

The Financial Effects of the Taiwan Tea Boom

Working paper
Nov-22-2016

Kelly B. Olds

In the last-half of the nineteenth century, northern Taiwan experienced a tea boom. Exports increased greatly leading to a large trade surplus accompanied by large inflows of silver. The increase in the money supply lowered interest rates in north Taiwan. With higher real money balances, landowners put less land on the market causing a great increase in real estate prices. The banking system allowed businesses to move funds easily in and out of the north Taiwan area, but once silver reached Taiwanese farmers in the village economy, who had no access to deposit banking, they held onto the money or used it only locally. Thus, one can argue that one reason international trade had a limited impact on Chinese economic development in the nineteenth century was the lack of banking services outside the business sector, which caused local money gluts instead of directing the money earned to its most valuable use.

Tea long played an important role in the Chinese economy. As early as the Tang Dynasty (618-907 AD), tea had not only become a common drink domestically, but was also an important export good. In the eighteenth century, China's growing exports to Europe through Guangzhou consisted largely of tea; and the tea export continued to grow rapidly after the Opium War and the opening up of other Chinese ports in the nineteenth century. The highlands of northern Fujian were one of the primary sources of tea exported to Europe. In the mid-nineteenth century, Amoy, in southern Fujian, also began exporting significant amounts of tea.

Taiwan lay across the strait from Amoy. In 1860, the Treaty of Peking opened up Taiwan, both north and south, to foreign trade. The south was the most developed part of the island with an established sugar industry. The northern economy was smaller, exporting small quantities of rice, coal and camphor. In the 1860s, however, tea produced in the northern mountains surrounding present-day Taipei was found to be a marketable commodity and by 1868 tea leaves were being processed in the Taipei area for the export market. The last third of the nineteenth century saw the industry boom. Eventually, the city of Taipei was founded and the Qing Empire moved the island's local government to the north. The Qing ruled until the Japanese took over after the 1894-1895 Sino-Japanese War. After the war, tea production largely stagnated in the face of growing competition from British India, the Dutch East Indies and Ceylon, but it remained the north's main export.

The tea boom, both in Taiwan and throughout the Qing Empire, brought local extensive economic growth. New land was opened up, emigrant workers increased the population and new towns were created (Gardella 1994, 85-105). However, the extent to which economic welfare increased is unclear. In the 1870s, some

observers, judging from imported goods, claimed to see some improvement (Lin 1976, 156). But by the 1880s, some claimed no improvement had been made at all. An example was the British Consul in Tamsui, Alexander Frater. Observing northern Taiwan in 1882, he reported: “Notwithstanding all the money which comes into the country in payment for tea, &c, the people are apparently poorer than they were fifteen to seventeen years ago. Intelligent Chinese even, who have noticed this, cannot in any way account for the present state of affairs. Many poor people are taking to using cheaper native nankeen cottons instead of English goods” (*Taiwan Political and Economic Reports 1861-1960*, III, 216)

There is general agreement that production methods in the tea areas showed little improvement (Gardella 1994, 53-54). There was some increasing sophistication in tea finance (Hao 1986, 148-154), but both the growth and manufacture of tea remained small scale. In the latter half of the nineteenth century, British producers in India were already moving to large-scale production on tea plantations with indentured labor. Chinese tea producers struggled in the face of lower-priced, higher-quality Indian teas and the Chinese market share declined precipitously.

Historians have offered a variety of explanations for the failure of international trade to reinvigorate the Chinese economy. Some see the trade as a rigged system, an example of imperialist exploitation. Others have blamed the structure of Chinese society and the passivity of the Qing government. Exploitive middlemen also come in for strong criticism (Gardella 1994, 107-9).

This paper uses the large set of contracts collected in Taiwan History Digital Library to observe the financial change that accompanied the tea boom that occurred in northern Taiwan after 1860. Trade data seems to show large flows of silver flooding into northern Taiwan after 1870. Some observers suspected that much of this silver found its way back to the mainland through the unrecorded junk trade, but loan documents for the period show that interest rates in northern Taiwan fell significantly, suggesting that much of the money remained in the area. This glut of money did not drive up consumer prices (proxied by rice prices), but land sales contracts show that land prices across the north did rise greatly. Real

land prices in the Taipei area peaked in the 1880s. Further south in the Hsinchu area real prices rose until just before 1910. There was no evident increase in real estate transactions as one sees in a modern property bubble. The increase in prices seems to have been due, at least as much to a fall in supply in the land market as to an increase in supply. Landowners who held more money had less need to sell land.

The above facts suggest that the tea boom little increased consumption per person in northern Taiwan because Taiwanese farm families preferred to increase their real money balances rather than spend their new earnings. They saw the extra money gained from the tea boom as transitory and they either wanted to save it for future emergencies or simply smooth their family's consumption over a long period of time. In the modern economy, the savings of these families might have been put into a bank and lent out to entrepreneurs, increasing economic growth. But the financial system that existed along the China coast in the late-1800s had only developed to the point that it could serve established businesses. Once money had made its way into the hands of Chinese farm families, it often got stuck. One could lend the money to neighbors or invest in nearby farmland; but there were no banks taking deposits from ordinary people and lending it to areas where demand for capital was higher. As a rule, banks during this period served only merchants and other businesspeople.

In the next section of this paper, the tea boom in Taiwan will be briefly sketched. The third section presents evidence for the fall in interest rates. The fourth section shows the increase in land prices and the fifth section provides data on transactions in the land market to argue that much of the money earned by Taiwanese was not spent but kept as a safety fund. The last section concludes.

II. The tea boom in northern Taiwan

In the 1860s, tea production was increasing rapidly across the strait from Taiwan. Oolong tea was being produced in Anxi county and shipped out of Amoy, the primary port city linking Taiwan and the mainland. Some Taiwanese farmers had begun growing tea and having it shipped to Amoy to be processed. John Dodd

and Li Chunsheng set up the first tea manufacturing business on Taiwan in 1868 and soon many other businessmen followed. Western businesses were the most important manufacturers in the beginning, but Chinese businesses soon moved in. By the 1880s, Western businesses had been largely relegated to quality control and exporting while the actual manufacture was primarily done by Chinese. Small tea farms spread into the foothills surrounding Taipei, an area that had been controlled by aborigines. Many of the Chinese developing this area were experienced tea farmers who had emigrated from Anxi. The growing town of Dadaocheng became the center of the tea processing industry. Each year transient workers would come to the town from Amoy. Taiwanese women and girls picked the tea leaves and did much of the cleaning in Dadaocheng ((Alsford 2010, 1-17, Gardella 1999, 173-175 and Davidson 1903 [1992], 373-394).

Taiwan's tea exports grew quite quickly, as shown in figure one. Taiwan was divided into two customs areas. The southern area had ports in Takow (Kaohsiung) and Taiwan-foo (Tainan). The northern area had ports in Tamsui and Keelung. In 1866, when records for northern Taiwan become available, the south's trade was clearly the most important. Throughout the period dealt with in this paper, the south's primary export was sugar. The north had been exporting relatively small amounts of camphor, coal and rice. But in the 1860s, the north began growing tea and by 1871, over half of northern exports, measured by value, were tea. As other northern exports were gradually crowded out, tea exports continued to grow and after 1880 their value surpassed the total value of all southern exports (*Maritime Customs* 1997). The tea was shipped to Amoy where it was often mixed with tea from the older Anxi region and shipped on to the U.S., but as Taiwan's tea industry grew, it quickly became the primary source of tea leaves and Amoy became simply a reshipment point (Gardella 1994, 63).

As tea exports grew, imports also increased, but not to the same extent. While southern Taiwan maintained relatively balanced trade through the 1867-1895 period, the north went from a trade deficit in the late 1860s to a growing trade surplus. From 1880 to 1894, imports were only two-thirds the value of exports. Much of the money tea exports were earning was not used to buy imports either

from the mainland or from abroad. The trade surplus was offset by large silver inflows. Silver was the money used in the Qing Empire and the silver purchased the exported tea. Silver circulated between Taiwan and the mainland, but, as can be seen in figure two, net recorded silver inflows averaged slightly over 1.7 million dollars per year in the decade 1885-1894 (*Maritime Customs* 1997).¹ To put this in context, this was over 5% of the currency and demand deposits held by the entire island's private sector in 1912² (Umemura and Mizoguchi, p. 301).

The apparent large increase in the supply of silver on the island puzzled contemporary observers. The total production of the island was growing along with population, but this did not seem nearly enough to explain the increase in the silver money supply. *Ceteris paribus*, an increase in the money supply is often associated with an increase in the consumer price level, but prior to the Japanese takeover in 1895, no large increase in the price level is observed. There is no CPI for nineteenth-century Taiwan, but by far the most important consumer good in this relatively poor economy was rice. Figure three shows three time series for rice prices. One time series shows rice prices from 1835 to 1893 as recorded in documents found at a Hsinchu temple just south of the Taipei area (Hsieh 2011). Another shows historical rice prices in Taipei from 1876 to 1901, gathered by a Japanese researcher in 1902 (*Taiwan Association Bulletin* 1902, 53-54), and continued from 1902 to 1912 by average prices recorded in Taiwan yearbooks (*Taiwan Government-General Statistical Yearbooks* 1903-1913). Finally, a longer time series from the on-line "Qing Dynasty's Price of Food Database" is shown. The prices from this series are an average of monthly median prices from the two major southern Fujian port cities of Quanzhou and Zhangzhou that traded with both northern and southern Taiwan. Throughout the Qing period, there was a rice trade between Taiwan and the mainland. Generally Taiwan had exported rice to the mainland via the junk trade, but by the 1890s the Taipei area was so specialized in tea that it had become a rice importer. Finally, a CPI covering the period 1879-1912

¹ Customs statistics did not cover the smaller cross-strait junk trade.

² Compared by silver value. The 1903 yen was worth 28.44g of silver in 1903 and the yuan (silver dollar) used in the Qing dynasty was 27.74 grams.

is shown for Japan, which ruled Taiwan beginning in 1895 (Ohkawa 1967, VIII, 135). The price series all indicate an absence of inflation before the 1890s. Significant inflation only appears thereafter.

William Hancock observed the build up in silver and in the Tamsui Trade Report of 1881 writes:

“The planters are steadily coining money, and it is difficult to know what has become of the millions of dollars that have been poured into the narrow slip of country called the Tea districts. Most of the planters who have been engaged in the same occupation since the starting of the trade come to market in common clothes and without shoes on. Their receipts year after year are enormous, and yet they show no signs of wealth easily acquired. They clear more ground, plant more Tea, perhaps improve their farm buildings and add a paddy field or two to their property, but the disposal of the bulk of their profits on Tea remains a mystery.” (*Maritime Customs* 1997, I, 542)

James Davidson plagiarizes this comment in his classic *The Island of Formosa, Past and Present*, suggesting that, when he was writing at the turn of the century, knowledgeable observers still shared Hancock’s bewilderment (Davidson 1903 [1902], 390-391). Although in the 1878 Trade Report, Walter Lay had also stated that “growers are the principle recipients of profits” (*Maritime Customs* 1997, I, 341), Henry Fisher in his 1883 Trade Report. suggested the money was being “swallowed up by middlemen” and other “mere birds of passage” (*Maritime Customs* 1997, II, 617). Silver could have been taken off the island on junks, which crossed the strait without going through customs, or perhaps the silver was sent to southern Taiwan overland. One way to test whether silver money was accumulating in northern Taiwan is to look at interest rates on loans. More money would both decrease the need for borrowing and increase the supply of funds to be borrowed, driving down local interest rates in the north.

III. Interest rates on Taiwanese loans

The Amoy branch of the Hongkong and Shanghai Bank lent money to Western tea exporters at 6% interest. This money was reloaned by the exporters to Taiwanese tea manufacturers and middlemen. Loans also were available from native banks (Gardella 1994, 65-66). Eventually, this money went to produce tea. It paid laborers and was lent to tea farmers. Davidson (1903, 383) reports that a typical loan to a tea farmer would pay a nominal interest rate of 1% per month but also require that the farmer sell his crop to the broker at a 10% discount. Davidson does not state the term of such a loan, but it would not have been for more than a year, so that the actual interest rate would have been at least 22%.

Clearly there was a wide-range of interest rates in northern Taiwan, but to find out what happened to interest rates in Taiwan, outside the commercial world of the tea merchants and manufacturers, this paper relies on the Taiwan History Digital Library (THDL), an on-line database containing Taiwanese (and a few mainland) contracts. About 75% of the over 38,000 contracts are from the Qing period, while the rest are from the early Japanese period. The index of the THDL contains a category for loans (胎借字) in which a total of 1298 loans are listed. There are also some loans with fixed interest rates in the conditional sale category (典契). None of these loans are identified with the tea industry. A few of the loans are short-term loans without collateral that look much like commercial trade credit, but most loans are collateralized, usually with farmland, and are long term, and sometimes even indefinite to be paid back at the convenience of the borrower. The loans often pay interest in units of unhulled rice. Most borrowers and lenders do not have more than one or two loans to their name in the database. It thus seems that most of these loans are probably between landowning farmers.

These loans are certainly not a random sample of the loans made in Taiwan. The THDL is a compilation of contracts published by many researchers. Contracts in the loan category come from 107 sources. Many have been gathered by local historians, but

others were gathered by Japanese researchers who were trying to understand the economy of their new Taiwan colony. It may be that many of these loans have survived because they were never paid off. Other unknown sources of sample bias may exist.

Sorting through the loans, there are 226 loan contracts from the period 1805-1912 that clearly state the amount of the loan, a monetary interest rate, an indication of the general location of the loan and the date the loan was made. Another 463 loans contain similar information but report an interest rate calculated in unhulled rice. Rice made sense as an interest payment because the opportunity cost to the lender of lending out the money was often the paddy fields he could have bought with the money. And these paddies yielded rice. Some loans did not charge interest or charged interest measured in something other than money or rice. These loans were excluded.

The average value for a loan with monetary interest was 177 yuan (yen) and the average value was 280 yuan (yen) for a loan with rice interest. Even 177 yuan was well over a year's wages for a laborer. The purpose of these loans is not recorded, but they were probably for investment, refinance or large expenses such as weddings or funerals.

Three sets of simple OLS regressions on the interest rates charged are used to organize the data. These are shown in table one. Separate regressions are run on loan contracts from the north (Miaoli County and above) and south (below present-day Miaoli County). Each regression uses a set of dummies for the period in which the loan was issued, controls for the area in which the loan was issued, the log of the amount of the loan and a dummy variable that equals one when the loan was for less than a year. The first set of regressions is run on loans subject to interest calculated in money. The second and third set are run on loans subject to interest calculated in unhulled rice. The measurement used is *sheng* per *yuan*, or *shou* per *yen* after 1895. A *sheng* (*shou*) is approximately 850 grams of rice, but the actual measure varies somewhat from place to place. Converting unhulled rice, for which there is no price series data, into processed rice, for which there is data, is also problematic. The third set of regressions adjusts for the changing price of rice, using as the interest rate the amount of rice for which the amount of rice stated in the contract could be

exchanged for at 1865 prices assuming the price of unhulled rice varied proportionately to the price of refined rice.

Since the data is not actually a random sample, statistical tests should be viewed cautiously, but monetary interest rates in the north during the post-1865 period seem to be clearly lower than in the period before 1850. Unfortunately there was only one northern loan in the sample for the 1855-1864 period, so it is not clear when monetary interest rates fell. Southern interest rates fell later and less. No matter which measurement is used, loans with interest paid in rice show a similar pattern; the only difference being that interest rates seem to have fallen somewhat slower. Therefore, it seems that the supply of loanable funds was increasing in the north with only limited leakage into southern capital markets. The British consulate in Tainan noted this situation in the “Tainan Trade Report for 1890.” The report states that the southern economy suffered from usurious rates of interest, but that, “in the northern districts (of Taiwan) this evil has not assumed nearly the same magnitude” (Jarman 1997, IV, 430).

As stated above, the loan data may suffer from unknown biases. If interest rates did fall in the north, this should have lowered the return on alternative investments. In nineteenth-century Taiwan, the main investment was land. Any glut of money in northern Taiwan should have caused an increase in the price of land. The following section, also based on the TDHL contract data, shows that a boom in real estate prices did occur.

IV. The Real Estate Boom

The THDL contains slightly more than 13,000 sales contracts from 161 sources. This paper is based on 6,364 contracts collected within the twenty sources listed in the appendix. Most of the contracts used come from the largest source of contracts—the Japanese forest survey. There still exists $2905 + 2191 + 176 = 5272$ contracts collected during the forest survey, which are contained in the first three collections listed. These forest survey contracts are largely from the hills within and surrounding the present-day cities of Taipei, Keelung and Hsinchu. These contracts

were in areas that contained previously unsurveyed land—land either undeveloped or devoted to tea production—but most of the contracts contained paddy land. The oldest land sales contract was from 1736 and the most recent from 1915, but over 95% of the contracts were from the period, 1820-1912. After eliminating contracts previous to 1820, duplicate contracts and contracts with incomplete information, 4,604 were found useable.

To increase coverage, we have added land contracts from seventeen other sources. Contracts collected by Japanese surveyors generally state in which of the island's roughly 2,800 villages (xiao zhuang) each land sale was located. This was important information in estimating the value of the land. Once one moves beyond the Japanese land surveys, one must match the land to the village oneself, which is a very time consuming activity. The collections used were ones for which we judged identifying the village would be less difficult.

In creating a statistical database from Chinese land contracts, the greatest problem is that the area of the land transferred is usually not stated. Therefore, in theory, a rise in the average price of land could be interpreted, not as a rise in unit price, but as a rise in the average area of land per sales contract. However, after a mid-1880s land survey by the Qing governor, Liu Ming-Chuan, there were several hundred cases in which the taxable area of land was stated and these cases show no significant change in the area of land per contract. Land is generally described qualitatively, and this description can give some hint to the land's area. For example, the larger a plot of land, the more likely it will contain a house or border a road. Thus in the price regressions that follow, when a house is mentioned in the contract, the price for the land is higher both because the house is in itself valuable and because the fact that the land contains a house indicates that the area of the land involved in the contract is likely to be somewhat greater.

As a general rule, a Taiwanese contract starts with a statement of who is selling the land and often a simple statement of what is owned. Then follows a description of how the land was obtained. Explaining how the property was acquired was important because without a central land registry it was impossible to run title to determine legal ownership as is done today. Usually, there then follows

a description of the land's location and boundaries, but sometimes there is only a simple statement that the land boundaries are clearly marked or that the land boundaries are described in other accompanying documents. Boundaries can be either natural or manmade. To one unacquainted with the community, the boundaries seem vaguely stated, but they probably gave enough information that well-meaning people within the community could identify where the land stopped.³ In most contracts, an indication of what the land contained and/or what obligations the landowner must bear follows the boundary statement. For example, land might contain housing, tea bushes or fruit trees, and landowners might be obligated to pay irrigation or other fees.

After the property being sold has been described a formulaic phrase follows stating the name of the buyer and the selling price, and often the name of a go-between. There then follows assurances that the land is not in dispute or mortgaged, and that the sellers and their relatives will make no more claim on the new landowners once the land is transferred. The other documents being transferred to the new landowners, in addition to the sales contract, are briefly noted. A number of addenda are often added to the contract. For example, the actual transfer of the money may be noted, the seller may promise not to block the water supply of the parcel of land being sold, or graves on the land may be noted and upkeep rights reserved. Finally, signatures are affixed. These include at least the signatures of the seller(s) and the actual writer of the contract. Usually there are also signatures of various neighbors and relatives of the seller(s), who act as witnesses and sign to indicate they have no claims to the property or objections to the sale

In creating the statistical database, the price, location and year of sale were first recorded. Prices in the contracts were given in various types of yuan before

³ Once the Japanese land survey was carried out in the very early 1900s, land parcels were sometimes just listed by the index number given by the Japanese survey without recording boundaries. The size and grade of the parcel determined by the Japanese land survey is often also stated. We have not yet made use of this information as it is very time consuming to process.

1895⁴ and in yen after 1895. Land sales in the 1820-1915 period were located in 875 villages. 316 of these villages were in the Taipei area (Ilan County, New Taipei City, Taipei City and Keelung City), 250 villages were in the Hsinchu area (Hsinchu City and County, Taoyuan City and Miaoli County) and 309 villages were south of the Hsinchu area (stretching from Taichung City down to Pingtung County). Besides, these three basic statistics, answers to questions concerning other land characteristics mentioned in the contracts were also noted: (a) was there any irrigated paddy land, (b) was the land served by or did it border on an irrigation project canal (圳), (c) did the land contain any tea plants or tea gardens, (d) did the land contain any fruit trees and (e) did the land contain any housing (厝, 屋, 店 or 平家). If the land contained housing, it was further noted whether the housing was a shop, whether the housing was described as using thatch (茅) or whether it was described as using tile (瓦), either in part (tile = 0.5) or entirely. Also recorded was the number of roads or irrigation ditches the land contained or bordered on as indicated by the character 路. The character 路 is itself ambiguous and can indicate either a road or a ditch. If the 路 was identified as a road, usually a “cow-road” (牛路) or a “cart-road” (車路), it was categorized as a road. If the 路 could be identified as an irrigation ditch, usually a “water-ditch” (水路) or an “irrigation-ditch (圳路), it was categorized as a ditch. However, many of the 路 were only referred to as, for example, either big or small (大路 or 小路), and in this case they were sorted into the ambiguous category, roads/ditches.

Finally, two contract characteristics were noted. First, sometimes only a share of the land described was being sold. Most land with more than one owner was owned jointly and sold as a unit, but some land was owned severally by a number of investors. Second, sometimes only the management rights of the land were sold. This usually occurred when the land was held through a conditional sale, which is a sale in which the original seller retained an option to buy back the land.

⁴ Regression analysis indicated no need to control for the variations in currency.

Conditional sales are not included in this paper's data, but sales of management rights of land held through conditional sales are.

Basic descriptive statistics are shown in table two. Land sales in the south tended to be of less value than those in Taipei and Hsinchu. Over two-thirds of the contracts did contain paddy and approximately half the land contracts contained land that had access to water from an irrigation project. 40% of the land contracts stated that the land sold contained at least one building, so a large portion of these sales involve whole farms rather than simply isolated fields. Most houses were left undescribed. The greatest difference between the Taipei area and the rest of Taiwan was the prominence of tea planting. 30% of land contracts in the Taipei area involved at least some land containing tea, while this was true of less than 5% of the contracts in other parts of the island. Orchards were also more commonly found on the Taipei lands.

Tables three, four and five show the results of regressions run on the real price of land using the price of refined rice as a deflator. Most of the value of the lands in these samples was tied up in rice-producing paddy fields, so this is a reasonable deflator to use. Three regressions are shown for each area. The first regression leaves out the village dummies and the second includes these dummies. Finally, to show that the change in land value is not simply due to the change in the value of tea gardens, the third regression is run on a subsample of land contracts, those that involve paddy land and contain no tea bushes.

The results for most land quality variables are significant with the expected sign. The effect of time is shown by a series of dummy variables for each five-year period, from 1820 to 1914. The period 1855-1859, immediately before Taiwan was officially opened, was used as the excluded period for comparison. In the Taipei area, real land prices rose, reached a peak in the 1880s and then declined somewhat. Somewhat further south, in the Hsinchu area, there was a similar rise in price, but prices continued to rise until at least 1905-1909. During the 1890s and 1900s, the center of the tea growing area was slowly moving south. South of Hsinchu, land prices rose much less, if at all. Land prices were low in the 1860s and 1870s. The 1880s shows an increase in paddy prices, but not other land prices. Southern paddy

land tended to be further north, close to the Hsinchu area. Using information from the second regressions run in each table, figure four shows the change in the geometric mean of real land prices in the three areas, holding characteristics constant. The geometric mean of the nominal land price in the Taipei area (regression not shown) is also presented. With the inflation beginning in the 1890s, nominal land prices did not fall.

Land sales contracts, thus, support the hypothesis that returns to investment fell generally in northern Taiwan along with the local decrease in interest rates. Much of the silver flowing into northern Taiwan was remaining there, creating a local glut of money, in some ways resembling a modern financial bubble. When a modern economy experiences low interest rates and rising housing prices, one often sees an increase in transaction volume in the real estate market as speculators, and others, borrow increasing amounts of money to invest. There is primarily an increase in demand for real estate in the market, rather than a decrease in supply. The next section runs a simple test to see if this is what was happening in nineteenth-century northern Taiwan.

V. Sales transactions in the Taiwan real estate market

Most of the land sales contracts in our sample were collected during the Japanese forest survey and land survey. The Japanese asked the supposed owners of the land to provide evidence that the land was indeed theirs. The evidence, usually a contract, was then copied and this copy is what we now possess. In most cases, the owner presented a contract showing how the land had come into his hands, or into the hands of one of his ancestors. By far the two most common contracts were land sales contracts and land division contracts. When a man died, his land passed to his son, or to his sons jointly and there was no written contract. But land passed to sons jointly was often divided among the sons and this involved a land division contract. Unless a contract had been lost, when the Japanese survey asked for a contract showing landownership, the landowner would naturally tend to

give them the most recent contract. No more than one contract was copied for each landholding.

Areas in Taiwan for which these contract records still exist show us a censored sample of contracts. If the contracts were collected at the end of 1911, then we should possess any land contract written in this year. But for 1910, we will not have any contracts for those landholdings for which we have a 1911 contract. And in 1909, we will not have contracts for any land for which we have a 1911 or 1910 contract, etc. To roughly estimate the chance that any given piece of land would be sold in any year, one can divide the number of land sales observed, by the landholdings still remaining in the sample. Moving backward in time, landholdings drop out of the sample when a contract or any other document associated with the land appears. We start out with a sample of 6470 documents in the Taipei area, 2774 documents in the Hsinchu area and 1840 contracts in the southern area. By 1890, 45% of the sample is still observable and by 1860, only 15% of the sample remains observable (1657 observations). Besides land-sale and land division contracts, one also sees conditional-sale contracts, partnership-contracts that generally are dividing land and documents obtained from either the Qing or Japanese government affirming land ownership. This sample unfortunately will be biased. If certain types of land tend to turn over quickly, this type of land will be most likely to disappear from the sample first, and in the earlier periods we will just observe those types of land that naturally turn over slower. Thus we may expect that the actual overall chance of a land sale will be increasingly underestimated as one looks further back in time. Nevertheless, if the increase in land prices in northern Taiwan were the result of a real estate boom similar to what we see today, we might expect to see some increase in land transactions in the 1870s and 1880s.

Figure five shows estimates of land turnover from sales in the Taipei, Hsinchu and southern areas. For comparison, estimates of the yearly chance of a land division are also shown. The 1905-1912 estimate should be an underestimate since some contracts were collected before 1912. According to this measure, the period when land turnover through sales appears to be highest in the Taipei and Hsinchu areas is the 1855-1864 decade, before land prices had risen much. Afterward, there

seems to be a gradual decrease in land sales. In the south, on the contrary, there is no sign of a decrease in land sales until after 1894. In Taipei the period of high land prices was the one period in which the estimate of the annual chance of land division is higher than the annual chance of a land sale.

The evidence suggests that any increase in demand for land in the land market was offset by an equal, or perhaps greater, decrease in the supply of land on the market. On the one hand, people had more money to buy land and could borrow money to buy land cheaper. On the other hand, and perhaps most importantly, farm families were making more money from growing tea and offering their labor to pick and clean tea. They were less likely to need to sell their land. Foreign observers did not notice any large increase in per-person consumption in the tea area, but farmers in this area did gain an increased degree of economic security.

Concluding discussion

During the Taiwan tea boom, silver flooded into the northern part of the island. Much of the silver circulated among the tea businesses but a good deal of silver was used to purchase tea from farmers and to pay wages to those who labored in either the tea gardens or the tea factories. The money paid to the common people increased their real money balances but did not drive up consumer prices, or noticeably increase per-person consumption. Many people seemed to consider the excess money a one-time increase and wished to smooth the increase in their family's consumption over a long period of time.

In a modern economy, with a well-developed financial system, farmers and laborers who earned income that they wished to save would put the money into the banking system to be lent out to those who wished to make investments. In the late-1800s, along the China coast, a banking system did exist; but it was set up to serve the needs of commercial businesses. It did not collect household deposits. It kept capital flowing to the sectors with the highest demand as long as the money remained in the commercial sector. However, once the money flowed into financial quagmire of the village economy, it often stagnated. It could be used locally to buy

land or perhaps to improve land, but it could only with great difficulty flow out of the area to be put to uses offering higher returns.

Many scholars have looked at trade between the developed and developing world and theorized as to why such trade seems to have a smaller positive impact on poorer economies than one might suppose it should. The suggestion here is that one of the major factors limiting the positive effects of such trade is domestic finance within the poorer economy. The Hongkong and Shanghai Bank, along with numerous domestic banks, lent money at reasonable rates to commercial enterprises; and this money reached Chinese businesses, so that these businesses were not financially constrained. Nevertheless, the lack of deposit banking for households could still hobble the economy

Bibliography

Alsford NJP (2010), *The Witnessed Account of British Resident John Dodd at Tamsui*. Taipei: SMC Publishing Inc.

Davidson JW (1903 [1992]), *The Island of Formosa Past and Present*. Taipei: SMC Publishing Inc.

Gardella R (1994) *Harvesting Mountains: Fujian and the China Tea Trade, 1757-1939*. Berkeley CA: University of California Press.

Gardella R (1999), "From Treaty Ports to Provincial Status, 1860-1894," in MA Rubinstein, ed., *Taiwan: A New History*. Armonk, NY: M.E. Sharpe.

Hao Y-P (1986) *The Commercial Revolution in Nineteenth-Century China: The Rise of Sino-Western Mercantile Capitalism*. Oakland: University of California Press.

Jarman RL (1997), *Taiwan Political and Economic Reports 1861-1960*. Slough, UK: Archive Editions Limited.

Maritime Customs Annual Returns and Reports of Taiwan, 1867-1895 (1997)
Academia Sinica, Institute of Taiwan History.

Ohkawa K, et.al. (1967), *Estimates of Long-Term Economic Statistics of Japan since 1868, Volume 8, Prices*. Tokyo: Toyo Keizai Shinpo Sha.

In Chinese

李文良 (2004) 〈土地行政與契約文書—臺灣總督府檔案抄存契約文書解題〉, 《臺灣史研究》, 11(2) : 223-242。

林滿紅 (1968) 《茶、糖、樟腦業與晚清台灣》, 台北: 台灣銀行。

謝美娥 〈十九世紀淡水廳、臺北府的糧食市場整合研究〉, 《淡江史學》 (臺北), 第 23 期, 2011 年 9 月, 頁 237-258。

In Japanese

Taiwan Government-General Statistical Yearbooks 《臺灣總督府統計書》 (1903-1913) 總督官房統計課。

Taiwan Association Bulletin 《臺灣協會會報》 (1902), "A Taiwan-Japan Rice Price Comparison" 〈臺灣內地米價比較〉, 51: 53-54

Databases

清代糧價資料庫 (Qing Dynasty's Price of Food Database)

<http://mhdb.mh.sinica.edu.tw/>

台灣歷史數位圖書館 Taiwan Digital History Library

<http://thdl.ntu.edu.tw/>

Table one. Interest Rates in the Taiwan Loan Sample

Ind. Variables	Money as Interest		Rice as Interest		Rice as Interest (adj.)	
	North	South	North	South	North	South
1805-1819	-4.68 (4.00)	7.48 (4.99)	-1.71 (2.12)	0.68 (2.27)	0.73 (2.07)	4.84** (2.06)
1820-1834	-2.66 (2.09)	3.11 (2.24)	-0.10 (1.88)	-1.93 (1.77)	1.64 (1.84)	0.76 (1.61)
1835-1849	Excluded Variable					
1850-1864	-9.35 (6.23)	-0.76 (2.41)	-1.68 (2.52)	3.02 (1.89)	-0.85 (2.46)	3.05* (1.71)
1865-1879	-10.87*** (2.67)	1.54 (2.32)	-3.78* (1.96)	-0.40 (1.66)	-3.52* (1.92)	-0.18 (1.51)
1880-1894	-9.86*** (1.78)	-3.39 (2.12)	-6.11*** (1.55)	-2.83* (1.64)	-5.57*** (1.51)	-1.76 (1.48)
1895-1914	-7.17*** (2.14)	-0.59 (2.30)	-10.26*** (1.88)	-8.75*** (2.38)	-4.93*** (1.84)	-0.45 (2.16)
Short term	1.93 (1.35)	2.57 (1.55)	7.52*** (2.50)	3.74 (2.32)	9.74*** (2.44)	3.60* (2.10)
Loan value	-3.12*** (0.54)	-1.54*** (0.43)	-1.71*** (0.33)	2.81*** (0.36)	1.62*** (0.32)	-2.47*** (0.32)
Place dummies	Not shown					
Mean of Dep. Variable	23.5	25.8	15.0	20.4	14.1	18.4
Adj. R2	0.50	0.20	0.47	0.31	0.44	0.27
Obs.	95	131	176	287	176	287

In the first two columns, the dependent variable is percent interest and in the last four columns it is *sheng* per *yuan*. The *sheng* is a unit of volume roughly equivalent to 850 grams of rice, but the size of the *sheng* varies, which is one reason place dummies are used. After 1895, some of the loans may have used the larger Japanese *sheng* (*shou*), exaggerating the fall in interest rates. Loan value is the natural log of the value of the loan. Short term is a dummy variable equal to one for loans of less than one year. Place dummies each indicate the modern county containing the place in which the loan was issued. They are not shown. There are five counties in the north, from Ilan to Miaoli, and nine counties in the south.

Table two. Descriptive land sales contract statistics.

Variable	Taipei Area	Hsinchu Area	Further South
Price (yuan or yen)	421	444	237
Real Price (1850 yuan)	382	401	239
Paddy	0.719	0.772	0.586
Irrigation Project	0.549	0.554	0.274
House	0.459	0.409	0.227
Thatch	0.170	0.112	0.066
Tile	0.030	0.035	0.033
Shop	0.028	0.014	0.018
Tea	0.302	0.066	0.005
Fruit	0.306	0.202	0.178
Roads	0.234	0.245	0.251
Ditches	0.188	0.103	0.063
Roads/Ditches Managed	0.448	0.293	0.313
Partial	0.042	0.043	0.100
Observations	0.054	0.018	0.002
	3360	1866	1138

From the Taiwan Digital History Library (TDHL)

Table three. Real land prices from Taipei area sales contracts

Independent Variables	All Land		All Land		Paddy, No Tea	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Constant	3.21***	0.10	-	-	-	-
1820-24	-0.01	0.16	-0.09	0.15	-0.01	0.21
1825-29	0.16	0.16	0.07	0.15	-0.00	0.21
1830-34	0.30**	0.15	0.18	0.14	0.29	0.19
1835-39	0.18	0.16	0.14	0.15	0.28	0.20
1840-44	0.40**	0.17	0.25	0.16	0.57***	0.21
1845-49	0.09	0.15	0.05	0.14	0.14	0.18
1850-54	0.13	0.15	0.14	0.14	0.52***	0.19
1855-59			Excluded Variable			
1860-64	0.09	0.13	0.12	0.12	0.21	0.16
1865-69	0.35***	0.14	0.40***	0.13	0.50***	0.17
1870-74	0.20	0.13	0.36***	0.12	0.67***	0.17
1875-79	0.65***	0.13	0.64***	0.12	0.62***	0.16
1880-84	0.78***	0.13	0.76***	0.12	0.72***	0.17
1885-89	0.68***	0.12	0.73***	0.11	0.91***	0.15
1890-94	0.45***	0.11	0.49***	0.10	0.59***	0.14
1895-99	0.33***	0.13	0.20	0.12	0.29	0.18
1900-04	0.24**	0.11	0.22**	0.10	0.40***	0.14
1905-09	0.32***	0.11	0.36***	0.10	0.53***	0.13
1910-14	0.04	0.12	0.13	0.11	0.31**	0.15
Managed	-0.11	0.10	-0.09	0.10	-0.17	0.14
Partial	-0.19**	0.09	-0.22***	0.08	-0.11	0.12
Building	0.07	0.05	0.17***	0.05	0.28***	0.07
Thatch	0.33***	0.06	0.20***	0.06	0.23***	0.09
Tile/Brick	1.25***	0.14	0.77***	0.15	0.97***	0.27
Shop	0.49***	0.15	0.16	0.15	0.06	0.30
Paddy	1.54***	0.05	1.32***	0.05	-	-
Irrig. Project	0.44***	0.05	0.39***	0.05	0.55***	0.07
Ditches	-0.08*	0.05	0.06	0.04	0.14**	0.07
Roads	0.13***	0.04	0.12***	0.04	0.06	0.06
Roads/Ditches	0.05**	0.02	0.06***	0.02	-0.00	0.04
Tea	-0.37***	0.05	0.03	0.05	-	-
Fruit Trees	0.26***	0.05	0.24***	0.05	0.12*	0.07
Place dummies		No		Yes		Yes
Obs.			3359		1658	
Adj. R2	0.39			0.53		0.53

All contracts are from the TDHL. Real prices are in 1850 yuan, derived using the South Fujian medium-grade rice price statistics. * indicates significance at the 10% level, ** indicates significance at the 5% level and *** indicates significance at the 1% level.

Table four. Real land prices from Hsinchu area sales contracts

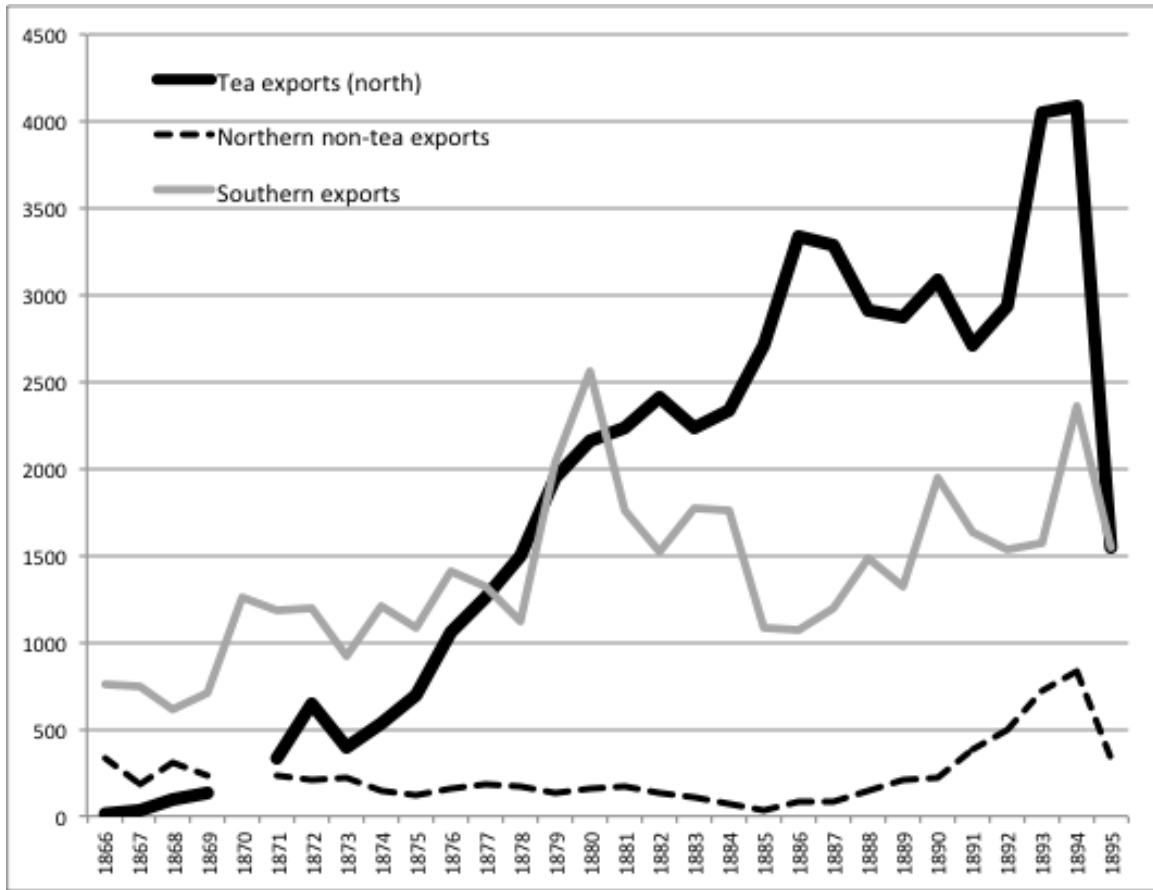
Independent Variables	All Land		All Land		Paddy, No Tea	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Constant	2.80***	0.14	-	-	-	-
1820-24	0.40	0.28	0.76***	0.29	0.64*	0.33
1825-29	0.61**	0.27	0.62**	0.27	0.16	0.32
1830-34	0.03	0.28	0.08	0.28	-0.05	0.32
1835-39	0.60**	0.24	0.81***	0.24	0.48*	0.29
1840-44	0.15	0.24	0.48**	0.23	0.28	0.31
1845-49	0.22	0.21	0.24	0.20	-0.02	0.24
1850-54	-0.30	0.24	-0.13	0.23	-0.06	0.27
1855-59			Excluded Variable			
1860-64	0.05	0.18	0.13	0.18	0.15	0.21
1865-69	0.17	0.18	0.26	0.18	0.20	0.20
1870-74	0.46***	0.18	0.58***	0.17	0.52***	0.19
1875-79	0.36**	0.16	0.69***	0.16	0.76***	0.18
1880-84	0.49***	0.17	0.75***	0.16	0.66***	0.18
1885-89	0.67***	0.16	0.82***	0.16	0.82***	0.18
1890-94	0.64***	0.15	0.92***	0.15	0.98***	0.17
1895-99	0.48***	0.17	0.74***	0.16	0.82***	0.19
1900-04	0.65***	0.16	0.76***	0.15	0.77***	0.18
1905-09	1.03***	0.16	1.18***	0.16	1.12***	0.19
1910-14	1.16***	0.23	0.81***	0.25	0.51	0.34
Managed	-0.24*	0.14	-0.31**	0.13	-0.20	0.15
Partial	-0.52**	0.21	-0.51**	0.22	-0.55*	0.30
Building	0.29***	0.07	0.20***	0.07	0.22***	0.08
Thatch	0.37***	0.10	0.30***	0.10	0.35***	0.11
Tile/Brick	0.66***	0.17	0.56***	0.16	0.58***	0.20
Shop	0.13	0.25	0.13	0.26	0.12	0.32
Paddy	1.46***	0.07	1.35***	0.07	-	-
Irrig. Project	0.54***	0.06	0.48***	0.06	0.41***	0.07
Ditches	0.18***	0.07	0.13*	0.06	0.18**	0.08
Roads	0.20***	0.04	0.12**	0.05	0.14**	0.06
Roads/Ditches	0.10***	0.04	0.09**	0.04	0.07	0.05
Tea	0.19	0.12	0.45***	0.12	-	-
Fruit Trees	0.14*	0.07	0.10	0.08	0.13	0.09
Place dummies		No		Yes		Yes
Obs.			1866		1352	
Adj. R2	0.38			0.50		0.38
See table three						

Table five. Real land prices from sales contracts further south

Independent Variables	All Land		All Land		Paddy, No Tea	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Constant	4.01***	0.17	-	-	-	-
1820-24	0.41	0.30	0.24	0.31	0.60	0.39
1825-29	0.58**	0.25	0.39	0.26	0.26	0.29
1830-34	0.36	0.24	-0.02	0.24	0.21	0.27
1835-39	0.65**	0.26	0.27	0.26	0.65**	0.32
1840-44	0.48*	0.26	0.38	0.26	0.61**	0.28
1845-49	0.21	0.27	0.01	0.26	0.53*	0.31
1850-54	0.12	0.29	0.01	0.29	-0.16	0.32
1855-59			Excluded Variable			
1860-64	-0.40	0.25	-0.20	0.25	-0.20	0.28
1865-69	-0.18	0.24	-0.30	0.25	-0.32	0.27
1870-74	-0.18	0.22	-0.14	0.23	-0.20	0.26
1875-79	-0.20	0.23	-0.24	0.24	-0.09	0.29
1880-84	-0.10	0.23	0.24	0.23	0.54**	0.28
1885-89	-0.25	0.22	0.19	0.22	0.40	0.26
1890-94	-0.35*	0.20	0.24	0.21	0.39	0.25
1895-99	0.01	0.22	0.12	0.23	0.36	0.27
1900-04	-0.33*	0.19	-0.13	0.20	0.11	0.23
1905-09	-0.73***	0.21	0.15	0.22	0.24	0.27
1910-14	-1.07***	0.37	-0.40	0.41	-0.45	0.56
Managed	0.51***	0.14	-0.08	0.22	-0.34	0.24
Partial	0.60	0.92	0.56	1.18	-	-
Building	0.05	0.12	0.36***	0.12	0.77***	0.16
Thatch	0.44**	0.18	0.10	0.18	-0.17	0.22
Tile/Brick	0.47*	0.24	0.37	0.25	-0.26	0.36
Shop	0.31	0.31	0.18	0.31	0.94	0.68
Paddy	0.66***	0.09	0.98***	0.11	-	-
Irrig. Project	0.33***	0.10	0.49***	0.10	0.40***	0.11
Ditches	-0.11	0.10	-0.06	0.10	-0.08	0.11
Roads	0.18***	0.05	0.14**	0.06	0.29***	0.08
Roads/Ditches	0.12**	0.05	0.11**	0.05	0.15**	0.06
Tea	0.14	0.54	0.74	0.68	-	-
Fruit Trees	0.29***	0.11	0.35***	0.13	0.43***	0.16
Place dummies	No		Yes		Yes	
Obs.		1139			662	
Adj. R2	0.23		0.49		0.51	

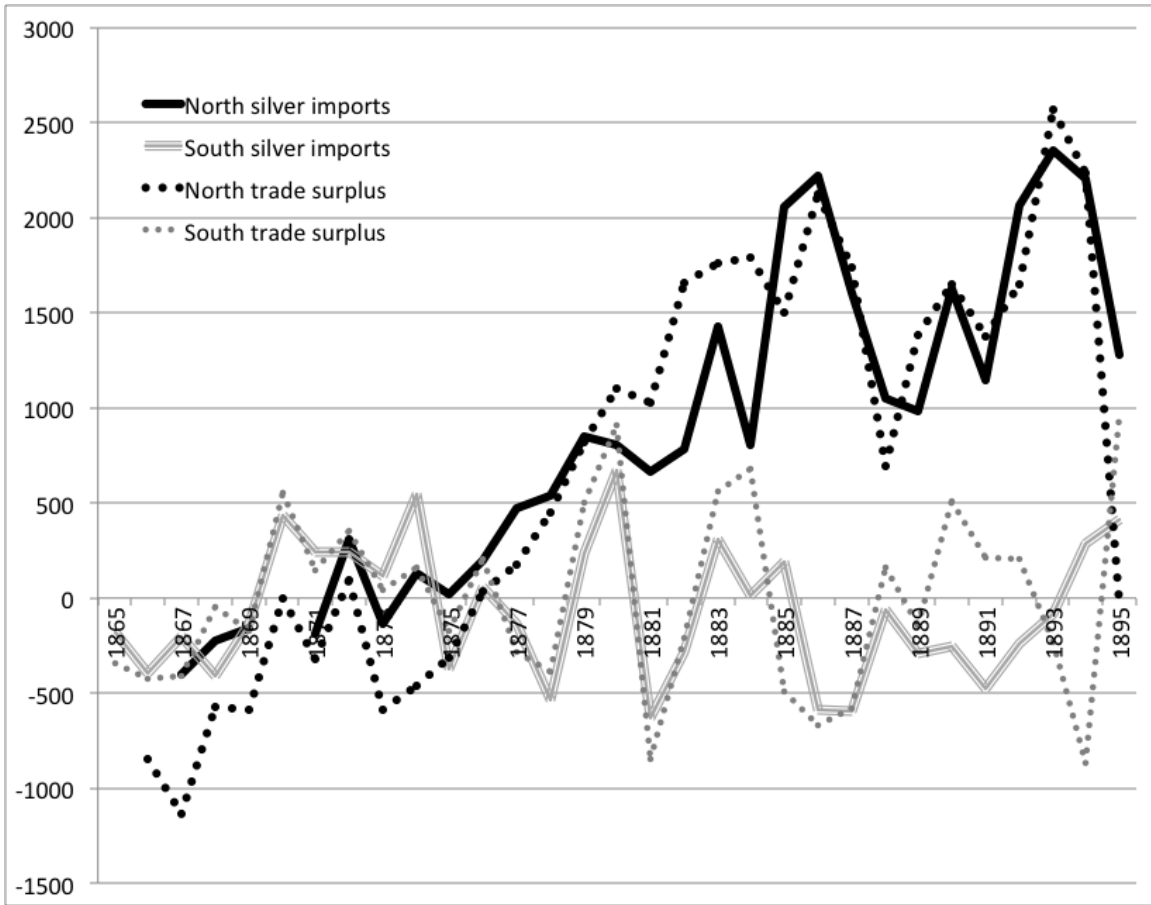
See table three

Figure one. Taiwan exports, in 100s of Haikuan Taels



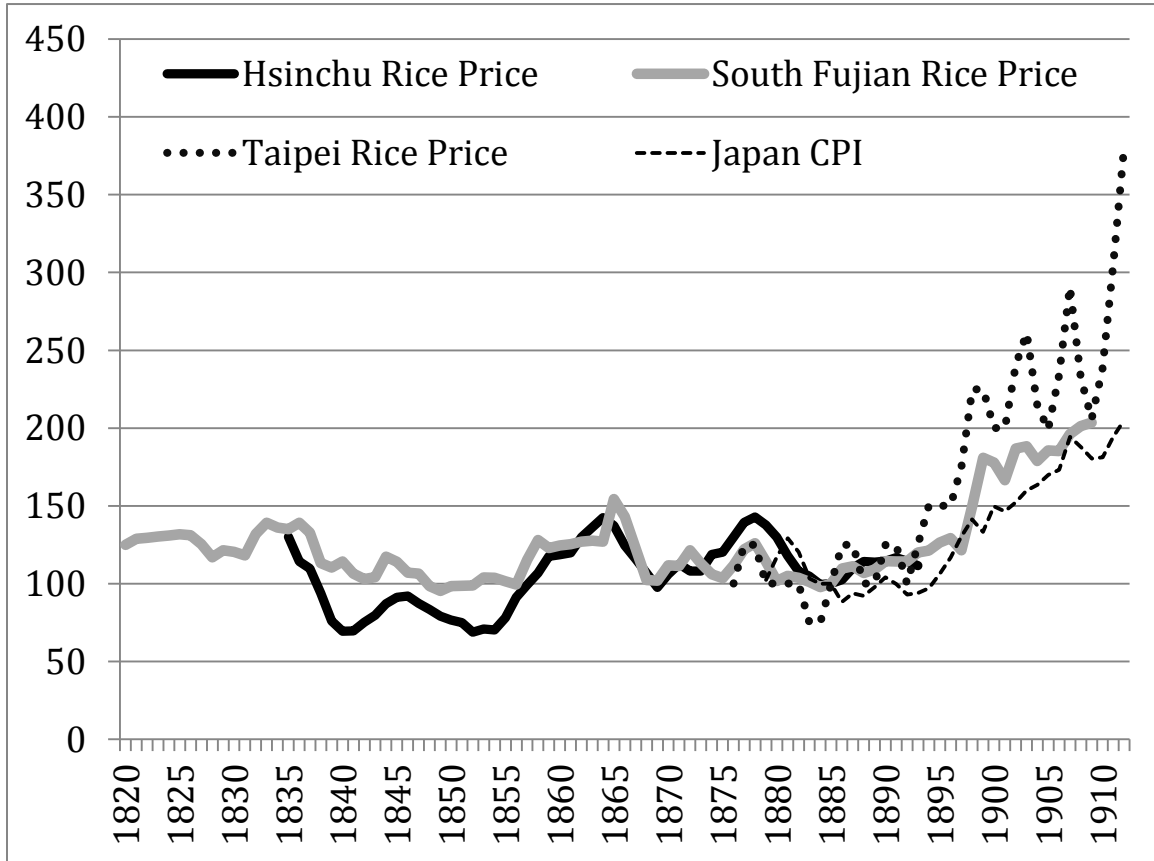
From *Maritime Customs Annual Returns and Reports of Taiwan, 1867-1895*, volumes I and II, (1997).

Figure two. Net silver imports and the trade surplus, north and south



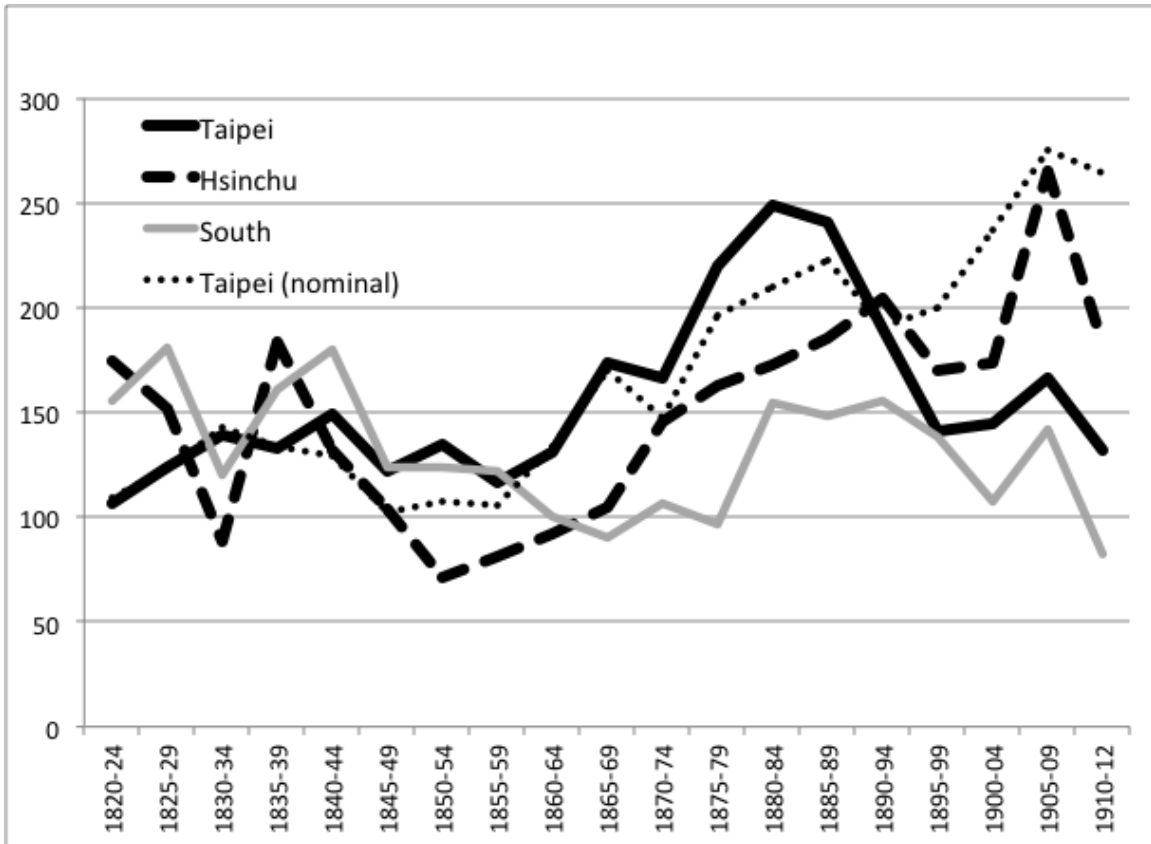
Units are in thousands of yuan (silver dollars) with the yuan evaluated at 0.6545 haikwan taels. From the *Maritime Customs Annual Returns and Reports of Taiwan, 1867-1895*, volumes I and II, (1997).

Figure three. Price indices, 1820-1912



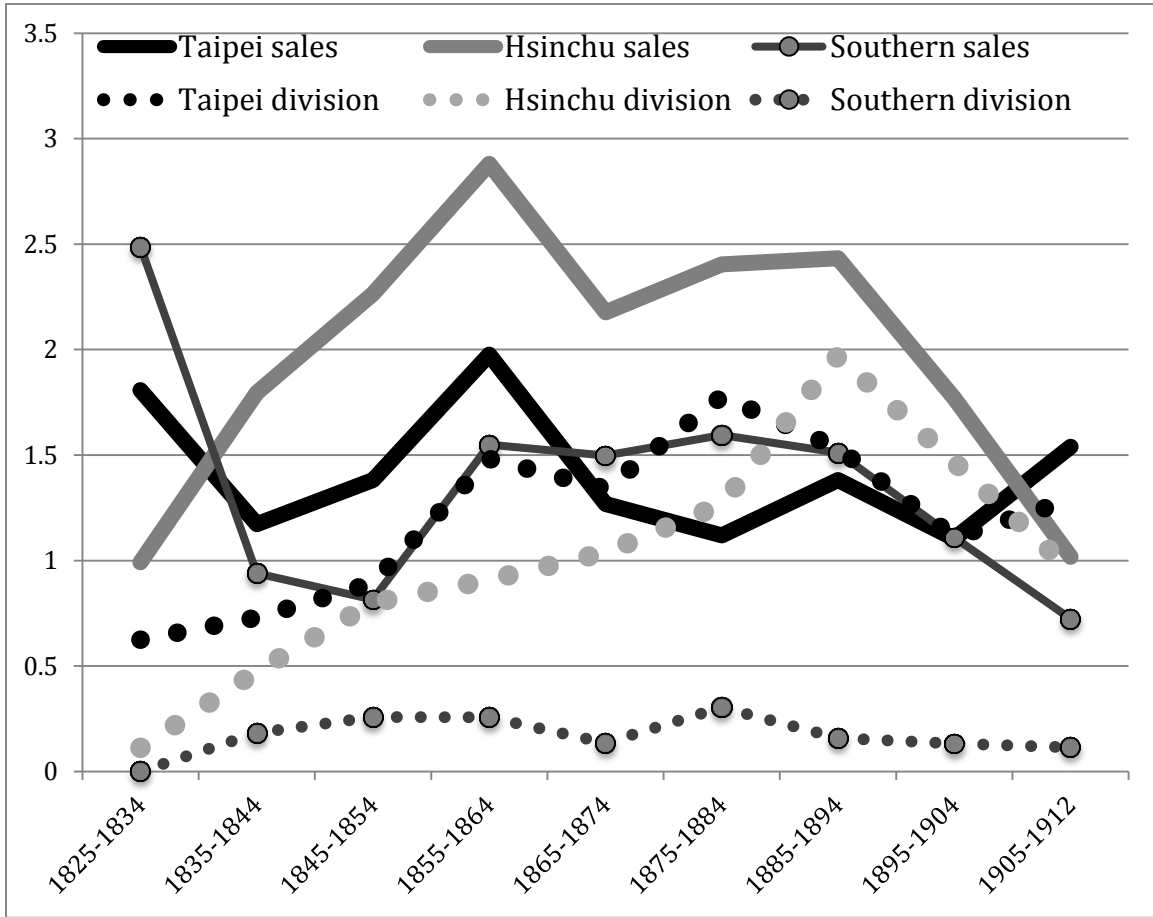
All indices are adjusted so that 1885 = 100. The Hsinchu Temple rice price statistics come from Hsieh (2011). The South Fujian statistics are the yearly average of the median price of the combined Zhangzhou and Quanzhou medium-grade rice prices from the *Qing Dynasty Price of Food Database* (in Chinese). The Taipei retail prices are from 臺灣內地米價比較 and the *Taiwan Government-General Statistical Yearbooks*. The Japanese CPI is from *Estimates of Long-Term Economic Statistics of Japan since 1868* (1967), VIII, 135.

Figure four. Change in the geometric mean of land prices, north and south



Real land prices were calculated using the logarithmic mean of 1860-64 real land prices and the data in table two. Nominal land prices were calculated using an identical regression on nominal land prices (not shown).

Figure five. Chance of land being bought or inherited each year (%)



From the TDHL.

Appendix. Sources of land contracts

Source	Total Sales Contracts	Useable Sales Contracts
臺灣總督府檔案抄錄契約文書·15年保存公文類纂(國中圖 92)	2905	2570
臺灣總督府檔案抄錄契約文書·永久保存公文類纂(國中圖 93)	2191	1943
臺灣總督府檔案抄錄契約文書·高等林野公文類纂(國中圖 93)	176	81
臺灣總督府檔案抄錄契約文書·土地調查公文類纂(國中圖 93)	518	260
臺灣總督府檔案抄錄契約文書·15年保存公文類纂(國中圖 93)	32	6
臺灣總督府檔案平埔族關係文獻選輯續編【上冊】【下冊】	85	60
屏東縣高樹鄉劉錦鴻家藏清朝古文書研究	70	53
高雄縣土地開墾史	48	15
苑裡地區古文書集【上冊】【下冊】	274	194
草屯地區古文書專輯(國中圖 92)	156	114
大甲東西社古文書下	131	98
水沙連眉社古文書研究專輯	85	41
國立交通大學四溪計畫資料庫	78	63
五股志	76	51
神岡：筱雲呂玉慶堂典藏古文書集	156	134
台大人類學系古文書	81	43
宜蘭縣古文書數位典藏計畫	156	112
彰化縣縣史館藏古文書數位化	65	23
宜蘭古文書【第壹輯】-【第陸輯】	126	97
大臺北古契字集·二集·三集	736	406
Total	8145	6364

Sales contracts are useable if they have complete information, involve the sale of land and are dated 1820-1914. Duplicate contracts were removed.