoling*) in the Eight Banners were given certificates to exchange for grain in particular granaries; the company commanders then distributed the grain to their soldiers.⁵²

Many soldiers sold their rice salaries as soon as they received them, although the practice was illegal.⁵³ The prevalence of this practice was not due to the northern preference for staples like wheat, millet, and sorghum over rice.⁵⁴ If northern indifference to rice had been the deciding factor, there would have been no market for the soldiers’ rice in Beijing, and there was a great demand for it. Throughout the eighteenth century, soldiers were always able to sell their armour grain, and its cost was not cheap. According to a 1760 memorial of grain prices in Beijing, the retailing price of *laomi*, though it had been stored for years, fetched 1.68 taels per *shi*, which was more expensive than local millet, which cost 1.5 taels, and wheat, which cost 1.45 taels.⁵⁵

⁵⁰ According to a memorial in the Yongzheng reign (1723-35), the Qing government distributed 2,440,000 *shi* of grain annually to the metropolitan Eight Banner soldiers while only 190,000 *shi* went to the metropolitan officials. See *GZD-YZ*, vol. 27, pp. 725-6 (n.d.).

⁵¹ *Shengzu shilu*, 1/6b (KX 24). In the early Qing, the amount of armour grain was divided in half and paid out twice a year. In 1723, a three-term system of payment was introduced, but the actual amount of the payment did not change. (See *Caoyun quanshu*, p. 416.) In 1737, the annual distribution of armour grain was divided into four terms. The aim of the new system was to prevent the metropolitan soldiers from selling the portion of their stipends which was not urgently needed. See *Qinding Hubu caoyun quanshu* (1766), 60/6a.

⁵² *Caoyun quanshu*, p. 417.

⁵³ *Lufu zouzhe*, microfilm, reel no. 49, pp. 1016-9 (QL 3.3.19), 1024-26 (JQ 4.6.24).

⁵⁴ See Li and Dray-Novey, “Guarding Beijing’s food security,” p. 1007.

⁵⁵ *Lufu zouzhe*, microfilm, reel no. 50, p. 1926 (QL 25.10.16).

Canal Transport and Market Integration

The high price of the tribute grain reflected a voracious demand for rice in Beijing. The reason the Eight Banners soldiers sold their armour grain was simple: they needed money. Unlike the metropolitan officials who received part of their salary in money, these soldiers were paid exclusively in grain. They had to sell a portion of their armour grain to buy other daily necessities. How much armour grain they sold depended on the amount of money they needed that year. Soldiers who needed money urgently would sell their entire portion of rice, and use a small amount of the proceeds to buy some coarser and cheaper grain for their own consumption. Since there were over 125,000 Eight Banners soldiers in the metropolitan area in the eighteenth century,⁵⁶ an enormous amount of rice flowed from Capital Granaries through the hands of the soldiers and into the market of Beijing every year. Since each soldier received 20 *shi* of grain annually, if they all sold half of their armour grain, of which about 2/3 were either *laomi* or *suomi*, more than 750,000 *shi* of rice would enter the Beijing market per year. As a censor mentioned in a 1738 memorial, many people in the metropolitan area were fed by the rice sold by soldiers.⁵⁷

The distinguishing characteristic of the grain tribute market in Beijing was that the selling price did not include transportation costs. The bannermen had no need to consider such costs, which had been paid by the government. Also, no matter how much rice was harvested in the lower Yangzi in a given year, the Eight Banners soldiers received the same amount every year. Therefore, when soldiers sold their rice to the market, they based the price upon the grain supply and demand within the metropolitan areas, and could ignore production, transport, and

⁵⁶ Edward Rhoads estimates that the total strength of the Metropolitan Banners ranged between 125,000 and 150,000 soldiers and officials. See Edward J. M. Rhoads, *Manchus and Han: Ethnic Relations and Political Power in Late Qing and Early Republican China, 1861-1928* (Seattle and London: University of Washington Press, 2000), p. 27.

⁵⁷ *Lufu zouzhe*, microfilm, reel no. 49, pp. 1016-9 (QL 3.3.19). In Tongzhou, the situation was similar. For example, in 1769, an official recorded that in each season, the Tongzhou granaries dispensed several hundred thousand *shi* of grain in salary, but half of it ended up for sale in the local grain market. See *Gaozong shilu*, 827/9b (QL 34.1).

Canal Transport and Market Integration

transaction costs. This assured a very low market price for Yangzi rice in the metropolitan areas. In 1743, for instance, the local Beijing rice, or "capital rice" (*jingmi*), sold for 1.78 taels of silver per *shi*, while *laomi* (tribute rice from the middle Yangzi) and *suomi* (tribute rice from the lower Yangzi) went for only 1.37 taels and 1.2 taels per *shi*.⁵⁸ In the tenth lunar month of 1761, capital rice sold for 2.6 taels of silver per *shi* in the market, while *laomi* cost only 1.68 taels and *suomi* was even cheaper, at 1.2 taels.⁵⁹

The Yangzi rice sold in Beijing was not only cheaper than local rice, but cheaper than rice for sale in the Yangzi region itself. Again taking 1743 as an example, the price of second-grade rice in Suzhou was 1.6 taels of silver per *shi*, which was 0.23 tael *more* than the same variety of *laomi* sold in Beijing.⁶⁰ (More examples are cited in Table 1.2.) The price of *laomi* in Beijing appears to have been free of production and transaction costs, as they had been paid by the government. Consequently, private merchants would not have transported southern rice to sell in the capital. According to the 1941 reminiscences of a Beijing resident, Yangzi merchants brought no rice to Beijing until the fall of the Qing dynasty.⁶¹

Although there was no private trade in rice between the Yangzi valley and Beijing, merchants occasionally exported *laomi* from the imperial granaries in Beijing and Tongzhou to other parts of Zhili province, and even south to Shandong along the Grand Canal, even though such trade was illegal. According to an official in the late seventeenth century, boatmen travelling south on the canal would buy rice at Tongzhou, where the tribute rice was stored, because of its low price.⁶² Then around 1800, merchants suddenly established more than ten rice shops near the

⁵⁸ *Gongzhong liangjiadan* (microfilm, Beijing: Zhongguo diyi lishi dang'anguan), Zhili province, reel no. 1; *Zhupi zouzhe*, microfilm, reel no. 55, pp. 1672-5 (QL 8.6.10).

⁵⁹ *Lufu zouzhe*, microfilm, reel no. 50, p. 1926 (QL 26.10.16).

⁶⁰ With regard to the prices of the second-grade rice in Suzhou, see Wang, "Secular trends of rice prices in the Yangzi delta, 1638-1935," Table 1.1.

⁶¹ Qi, *Beijing sanbai liushi hang*, pp. 122-3.

⁶² Yao Wenran, "Zhouxing rijì" (n.d.; in *Qing jingshi wenbian*, 47/1a).

Canal Transport and Market Integration

imperial granaries in Beijing. At the same time, rumours circulated about “shipping back the grain tribute” (*huicao*) when the grain tribute boats reached Beijing. The Vice Minister of the Capital Granaries (*Cangchang Shilang*) recorded that these rice shops might be using the grain tribute boats, smuggling the tribute grain back from the capital to sell in the southern regions where grain prices were higher.⁶³

In sum, the rice trade originating in the Yangzi region had little impact on prices in Beijing. Government interference, in the form of tribute grain used as soldiers’ wages that found its way into the Beijing market, obstructed the rice trade between the lower Yangzi and Beijing, preventing the development of an integrated market.

Conclusion

In the eighteenth century, completion of the Grand Canal reduced transport costs between the Yangzi valley and north China, and stimulated trade between the two regions.

Despite this, the Yangzi valley and north China did not merge into one economic unit in terms of the rice trade. Being narrow, shallow, and constructed on mostly uneven terrain, the canal was neither a convenient nor an inexpensive way to transport rice, the most important commodity in local and long-distance trade in China. People in some canal cities in southern Shandong, like Jining, did import southern rice, but the volume was so small as to be unnoticeable except during a severe famine. Farther north on the canal in a city like Linqing, it was hard to find any Yangzi rice in local markets. While rice was a common staple food in southern China, the population north of the Huai continued to eat more wheat, millet, and sorghum. The cost of transport between the two regions was too high to affect this proclivity. In the eighteenth century, therefore, China was divided in half in terms of the culture of food consumption.

Along with transportation costs, state policy also impeded the expansion of the southern rice market to the north, especially in Beijing. Although Beijing with its thousands of officials and soldiers presented a huge demand for grain, the Qing government,

⁶³ *Lufu zouzhe*, microfilm, reel no. 49, pp. 1068-70 (JQ 5.10.25).

Canal Transport and Market Integration

instead of relying on the market, solved the food problem with the grain tribute tax. Every year the court distributed millions of *shi* of tribute rice from the Yangzi provinces to the metropolitan soldiers. To pay for daily necessities the soldiers sold their rice, flooding local markets with Yangzi rice, which was cheaper than local rice, and even than rice sold in the Yangzi. Thus, merchants could not profit from selling Yangzi rice in Beijing. The Qing government had guaranteed the food supply in Beijing, but segregated the capital from the rice market in the Yangzi delta.