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Chinese Agriculture and the International Economy, 1870–1930s: A Reassessment*

LOREN BRANDT

Department of Economics, St. Olaf College

Introduction

In the literature on the pre-1949 Chinese economy, the influence of the international economy on Chinese agriculture has been a source of disagreement between scholars. While many in the West are generally sympathetic with the interpretation of Chinese Marxists that foreign trade was seriously detrimental to Chinese agriculture and its rural sector,[1] an equal number of specialists have discounted any influence that the international economy may have had on late 19th, early 20th century Chinese agriculture. This skepticism is based on the fact that China's foreign trade in agricultural products was so small. According to estimates made by Dwight Perkins for the early 20th century, agricultural imports and exports combined represented less than 10% of the gross value of agricultural output.[2] High transportation costs within China are frequently cited as the principal limitation on trade. Drawing on Perkins' estimates, Thomas Rawski expressed a widely held view: "(T)he fundamental point

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[1] Chinese Marxists have argued that China's incorporation into the international economy, pinpointed to have occurred in the early to mid 19th century, was not only ruinous for rural handicrafts, but also encouraged peasant households to shift into the production of cash crops for export. This fostered a new dependency on foreign markets that made the incomes of Chinese peasants subject to the sharp and sudden shifts that frequently occurred in international demand. See, for e.g., Hu-pei ta-hsueh cheng-chih ching-chi hsueh-chiao yen-shih-pien (1958). It is now generally acknowledged by a majority of scholars, Marxist and non-Marxist alike, Moulder (1977), Feuerwerker (1982), that handicraft output held its own or perhaps even increased over the late 19th and early 20th century.

[2] Perkins (1968, p. 119).

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. . . is that the specific influence of foreign activity on the size and composition of farm output, on prices . . . and on other important economic magnitudes was generally small."[3] In other words, the Chinese agricultural sector was basically closed and insulated from the developments in the international economy.[4]

This paper offers the beginning of a critical reassessment of existing interpretations of the role of the international economy in Chinese agriculture. Our major thesis is that by the 1890s, Chinese agriculture and millions of farm households had become integrated with the international economy and markets. This is substantially later than Moulder (1977) and others have dated China's "incorporation" into the international economy. Integration with the international economy has implications for price formation and, in turn, resource allocation, productivity and incomes in the domestic economy. For China this would imply that although the volume of agricultural imports and exports was small, there were potentially other influences that were exerted by the international economy on Chinese agriculture through the price mechanism.

The focus of our attention will be the link between the international rice market and China's rice-growing areas. Rice was the major crop in an area that included all of southern China, extended north of the Yangtse River 150 miles or so, and as far west as Szechwan.[5] Through an analysis of domestic rice markets and their international counterparts over the period from the 1870s to the 1930s, questions relating to both the timing of and the extent of this integration will first be addressed. Were major rice markets in China such as those in Canton and Shanghai integrated with the international market? If so, was integration a phenomenon unique to these few treaty ports, or are there reasons for us to believe that it extended to interior markets as well?[6] Moreover, what can be said about the local markets in the rural hinterland where peasant households sold

[3] Rawski (1978, p. 3).

[4] It should be noted that Ramon Myers (1970) has summarily argued that transport development in North China in the early 20th century helped to link peasant households to the international economy and encouraged production for export. Cotton, for example, became a major item of export in both Hopei and Shangtung in the 1920s and 1930s. The details of this relationship are never spelled out, however, and the effect of export demand and the international economy on cotton production, marketing or prices never systematically examined. In fact, at one point he states that 20% of Shantung's cotton output was exported, but prices in the province were determined solely by domestic demand.

[5] Buck (1937) estimated that 49.6% of crop area in the Rice Region was cultivated in rice.

[6] Rhoads Murphey (1977, p. 220) argued that "It is hard to avoid the conclusion that most of the market which the treaty ports served was encompassed in themselves and their local satellites. Their sharp political and cultural isolation from the rest of China was mirrored economically." This would seem to suggest, in turn, that any effect that the international economy may have had on China was confined to the coastal treaty ports and did not extend inland.

their rice? Once the case for integration has been made, we will examine the effect that external factors had on domestic agricultural prices. The other influences that may have been transmitted through the price mechanism await additional research.

South China and the International Market in Rice

Recently, Latham and Neal (1983) examined the formation of an international market in rice and wheat over the period 1868–1914. This market had as its nexus India, where the wheat world and rice world met to form a single integrated international market. Over this period, China appears to have been only a minor participant in the international rice market, usually importing between 5 and 10% of the total exports of Siam, Cochin-China, Indo-China, and India. In the table below, Chinese imports and total exports for the four major rice exporters are provided for the 10 years between 1901–1910.[7] Over this period, Chinese rice imports averaged approximately 6 million cwts., and were less than 7% of the total exports of the aforementioned rice exporters.

According to the data compiled by China's Imperial Maritime Customs, most of this rice was destined for southern China and the markets of Amoy, Canton, Kowloon, Lappa, and Swatow. All but Amoy were located in Kwangtung province. Amoy is situated on the southeastern coast of Fukien. Rice imports helped to supplement the domestic sources of supply that these markets had access to. For the latter four markets this would not only include rice from Kwangtung province, but rice from the neighboring province of Kwangsi and from the distant upper and middle Yangtse provinces. It should be noted, nonetheless, that total imports into Kwangtung probably represented no more than 3% of provincial rice production.[8] Kowloon was the major port of entry for this rice with more than 80% of the rice imported into China during the 1890s entering through this port.[9] A high percentage of this rice was, in turn, transshipped

[7] Estimates cannot be made for the years prior to 1900 because of the unavailability of data on Indo-China's exports. In addition, Chinese Maritime Customs data do not include rice imports into Kowloon, a major port of entry for rice from Hong Kong, until 1889. Even after 1900 the data has its shortcomings in that there likely continued an unrecorded rice trade in and out of South China by small native craft outside the purview of Maritime Customs.

[8] Perkins (1968) has estimated Kwangtung average rice production at 186.5 million picul for the periods between 1914 and 1918 and 1931 and 1937. A picul weighs 110 lbs. Imports into Kwangtung, on the other hand, averaged slightly less than 6 million picul between 1900 and 1910.

[9] Between 1890 and 1899, 53 million out of total rice imports of 66 million entered through Kowloon. Rice import figures were taken from Hsiao (1974, pp. 32–33). Data on imports into Kowloon were obtained from Imperial Maritime Customs, *Trade Reports and Returns* for Kowloon for those years.

TABLE 1
Chinese Rice Imports, 1901–1910

	Exports of Indo-China Cochin-China, India, and Siam (in million cwts.)	Chinese imports (in million cwts.)	Chinese imports as a percentage of exports
1901	75.77	5.25	6.93
1902	98.07	1.15	1.17
1903	77.25	3.33	4.31
1904	96.25	3.99	4.15
1905	78.45	2.65	3.38
1906	79.05	5.37	7.05
1907	99.49	15.19	15.27
1908	85.19	8.02	9.41
1909	90.60	4.52	4.99
1910	107.53	10.97	10.20

Note. Chinese rice imports were obtained from Hsiao (1974, pp. 32, 33). Data on the exports of Siam, Cochin-China, Indo-China, and India were compiled by Latham and Neal (1983, p. 278).

for Canton.[10] By the first decade of the 20th century, the percentage of rice that entered through Kowloon had dropped off, but a high percentage of imports continued to be shipped into these five markets. This is clearly reflected in Table 2.

The question remains, however: How integrated were these markets with their international counterparts? In Table 3, simple correlation coefficients between the unit values of Chinese rice imports and the price of rice exports of four of the leading rice-exporting economies of Monsoon Asia are provided for the period between 1870 and 1930 and four subperiods. Correlation coefficients are one of several measures of market integration that are frequently used.[11] The better integrated two markets happen to be, the higher the correlation coefficient between their price series. Because up until the 1920s almost all of China's rice imports were destined for these markets in southern China, the import price of rice can be used as a proxy for the price of rice prevailing in these markets and the correlation coefficients for earlier periods can be taken as a measure of

[10] The Kowloon *Trade Report and Return* for 1893 shows that 5,081,396 out of 7,377,140 picul of rice and paddy imported into Kowloon was shipped on to Canton. The following year, close to two-thirds was again transshipped to Canton.

[11] Correlation coefficients were used elsewhere by Latham and Neal (1983) to test for the degree of integration in and between the international markets in rice and wheat. As a standard of comparison, they selected the international market in wheat, a frequently cited example of an efficient commodity market in the late 19th century. The average correlation coefficient between prices in the United States, United Kingdom, France, and Germany, the four major participants in the North Atlantic wheat market, was 0.83.

TABLE 2
Destination of Chinese Rice Imports, 1901–1910

Port of entry	Percentage of total imports
Amoy	7
Canton	6
Kowloon	57
Lappa	10
Swatow	7
Total	87

Note. The data were obtained from Chinese Maritime Customs, *Returns of Trade and Trade Reports,* for these years.

the degree of integration between the markets in the Monsoon Asia rice-exporting economies and the major grain markets in southern China.

The results presented in Table 3 are informative in a number of respects. Between 1870 and 1892, the rice markets in southern China were most closely tied to the sources of their imports, Siam and French-Indochina. Probably 80% or more of the rice imports into southern China were from these two.[12] Over the period between 1893 and 1914, although most of the imports continued to originate in Siam and French-Indochina, the markets in southern China were as integrated with Burma and India as they were with either Siam or French-Indochina. Indeed, this attests to not only China's increasing integration with Monsoon Asia, but the growing integration throughout Monsoon Asia and in the international economy that Latham and Neal documented. But, in addition, the correlation coefficients for 1893–1930 are not substantially higher than they were for 1893–1914, leading us to believe that South China's integration with Monsoon Asia was fairly complete by the turn of the 20th century.

Shanghai's Early Link to Monsoon Asia and the International Rice Market: South China as an Intermediary

It was not only the markets in southern China that were integrated with Monsoon Asia by the 20th century. In Table 4, simple correlation coefficients between rice prices in Shanghai and the price of rice exports of Siam, Saigon, India, and Burma are provided. The price for Shanghai

[12] Most of the rice that was imported into China passed through Hong Kong. Hong Kong acted as an entrepot for the trade with southern China. Unfortunately, no trade statistics exist for Hong Kong so that the country of origin is unknown. Maritime Customs reports for these years, however, typically reveal the rice imported into southern China to be Siamese or French-IndoChinese in origin.

TABLE 3
Price Correlation Coefficients

	1870–1930	1870–1914	1870–1892	1893–1914	1893–1930
China and Siam	0.87	0.79	0.69	0.84	0.86
China and Burma		0.49	−0.07	0.82	
China and India	0.87	0.56	0.23	0.81	0.89
China and Saigon[a]	0.83	0.80	0.90	0.74	0.95

Note. Price data for years prior to 1914 are taken from Latham and Neal (1983, Appendix I, pp. 276–277). For later years, price data for Siam are taken from Ingram (1964, pp. 120, 121), and Ingram (1970, p. 337); for China from Hsiao (1974, pp. 32, 33 and 190, 191); for India from Statistical Abstracts for British India; and for Saigon from Annuaire Statistique de L'Indochine.

[a] The series for Saigon does not begin until 1876.

is an internal price.[13] The correlation coefficient between the price in Shanghai and the unit value of Chinese imports is also given.

A comparison of Tables 3 and 4 shows a great deal of similarity. With the exception of Saigon, Shanghai was only loosely tied to the Monsoon Asia rice markets during the years between 1870 and 1892. At the same time, it should be noted that Shanghai and the markets in southern China were themselves closely linked, although the statistical relationship is weaker for the last half of the period between 1870 and 1914 than it is for the first half. By the beginning of World War I, however, Shanghai appears to have been just as integrated with Monsoon Asia as were the markets in southern China. This result is all the more interesting because (1) Shanghai was 1000 miles farther from these markets than Canton; (2) it did not begin to import rice from Monsoon Asia until the 1920s, and then only occasionally; and (3) it never exported rice overseas over this period. Historically, the overseas export of rice had been prohibited.

Market integration between Shanghai and Monsoon Asia can also be tested for by regressing the price of rice in Shanghai on the price in each of the other four markets. The regression coefficient can be taken as a measure of the degree of market integration and the constant an estimate of transaction costs. A value of one for the slope signifies that the two

[13] The price of rice in Shanghai is the annual average price of nonglutinous rice. The original source for this time series is the price reports that appeared several times each month in *Shen-pao,* a Shanghai newspaper. Annual rice prices for the years 1896–1927 that were based on these reports were first published in *She-hui yueh-kan,* Vol. 1, No. 2, February 1929. Annual rice prices for the years between 1870 and 1895 were later computed by Tsou Ta-fan *et al.* (1965). In both cases, the authors converted the original prices into Chinese silver dollars per shih. We have subsequently converted the prices into Hai-kwan Tael (HKT, hereafter) per cwt. and for the purposes of calculating correlation coefficients, £/cwt. The Chinese silver dollar or yuan was equal to 0.6218 HKT. Data on the exchange rate between the HKT and British £ were obtained from Hsiao (1974, pp. 190–192).

TABLE 4
Correlation Coefficients

	1870–1930	1870–1914	1870–1892	1893–1914	1893–1930
Shanghai and Siam	0.80	0.67	0.53	0.80	0.79
Shanghai and Burma		0.42	0.29	0.85	
Shanghai and India	0.91	0.46	0.06	0.79	0.93
Shanghai and Saigon[a]	0.79	0.80	0.89	0.85	0.89
Shanghai and Chinese imports	0.90	0.68	0.84	0.61	0.89

[a] Saigon prices do not begin until 1876.

markets are highly integrated and that monopoly elements did not interfere with arbitrage. In Table 5, the results of regressing the price of rice in Shanghai on the prices prevailing in Monsoon Asia are provided.

In general, these results are consistent with our earlier findings. Prior to World War I, Shanghai was most highly integrated with the major sources of China's imports, Siam and Saigon, as revealed by both a higher slope coefficient and R^2. In only 5 out of 14 cases, however, was the slope coefficient greater than or equal to one, and in a few cases the

TABLE 5
Regression Results of Tests of Integration between Shanghai and Monsoon Asia Rice Exporters

	Constant	Slope	R^2
Siam			
1870–1930	0.07	0.96(0.09)	0.64
1893–1930	0.08	0.94(0.13)	0.61
1870–1914	0.10	0.73(0.12)	0.44
1893–1914	0.08	0.77(0.13)	0.63
Burma			
1870–1914	0.15	0.63(0.21)	0.17
1893–1914	−0.03	1.22(0.17)	0.72
Saigon			
1876–1930	0.07	0.89(0.06)	0.79
1893–1930	0.10	0.86(0.07)	0.79
1876–1914	0.03	0.91(0.11)	0.63
1893–1914	−0.09	1.39(0.19)	0.73
India			
1870–1930	−0.04	1.24(0.07)	0.83
1893–1930	−0.12	1.38(0.07)	0.87
1870–1914	0.12	0.64(0.19)	0.21
1893–1914	−0.03	1.07(0.18)	0.63

Note. Standard errors are in parenthesis.

constant term was actually negative. In evaluating these results, it must be remembered that not only are measurement errors present in our price variables, but we are estimating a relationship that was changing over time because of reductions in transport costs, developments in communications, etc. In such cases, confidence intervals rather than point estimates may be more meaningful. Calculating 95% confidence intervals, we find that in all but a few cases the intervals for the slope coefficient bound the critical value of one.

The question remains: How did Shanghai become so integrated with Monsoon Asia? Historically, Shanghai and the Lower Yangtse area were grain deficit. Rice from middle and upper Yangtse provinces passed through an elaborate network of waterways and canals into Changsha, Hankow, Kiukiang, and Wuhu and then down the Yangtse River to the lower delta. These four markets were 850, 700, 575, and 225 miles from Shanghai, respectively. During the late 19th and early 20th century, Shanghai was one of the most rapidly growing urban areas in the region and China in general. According to estimates compiled by Dwight Perkins, Shanghai's population was growing at an annual rate of 6% in the early 20th century and was in excess of 3 million by the 1930s.[14] As a major consumer of grain in the region and by fact of its location at the mouth of the Yangtse, Shanghai soon became the major grain market in the region.

Shanghai and the lower Yangtse were not the only outlets for the grain surplus of the provinces of the middle and upper Yangtse, however. A detailed examination of the annual trade reports of the treaty ports on the Yangtse and in southern China reveals that substantial amounts of rice were shipped from Changsha (Hunan), Kiukiang (Kiangsi), and Wuhu (Anhwei) to Canton and the other markets in southern China. This rice was either shipped directly by steamer from these treaty ports or was transported to Shanghai by small-native craft outside the authority of Maritime Customs, and then conveyed by steamer to southern China through Maritime Customs. In the 1890s and the 1900s, between 6 and 9 million cwts. of rice were shipped annually through Maritime Customs from the Yangtse provinces to southern China.[15] Total shipments may have been even higher given that a major portion of the Yangtse rice trade went unenumerated.[16]

Throughout the late 19th century, there was both an increase in rice production and major export expansion in the four rice-exporting economies

[14] Perkins (1968, p. 293).

[15] This estimate is based on an examination of the trade reports of these treaty ports. See Imperial Maritime Customs, *Returns of Trade and Trade Reports,* for these years.

[16] The problem of the coverage of Maritime Customs trade statistics is discussed in some detail in Brandt (1983, Chap. II).

of Monsoon Asia that we have been discussing. This behavior was encouraged by the introduction of the steamship and the concomitant drop in long-distance transport costs and by government policies that encouraged trade. Between 1870 and 1874 and 1901 and 1905, for example, average annual rice exports of Siam, Cochin-China, and India increased from 27 million cwts. to 71 million cwts.[17] It was through the increasing competition that this fostered in the grain markets in southern China that Shanghai and the other grain markets in central and eastern China became so closely tied to the developments in Monsoon Asia. This sensitivity of the Yangtse markets to developments in Monsoon Asia is captured in three separate reports by the Commissioner of the treaty port of Wuhu, the first reviewing the rice trade in 1893.

> In my report for 1892 I observed that the price of rice in the southern markets declined towards the close of the year, and thus caused a check to the export of this article from Wuhu; consequently, a considerable quantity of grain remained on the market at the end of December, waiting for a rise of price during 1893. The first six months of the year, however, passed by without bringing about any great briskness of trade. Although the first quarter showed an increase in the export, the second and the third quarters' Returns exhibited a falling off in comparison with the corresponding periods of the previous year, and large quantities remained stored, waiting for better times. This long lull in the Rice trade was doubtless cause by exceptionally good harvests of Rice in Siam and Annam, coupled with the fact of these countries having suspended laws interdicting the export of Rice, which enabled Canton to draw largely from abroad at cheap rates, thereby causing such a fall in the market prices that the Wuhu merchant was unable to ship his grain at a remunerative figure.[18]

In 1897, the Commissioner of Wuhu similarly noted in his annual review:

> The Rice trade during the year under review was subjected to a great deal of fluctuation and uncertainties, which proved rather baffling to our merchants and acted adversely to our export trade. . . . Large quantities of Rice from Saigon and further supplies from Kwangsi, where the opening of Wuchow and Samshui is said to have facilitated the down-river traffic in Rice, flooded the Canton market to such an extent that the prevailing rates there fell at times to a point actually lower than the prices ruling here. The uncertainties of the Canton market and the narrow margin of profit left on the exported article after the payment of all charges induced traders in the interior to seek for other outlets.[19]

And finally, in 1909, the Commissioner of Wuhu rather "matter-of-factly" remarked: "Exporters again complain of unprofitable business,

[17] Latham and Neal (1983, p. 278).

[18] Imperial Maritime Customs, *Wuhu Trade Report for 1893,* p. 169.

[19] Imperial Maritime Customs, *Wuhu Trade Report for 1897,* pp. 184, 185. In this passage the term export does not refer to the overseas export of rice, but to either the intertreaty port rice shipments or to the shipment of rice elsewhere in China.

local prices being too high for successful competition with Indo-China rice in the southern markets".[20]

These remarks and the statistical results obtained earlier lead us to believe that although Shanghai and the lower Yangtse was grain deficit, the prices prevailing in that market depended heavily on the price at which the surplus of the middle and upper Yangtse markets could be disposed of in southern China and, therefore, the price prevailing in Monsoon Asia and the international rice market. Shanghai's early link to Monsoon Asia and the international market in rice was the competition that the surplus of central and eastern China faced in South China.

Interior Markets and the International Market in Rice

So far we have been able to show that Shanghai and the major markets in southern China were highly integrated with the international market. But was integration limited to these few treaty ports or did it extend into the major markets in the interior? Moreover, what was the relationship between the prices that prevailed in these markets and farmgate prices, i.e., the prices received by peasant farm households? The answers to these questions have a critical bearing on our overall assessment of the effect of the international economy on Chinese agriculture. The *Trade Report and Returns* for Wuhu that were quoted from earlier clearly suggest that at least one interior market was very sensitive to developments in the international market. Wuhu was approximately 225 miles inland from Shanghai on the Yangtse River. Unfortunately, we have not yet uncovered the data necessary to carry out tests for market integration similar to those for Shanghai. Nonetheless, there are other reasons for us to believe that there were interior markets that were closely linked to the international market.

Chuan and Kraus have argued on the basis of selective price and grain trade data that as early as the 18th century there was a highly integrated market operating in rice in central and eastern China. According to their estimates, shipments of rice from middle and upper Yangtse provinces destined for the lower Yangtse market averaged between 10 and 15 million shih, or 16 and 24 million cwt.[21] Most of this rice was from Hunan, Hupei, Kiangsi, and Anhwei, with the remainder from distant Szechwan. Critical to this market was the well-developed water transport system that facilitated the distribution of the surplus of these middle and upper Yangtse provinces.

By the turn of the 20th century, Shanghai had become the major grain market in all of central and eastern China. Rice ceased to be shipped

[20] Imperial Maritime Customs, *Wuhu Trade Report for 1909*, p. 320.

[21] The shih was a capacity measure used in Ch'ing China. Chuan and Kraus (1975) have estimated that the weight of an imperial shih of milled rice was between 175 and 195 lbs.

from Szechwan, but substantial amounts of rice continued to be shipped from Hunan, Kiangsi, and Anhwei.[22] The six provinces that made up central and eastern China were among the most densely populated provinces in all of China and by the 1930s had a population of at least 165 million, or roughly one-third of the population of the Chinese mainland.[23] Rice was the major crop in the area, with output of the six provinces approximately 50% of total national output between 1931 and 1937, and slightly higher between 1914 and 1918.[24]

Monthly price data that we have been able to compile for the relatively short period between 1928 and 1932 similarly reveal a high degree of integration in the middle and lower Yangtse. In Table 6, simple correlation coefficients between prices in Shanghai and four other secondary markets in the region, Hangchow, Wuhu, Nanchang, and Changsha are provided.[25] The price data they are based on are shown in Fig. 1.

As can be seen from the correlation matrix, all the price series show a relatively high degree of integration. If we had prices for a standardized variety of rice for all five markets, the degree of correlation may have been even higher. In addition, there was occasional market disruption over this period that affected price relationships as well.[26] Aside from showing a high degree of integration, the results in Table 6 corroborate the view that Shanghai was indeed the major market in the region. In fact, the price series for Hangchow, Wuhu, Nanchang, and Changsha are each most highly correlated with the Shanghai series. For example, the correlation coefficient between prices in Changsha and Nanchang is 0.60, between Changsha and Wuhu 0.62, Changsha and Hangchow 0.76, but that between Changsha and Shanghai 0.80. So, although both Wuhu and Nanchang were closer to Changsha, prices in the latter were more

[22] See Brandt (1983, Chapt. II, Appendix A).

[23] Perkins (1968, p. 212).

[24] Perkins (1968, p. 276).

[25] In addition to the correlations below, we also calculated the correlation coefficient between the monthly prices in Shanghai and an index of monthly wholesale rice prices for Canton. The correlation coefficient was a very high 0.87. The correlation between annual rice prices for the two markets between 1926 and 1934 was 0.83. Similarly, a high degree of correlation was found between prices in Shanghai and Tientsin. For the years between 1913 and 1933 the correlation coefficient between the retail price of rice in Shanghai and the wholesale price in Tientsin was 0.90. For monthly price data between 1928 and 1932, the correlation coefficient was between 0.81 and 0.96, depending on the variety of rice. These results help confirm the view that there was a high degree of integration between Shanghai and the markets in southern China and suggests a high degree of integration with northern markets as well. The prices for Canton were obtained from Ching (1938, p. 69); for Tientsin from Nankai Institute of Economics (1935, pp. 9–11).

[26] Rice shipments out of Changsha's Maritime Customs, for example, were prohibited for major parts of every year between 1928 and 1932. The fact that the correlation coefficient between Changsha and Shanghai is still relatively high, on the other hand, may just signify how easily restrictions could be circumvented.

TABLE 6
Price Correlation Matrix, 1928–1932

	Wuhu	Changsha	Shanghai	Nanchang	Hangchow
Wuhu	1.00				
Changsha	0.62	1.00			
Shanghai	0.92	0.80	1.00		
Nanchang	0.84	0.60	0.89	1.00	
Hangchow	0.89	0.76	0.94	0.87	1.00

Note. Based on rice price data contained in Appendix I.

highly correlated with Shanghai, several hundred miles down river from Wuhu. This same relationship holds true for the other three markets as well. This kind of behavior is indicative of Shanghai's role in the regional market and is also reflective of the nature of the informational flows in the region. At the same time it can be noted that the correlation with Shanghai is a decreasing function of distance as Table 7 reveals.

Given that there existed an integrated market in the Yangtse as early as the 18th century and that by all indications it was operating rather effectively in the late 1920s and early 1930s, there is no reason for us not to believe that during the late 19th and early 20th century that these markets were also closely tied. In fact, the degree of integration may have increased over the late 19th and early 20th century because of developments in transportation, communications, and marketing.[27] The introduction of the steamship reduced the time that it took to ship grain to Shanghai; the introduction of the telegraph in the 1880s better linked buyer and seller; and the expansion in warehousing facilities in these markets may have helped to eliminate some seasonal variability.

If we are correct in assuming that (1) in the late 19th and early 20th century there was a highly integrated regional market in rice and (2) these interior markets were closely linked to Shanghai, it logically follows that these markets would have also been tied to the international market either directly or indirectly. Heuristically, price formation in the region

[27] Chuan and Kraus (1975), have actually argued that the Yangtse rice market was no more integrated in the early 20th century than it was 200 years earlier. They have based this claim on a comparison of the coefficient of variation of monthly rice prices for the two periods, 1713–1719 and 1913–1919. The more integrated the market, the smaller the price fluctuations and, therefore, the smaller the coefficient of variation. Aside from certain methodological problems that arise because they are missing 27 out of 84 monthly observations for the earlier period, it is unlikely that external factors played the same role in price formation in the early 18th century as they did in the early 20th. In the latter period, rice prices were affected by developments in the international rice market as well as by changes in the gold price of silver. Moreover, during World War I, the month-to-month variability in silver prices was three times as great as it was in either the immediate pre- or post-World War I period.

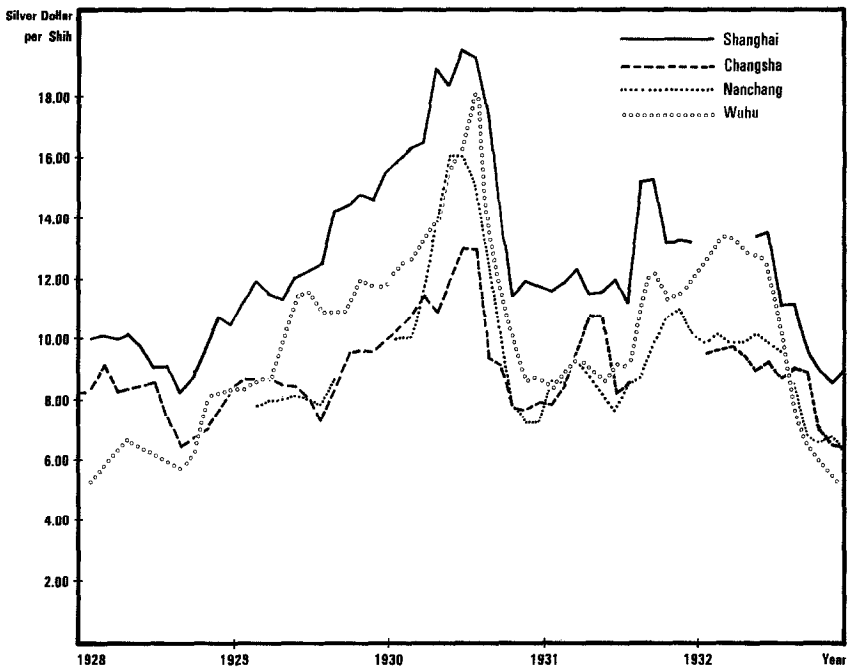

FIG. 1. Monthly rice prices for selected Yangtse markets, 1928–1932. *Source:* See Appendix I.

might be viewed as a simultaneous process in which prices were determined in Shanghai and prices in the interior markets such as Wuhu, Nanchang, and Changsha set to reflect the transport and transactions costs incurred in shipping rice to Shanghai. Prices in Changsha, therefore, would have been less than those in Wuhu because of its greater distance from Shanghai. Prices graphed in Fig. 1 generally bear this out, as prices are a decreasing function of distance from Shanghai. As we noted earlier, over this 5-year period the markets were occasionally disrupted and so the differentials between Shanghai and the secondary markets were not always maintained.

TABLE 7
Distance and Correlation with Shanghai

	Correlation with Shanghai	Distance from Shanghai by water (miles)
Hangchow	0.94	100
Wuhu	0.92	225
Nanchang	0.89	525
Changsha	0.80	850

Note. See Table 6.

The Rural Hinterland and the International Market: A Question of Market Structure

One final question remains: Were the prices that prevailed in the rural hinterland linked to those in these major markets in such a way as to lead us to believe that economic decision making by rural households was actually influenced by the international market? Long-run time series on prices received by farmers have not yet been uncovered.[28] Inferences about the relationship between prices received by peasants and those in those larger markets can still be made, however, on the basis of additional information on Chinese market structure. In other words, were grain markets and, more generally, agricultural markets in China competitive, or were there monopolistic and monopsonistic elements present that might have severed the link between the price in Wuhu, for example, and the price received by the farmer whose rice was shipped to Wuhu?

In the literature on the pre-1949 period, the latter elements have been most frequently emphasized.[29] More recently, a number of authors have argued that markets in China fit the textbook case of competitive markets rather well . . . many well-informed buyers and sellers operating in each market, freedom of exit and entry, mobility of capital and other resources, etc.[30] These features were common not only to the larger markets but also to the smaller periodic markets that convened several times a week. A Japanese description of the rice market in Hankow in 1913–1914 quoted by Ramon Meyers nicely conveys this image.

> "Rice exchange in Hankow is no different than in Shanghai, where it is handled through rice brokerage firms. . . . There are 20 rice brokerage firms. . . . However there is no case whereby these firms buy large quantities of rice at a fixed time, or send agents to the rice producing areas to corner the rice supply. Nor are there any examples whereby they resort to cunning means to collude with various shops which buy rice. We can say that these practices simply do not exist on a

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[28] The only data that we have found on prices received by farmers are the indices that have been compiled by Buck (1937, pp. 217, 218), for the relatively short period between 1907 and 1933. Interestingly, the behavior of the index for the Rice Region is very similar to the behavior of rice prices in Shanghai.

[29] According to Feuerwerker (1968, p. 39), "The local market tended to be monopsonistic for what the peasant sold and monopolistic for what he bought. He was subject to considerable price manipulation, which was intensified by the fact that supply would naturally be larger at harvest time when he wanted to sell and smaller in the spring when he wanted to buy. . . . In general, the marketing process aggravated an already skewed distribution of the agricultural product between the producer and others." More recently, Feuerwerker (1982) has criticized this particular viewpoint, noting that few studies have been able to document the presence of monopolistic and monopsonistic elements in local markets.

[30] These factors have been emphasized explicitly by both Rawski, (1978), and Myers, (1980). Highly competitive market conditions can also be inferred on the basis of recent empirical work by Wiens, (1982), and Liang, (1981), both of whom find a high degree of allocative efficiency in the Chinese farm economy.

yearly basis, and for Chinese merchants this is one of their noteworthy characteristics.[31]

Now certainly in some markets there were monopolistic and monopsonistic elements present. But, as Thomas Rawski points out, in "core" areas where there were well-developed networks of traditional transport, communication, and marketing, where there was a high level of commercial activity and where there were expanded economic opportunities, these forms of exploitation were less likely to be found.[32]

This discussion leads us to believe that because of the basic competitiveness of markets throughout these core areas, prices received by literally millions of farm households would have been closely tied to those prevailing in larger markets, and in turn, Shanghai. Given that Shanghai was so highly integrated with the international market, it does not seem unreasonable to believe that prices received by farmers were similarly linked to the international market.

Yet this kind of relationship was not unique to the lower and middle Yangtse. Along the southeastern coast, farmers would have been similarly tied to the international market through Ningpo, Amoy, Foochow, Lappa, Swatow, and Canton. In each case, major waterways linked the hinterland with these major commercial centers. The East, West, and North Rivers, for example, all flowed into the Canton Delta. In the north, peasant households would have been tied to the international market through Tientsin. A system of price setting behavior very similar to the heuristic process described for Shanghai and the Yangtse markets was likely operative in these markets as well and effectively linked the rural hinterland with the international economy.

Finally, lest it be forgotten, these major commercial centers, i.e., Shanghai, Hangchow, Canton, Tientsin, etc., and the core areas that they were the hub of, were themselves highly integrated. The high degree of correlation between grain prices in these markets is just one aspect of this relationship. This behavior is in itself noteworthy in light of recent work that has suggested that China's regional economies were autonomous.[33] We are inclined to believe, on the other hand, that they were

[31] Myers, (1980, p. 94).

[32] Rawski, (1978, pp. 56–68). Rawski is drawing on the distinction between core and periphery areas as applied to China by Skinner (1977). The cores were usually river valley lowlands or fertile plains with well-developed networks of traditional transport, communication, and marketing. They could also be identified by their higher population density, greater urbanization, and higher levels of commercialization. By comparison, the periphery were isolated with higher transport costs vis-a-vis the core. In turn, the level of commercialization was lower, economic opportunities fewer, and incomes probably below those in core areas.

[33] Skinner (1977).

linked, and that by the late 19th century, if not earlier, regional economic cycles ceased to be distinct.

The Effect of External Factors on Domestic Prices

We have been able to show that agricultural markets throughout China were highly integrated with the international rice market. But, can we determine more precisely the role of external factors in domestic price formation? This question can be addressed through an analysis of Shanghai rice prices.

Because Shanghai was so highly integrated with the international market, one would have expected prices to have been formed not only on the basis of domestic demand and supply, but also in light of concurrent information on the prices in major Monsoon Asia rice-exporting economies. At a maximum, the price of rice in Shanghai could not exceed the price at which grain could be imported from the grain-exporting economies of Monsoon Asia. If we let P_M represent the price of rice prevailing in Monsoon Asia, in equilibrium the price in Shanghai, P_S would equal $P_M + T$, where T represents the transport and transactions cost incurred in shipping rice to Shanghai. If P_S rose temporarily above $P_M + T$, for example, in expectation of a less than average rice crop and marketings in the region, imports would have presumably increased in order to clear the market. On the other hand, if the price of rice in Shanghai was actually less than that prevailing in Monsoon Asia, there was no guarantee that the differential would have been eliminated and equilibrium obtained as grain exports out of China had historically been prohibited. The extent to which the price in Shanghai would have remained lower than the price in Monsoon Asia would have depended on demand elsewhere in China and on the ease with which the surplus of the upper and middle Yangtse provinces could have been disposed.

Throughout most of the period we are examining, China was a price taker in the international market. Data cited earlier show that between 1901 and 1910 Chinese imports averaged less than 7% of the exports of the four major rice exporters. According to data compiled by Bennett and Wickizer for the period between 1911 and 1920, China's net rice imports were only 8% of the total net rice exports of Monsoon Asia.[34] Between 1921 and 1935, however, China's average annual rice imports almost tripled and increased to approximately 15% as a percentage of total rice exports from Monsoon Asia. Yet over this same period total rice exports from Monsoon Asia increased as well. Between 1911 and 1915 and 1931 and 1935, they increased from 4.3 million to 7.5 million metric tons. Although in some years the increase in imports into China can be attributed to either poor crops or disruption of normal market

[34] Most of this paragraph is based on Bennett and Wickizer (1941).

activity, a case can be made that the increase in rice imports reflects developments in the international market and the fact that it became more difficult for domestic agriculture to compete with the Monsoon Asia surplus.[35] It is interesting to note that trends similar to those in China are also found in the behavior of rice imports into India and Japan. Between 1931 and 1935, rice imports into India averaged 1.4 million metric tons, or almost five times their level between 1911 and 1915. Over the same period, Japanese rice imports almost tripled. In the final analysis, we are inclined to believe that throughout the late 19th and early 20th century, China's demand for imports affected the international price only marginally, if at all, and that the price in the international market was exogenous to China.

Aside from being affected by grain prices in Monsoon Asia, rice prices in Shanghai were also affected by the change in the world gold price of silver. China was on a silver standard over the entire period we are examining; it was not until 1935 that the Chinese currency officially severed its ties with silver. The currencies of most other Monsoon Asian economies, on the other hand, were tied to gold as were those of most of China's trading partners. As a result, the gold price of silver effectively determined the rate at which China could trade with the rest of the world. It was her exchange rate.

How did a change in the gold price of silver affect the price of a domestic tradable, i.e., a good traded in the international economy? When the gold price of silver fell (rose) in the international market, the price of the domestically produced tradable expressed in silver would fall below (rise above) its foreign counterpart also expressed in silver. If the two markets were highly integrated, the price of the domestic tradable would soon be bid up (down) because of the higher (lower) price of the imported tradable. In general, one would expect a fall (rise) in the exchange rate to be followed by a rise (fall) in the price of the domestic good by a similar percentage in order to maintain equilibrium in the market between the internal and external price. Assuming no restrictions to trade, arbitrage would assure that equilibrium would be continuously maintained between the domestic and the foreign price of the tradable. This suggest that ceteris paribus, an inverse relationship should exist between changes in the price of tradables and the gold price of silver.

The effect that China may have had on the international gold price of silver is slightly ambiguous. Over the late 19th and early 20th century, silver was gradually demonetized in the world economy. Its role in the international financial system as both a medium of exchange and store of value was reduced as economies increasingly tied their currencies to

[35] The effect that integration had on resource allocation, commercial activity, etc., will be discussed in a subsequent paper.

gold. As the demand for silver declined, so did its price relative to gold. This downward trend, as well as a great deal of volatility are reflected, for example, in the behavior of the exchange rate between the Hai-kwan Tael (HKT, hereafter) and the British pound sterling, shown in Fig. 2. The HKT was the unit of account used by the Imperial Maritime Customs in China and represented 581.83 grains of silver. Britain, on the other hand, was on a gold standard throughout most of the period we are discussing.

Elsewhere it has been argued that China had no control or influence on the world's silver price changes.[36] It must be remembered, however, that China was the largest silver standard economy in the world. The primary sources of demand would be for coinage and for industrial use. Estimates for the latter do not appear to have been made; estimates on China's net coinage requirements have been found for the relatively short period between 1922 and 1931 and represent approximately 20% of total silver production and sales of silver by governments for these years.[37] A better measure of Chinese demand for silver may be given by net silver imports. This would reflect not only the demand for monetary and industrial purposes, but also the role of silver in China's balance of payments.[38] Between 1920 and 1932, China was consistently a net importer of silver, with net silver imports averaging 78.3 million fine ounces, or 23.7% of total silver production and sales of silver by governments. These silver imports helped to offset the deficit in China's current account. Although China was a major consumer of silver in the 1920s, the effect that its demand may have had on the price of silver in the international market is hard to ascertain because silver prices were falling so rapidly. For earlier years, however, China was just as likely to be a net exporter of silver as a net importer. An examination of Maritime Customs data reveals that between 1889 and 1919, net silver imports were only one-third their level between 1919 and 1933.[39] More than likely, this is indicative of the weaker influence that Chinese demand had on the gold price of silver in the international market over this period.

Our previous analysis clearly suggests that changes in both rice prices in Monsoon Asia and the gold price of silver played a major role in the determination of rice prices in the region. The behavior of the price of rice in Shanghai between 1870 and 1933 is shown in Fig. 3. To what extent can the behavior in this price series be attributed to external factors rather than be ascribed solely to the trends and fluctuations in

[36] Cheng, (1956, p. 56).

[37] Estimates of China's demand for silver coinage and of world silver production and sales by governments were compiled by Lin (1935, Chap's. II, III).

[38] Lin, (1935, p. 36).

[39] Maritime Customs began reporting data on specie flow in 1888. These data are included in Hsiao (1974, pp. 128, 129).

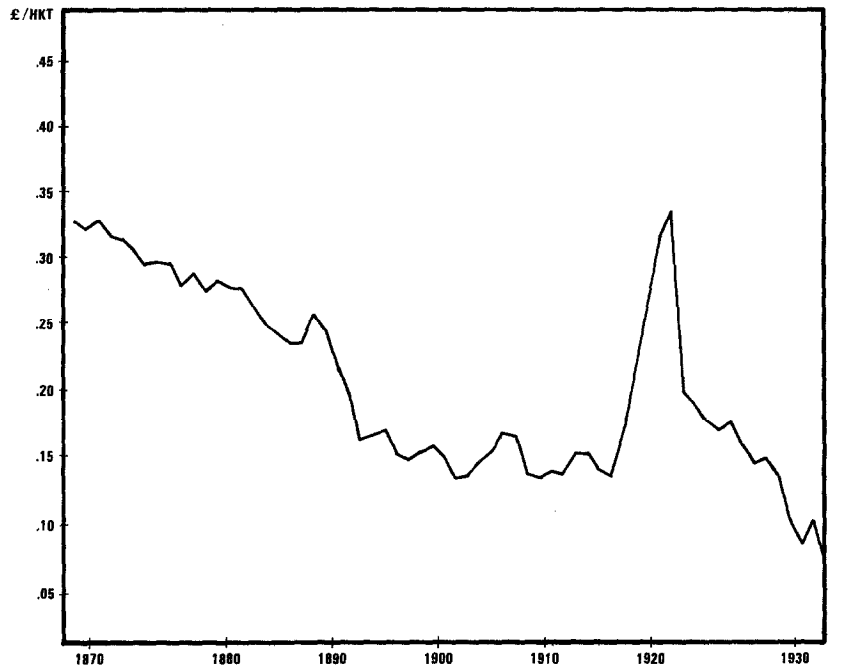

FIG. 2. Sterling—HKT exchange rate, 1870–1933. *Source:* Hsiao (1974, pp. 190–192).

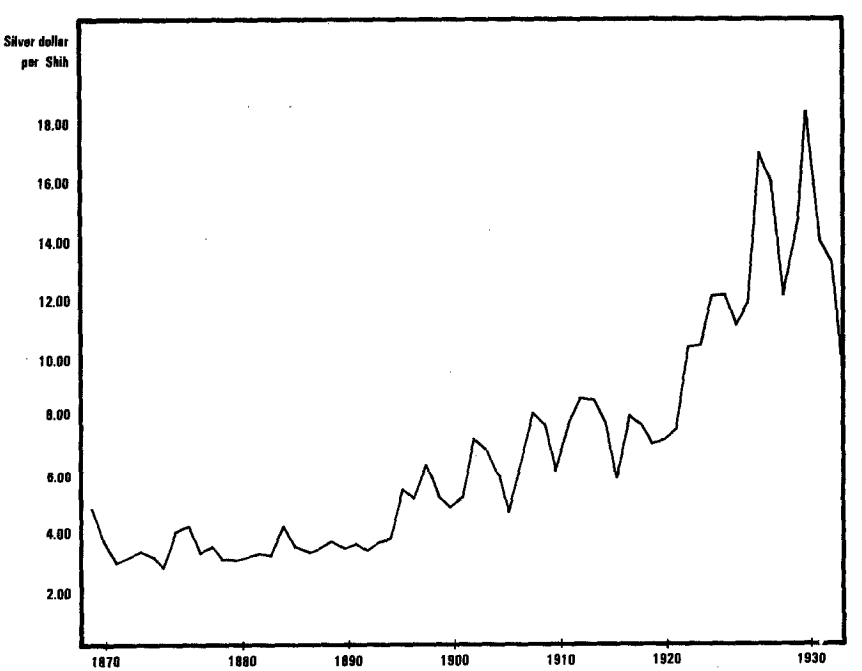

FIG. 3. Shanghai rice prices, 1870–1933. *Source:* See footnote 13.

internal supply and demand? Interestingly, a study by the Institute of Economic and Social Research in Shanghai attributed almost all of the change in rice prices between 1912 and 1931 to internal factors.[40] This question can be addressed econometrically through the use of the following equation:[41]

$$\ln P_{S,HKT} = \beta_0 + \beta_1 \ln P_{I,£} + \beta_2 \ln R_{£/HKT} + \mu_i$$

Where $P_{S,HKT}$ is the price in Shanghai expressed in HKT, $P_{I,£}$ is the price in the international market expressed in sterling, and R is the exchange rate between the British pound sterling and the HKT. The coefficients β_1 and β_2 are measures of the rate at which Shanghai prices were adjusting to changes in the price of rice in the international market and the gold price of silver, respectively. In light of our previous analysis, we would have expected β_1 to be positive but the sign on β_2 to be negative because of the inverse relationship between the gold price of silver and $P_{S,HKT}$. Moreover, if the market was highly integrated with the international rice market, and consequently, domestic prices adjusted relatively rapidly to changes in either the gold price of silver or the international price, we would have expected the coefficients on $\ln R_{£/HKT}$ and $\ln P_{I,£}$ to be close to -1 and 1, respectively. Finally, the R^2 for the model would provide us with an estimate of the percentage of the variability in Shanghai prices that can be explained by external factors. A high R^2 would confirm our beliefs that external factors were significant in the explanation of changes in domestic prices.

This relationship was estimated for the periods between 1870 and 1930 and 1893 and 1930 using two proxies for the price prevailing in the international market. Given that India was the nexus for the international market in rice and wheat, we have used the price of its rice exports as one proxy and have used the average of the export price of Saigon, India, and Siam as a second proxy. The results are shown in Table 8.

Three aspects of our results are in particular noteworthy. First of all, the coefficients on $\ln R_{£/HKT}$ and $\ln P_{I,£}$ are of the correct sign, negative and positive, respectively, and are statistically significant. This implies that an increase in the price of rice in the international market would

[40] Institute for Social and Economic Research (1935).

[41] In general, if an economy or selected parts of it is highly integrated with the world market and faces an infinitely elastic supply curve for some import, the domestic price of that good will be related to the foreign price by $P_D * R = P_F$, where P_D and P_F are domestic and foreign prices, respectively, and R is the exchange rate. This implies that $P_D = P_F/R$. It can be seen immediately that in order for equilibrium between the internal and external price to be maintained continuously, it must be the case that P_D is positively correlated with P_F, but negatively correlated with R. Taking natural log of 2 we have $\ln P_D = \ln P_D - \ln R$. The relationship can be estimated by $\ln P_D = \beta_0 + \beta_1 \ln P_F + \beta_2 \ln R + \mu_i$ where μ_i is normally distributed with mean zero and variance equal to σ_i^2, and β_1 and β_2 are measures of the rate at which domestic prices were adjusting to changes in the foreign price and the exchange rate, respectively.

TABLE 8
Regression Results: The Role of Extrenal Factors in Domestic Price Formation

	β_1	β_2	R^2
Regression 1: Using price of India's exports as a proxy			
1870–1930	1.13(0.06)	−0.65(0.06)	0.92
1893–1930	1.19(0.07)	−0.76(0.11)	0.89
Regression 2: Using average export price of India, Siam, and Saigon as a proxy			
1876–1930	1.10(0.05)	−0.98(0.06)	0.93
1893–1930	1.12(0.07)	−0.99(0.12)	0.87

have led to higher prices in Shanghai, while a rise in the gold price of silver and reflected by an increase in the £/HKT exchange rate would have had the opposite effect. Second, the magnitude of β_1 and β_2 suggests that prices in Shanghai were adjusting relatively rapidly to changes in either $P_{I,£}$ or $R_{£/HKT}$. For the second set of results, we could not reject the hypothesis that prices in Shanghai were adjusting to changes in $P_{I,£}$ and $R_{£/HKT}$ at the same rate. In general, we are inclined to believe that information on external changes was rapidly assimilated and reflected in the price of rice in Shanghai. Finally, changes in the price prevailing in the international market and in the gold price of silver, both of which were basically exogenous to China throughout most of this period, are able to explain close to 90% of the variability in Shanghai rice prices over a 60-year period. This leaves only a small residuum to be explained by domestic factors and considerations. In some years, these are easily indentifiable. In 1926 and 1927, for example, there was Civil War in China and market activity in the Yangtse was disrupted. Not unexpectedly, prices in Shanghai in both years were more than 20% higher than what would have been predicted on the basis of the price prevailing in the international market and the gold price of silver.[42]

Given the preponderant role played by external factors in Shanghai's price formation, and the close ties between prices in Shanghai and the interior markets, it is highly likely that changes in these same external factors would be similarly reflected in the prices in Wuhu and other interior markets, and in the price ultimately received by the farmer. Again, we return to our heuristic explanation of how prices in the middle and lower Yangtse markets were determined. It was a simultaneous process in which prices were fixed in Shanghai and prices in the interior markets set to reflect the transactions costs incurred in shipping rice to Shanghai. Naturally, the farther the market was from Shanghai, the longer it may have taken for external changes to be fully captured in

[42] In 1926 and 1927, the price of rice in Shanghai was 5.49 HKT/cwt. and 5.14, respectively. The predicted values were obtained from the regression equation for 1876–1930 using the contemporaneous values of the price of rice in the international market and the exchange rate and were found to be 4.30 and 4.36 HKT/cwt.

local prices, and, perhaps, the marginally smaller role of external factors. Even compensating for these considerations, external factors may still be able to explain, for example, 75% or more of the variability in Changsha, more than 800 miles up river from Shanghai. In Wuhu and in other markets which were in closer proximity to Shanghai, the percentage was probably even higher.

Analogously, external factors would have played a key role in price formation in other treaty ports like Canton, Swatow, Foochow, and Ningpo. In turn, hundreds of lower level markets and millions of farm households would have been linked to the international market through a transmission process very similar to that described for Shanghai. One cannot escape the conclusion that for a major segment of the farm population in China's rice region, the behavior of prices was heavily dictated by external factors.

Concluding Remarks

We have tried to show that the international dimension to late 19th, early 20th century Chinese agriculture has been unjustifiably ignored in the literature on the pre-1949 Chinese economy. By the turn of this century, despite the fact that Chinese rice imports were only a small fraction of domestic production and of total exports in the international market, rice markets throughout China had become highly integrated with their international counterparts. Attendant with this change, external factors came to play the major role in price formation.

At the outset, we pointed out that market integration has testable implications not only for price formation, but also for resource allocation, productivity, and income. Aside from determining if other commodity markets were as highly integrated with their international counterparts as the rice market was, it remains for us to try to analyze the changes that occurred in Chinese agriculture in light of the behavior of prices in the international market. We are interested in changes that occurred in selective price relatives, i.e., the price of rice relative to cotton, as well as those between the ratio of agricultural prices to nonagricultural prices, i.e., the terms of trade. The potential consequences of changes in both are manifold and have been examined in the context of a model of an agrarian economy by Hymer and Resnick.[43] It remains to be seen if changes in China are consistent with these theoretical expectations.

Finally, we must also examine the effect that structural changes within the domestic economy had on agriculture. The growth and industrialization of Shanghai would be included in such a list of changes. Unraveling the mystery over the performance of Chinese agriculture during this period ultimately requires examining the interaction in rural China of these internal forces with the external forces we have identified in this paper.

[43] Hymer and Resnick (1969).

APPENDIX I
Monthly Grain Price Data for Yangtse Markets, 1928–1932

	Wuhu	Changsha	Shanghai	Hangchow	Nanchang
1928:1	8.14	5.10	9.67	10.00	
1928:2	8.82	5.70	9.78	10.40	
1928:3	8.04	6.15	9.63	10.40	
1928:4	8.19	6.49	9.77	10.20	
1928:5	8.24	6.31	9.44	10.30	
1928:6	8.34	6.04	8.81	10.60	
1928:7	7.19	5.82	8.83	9.10	
1928:8	6.34	5.60	7.98	8.85	
1928:9	6.56	5.97	8.46	10.30	
1928:10	6.86	7.66	9.30	10.80	
1928:11	7.40	8.01	10.37	11.00	
1928:12	8.14	8.15	10.09	10.80	
1929:1	8.46	8.05	10.89	10.80	
1929:2	8.46	8.45	11.50	10.80	7.60
1929:3	8.46	8.45	11.09	11.10	7.78
1929:4	9.78	8.26	10.91	11.00	7.80
1929:5	10.94	8.20	11.58	10.70	7.90
1929:6	11.10	7.84	11.81	11.10	7.80
1929:7	10.58	7.12	12.01	11.50	7.63
1929:8	10.58	8.05	13.72	11.80	8.43
1929:9	10.58	9.22	13.89	12.40	
1929:10	11.48	9.32	14.25	13.60	
1929:11	11.28	9.28	14.09	13.10	
1929:12	11.37	9.60	14.90	13.10	
1930:1	11.90	9.99	15.17	13.50	9.70
1930:2	12.16	10.39	15.58	14.20	9.70
1930:3	12.85	10.96	15.77	14.20	11.11
1930:4	13.48	10.40	18.13	14.70	13.50
1930:5	15.07	11.48	17.57	16.00	15.40
1930:6	15.60	12.40	18.72	15.00	15.40
1930:7	17.56	12.44	18.53	15.50	14.42
1930:8	12.94	9.11	16.70	14.30	12.15
1930:9	11.16	8.83	13.06	13.60	9.58
1930:10	9.25	7.60	11.03	11.20	7.51
1930:11	8.46	7.04	11.47	9.60	7.40
1930:12	8.46	7.08	11.32	10.60	7.63
1931:1	8.14	8.39	11.14	11.00	7.60
1931:2	8.46	8.31	11.43	11.00	8.14
1931:3	8.98	9.11	11.84	10.70	9.41
1931:4	8.46	8.53	11.06	11.00	10.40
1931:5	7.92	8.24	11.14	10.90	10.40
1931:6	7.40	8.79	11.51	10.80	7.94
1931:7	8.19	8.76	10.76	10.70	8.32
1931:8	8.46	10.67	14.58	12.70	
1931:9	9.52	11.64	14.67	13.70	
1931:10	10.31	11.01	12.65	13.00	
1931:11	10.58	11.11	12.73	11.90	
1931:12	9.78	11.54	12.68	12.30	

APPENDIX I (*continued*)

	Wuhu	Changsha	Shanghai	Hangchow	Nanchang
1932:1	9.52	12.23		12.30	9.20
1932:2	9.78	12.80		12.40	9.30
1932:3	9.52	12.77		12.30	9.40
1932:4	9.52	12.44		12.20	9.10
1932:5	9.78	12.30	12.83	12.20	8.58
1932:6	9.52	11.96	12.99	12.60	8.93
1932:7	9.25	11.10	10.70	11.70	8.40
1932:8	8.19	7.48	10.78	11.00	8.70
1932:9	6.34	6.54	9.26	10.80	8.58
1932:10	5.81	6.36	8.64	9.20	6.82
1932:11	5.28	6.58	8.28	7.70	6.30
1932:12	5.28	6.12	8.57	8.10	6.20

Source. Shanghai and Nanchang, Institute for Social and Economic Research, (1935), pp. 30 and 41, respectively; Wuhu, Wu (1936), pp. 18, 19; Changsha, Chang (1936), pp. 172–174; Hangchow, Chu (1937), p. 141.

APPENDIX II
Rice Prices in Shanghai (Silver Dollar/Shih)

1870	4.40	1903	6.32
1871	3.28	1904	5.48
1872	2.71	1905	4.31
1873	2.90	1906	5.86
1874	3.05	1907	7.51
1875	2.89	1908	7.06
1876	2.53	1909	5.63
1877	3.68	1910	7.13
1878	3.86	1911	7.98
1879	3.00	1912	7.94
1880	3.19	1913	7.21
1881	2.79	1914	5.42
1882	2.76	1915	7.40
1883	2.88	1916	7.12
1884	2.98	1917	6.51
1885	2.91	1918	6.62
1886	3.86	1919	6.94
1887	3.17	1920	9.61
1888	3.02	1921	9.68
1889	3.15	1922	11.18
1890	3.38	1923	11.25
1891	3.15	1924	10.24
1892	3.30	1925	10.95
1893	3.06	1926	15.77
1894	3.38	1927	14.77
1895	3.46	1928	11.17
1896	5.02	1929	13.51

APPENDIX II (*continued*)

1897	4.72	1930	17.02
1898	5.85	1931	12.95
1899	4.80	1932	12.32
1900	4.46	1933	9.34
1901	4.74		
1902	6.66		

Source. See footnote 13.

REFERENCES

Bennett, M. K., and Wickizer, V. K. (1941), *The Rice Economy of Monsoon Asia*. Stanford, Calif.: Stanford Univ. Press.

Brandt, L., Jr. (1983), Population Growth, Agricultural Change and Economic Integration in Central and Eastern China, 1890s–1930s. Unpublished Ph.D. dissertation, University of Illinois, Champaign–Urbana.

Buck, J. L. (1937), *Land Utilization in China*. Nanking: University of Nanking.

Chang, Jen-chia (1940), Konan no kokumai. Translation of 1936 report by the Hunan Provincial Economic Research Institute. Tokyo: Seikatsusha.

Cheng, Yu-kwei (1956), *Foreign Trade and Industrial Development in China*. Washington, D.C.: Univ. Press of Washington, D.C.

Ching, Shou-ch'u (1938), Kwangchou chih mi-yeh. Canton: Bank of Kwangtung.

Chu, Hsi-chou (Ed.) (1937), *Mi*. Nanking: Bank of China.

Chuan Han-sheng and Kraus, R. A. (1975), *Mid-Ch'ing Rice Markets and Trade: An Essay in Price History*. Cambridge, Mass.: Harvard Univ. Press, East Asian Monograph, No. 54.

Faure, D. (1978), "The Rural Economy of Kiangsu Province, 1870–1911." *Journal of the Institute of Chinese Studies of the Chinese University of Hong Kong* **9.2,** 365–469.

Feuerwerker, A. (1968), *The Chinese Economy, 1912–1949*. Ann Arbor: Univ. of Michigan, Michigan Papers in Chinese Studies, No. 1.

Feuerwerker, A. (1983), "Economic Trends, 1912–1949." In J. K. Fairbank (Ed.), *The Cambridge History of China, Republican China 1912–1949, Part I*. Cambridge: Cambridge Univ. Press. Vol. 12, pp. 28–127.

Hsiao, Liang-lin (1974), *China's Foreign Trade Statistics, 1864–1949*. Cambridge, Mass.: Harvard Univ. Press.

Hu-pei ta-hsueh cheng-chih ching-chi hsueh-chiao yen-shih-pien, comp. (1958), Chung-kuo chin-tai kuo-min ching-chi-shih chiang-i. Peking: Kao-teng chiao-yu ch'u-pan-she.

Hymer, S., and Resnick, S. (1969), "A Model of an Agrarian Economy with Nonagricultural Activities." *American Economic Review* **59,** 493–506.

Institute for Social and Economic Research (1935), *Shanghai mi-shih tiao-ch'a*. Shanghai: Institute for Social and Economic Research.

Ingram, J. C. (1964), "Thailand's Rice Trade and the Allocation of Resources." In C. D. Cowan (Ed.), *The Economic Development of Southeast Asia*. New York: Praeger.

Ingram, J. C. (1971), *Economic Change in Thailand*. Stanford, Calif.: Stanford Univ. Press.

Latham, A. L. J., and Neal, L. (1983), "The International Market in Rice and Wheat, 1868–1914." *Economic History Review* **36,** 260–280.

Liang, E. P. (1981), "Market Accessibility and Agricultural Development in Pre-War China." *Economic Development and Cultural Change* **30,** 77–105.

Lin, Wei-ying (1935), *China under Depreciated Silver, 1926–1931*. Shanghai: Commercial Press.

Murphey, R. (1977), *The Outsiders: The Western Experience in India and China*. Ann Arbor: Univ. of Michigan Press.

Myers, R. H. (1970), *The Chinese Peasant Economy*. Cambridge, Mass.: Harvard Univ. Press.

Myers, R. H. (1980), *The Chinese Economy: Past and Present*. Belmont, Calif.: Wadsworth.

Nankai Institute of Economics (1935), *Nankai Index Numbers, 1935*. Tientsin, China: Nankai University.

Perkins, D. H. (1968), *Agricultural Development in China, 1368–1968*. Chicago, Ill.: Aldine.

Rawski, T. G. (1978), China's Republican Economy: An Introduction. Joint Centre of Modern East Asia, University of Toronto-York, Discussion Paper 1.

Skinner, G. W. (1977), "Regional Urbanization in Nineteenth Century China." In G. W. Skinner (Ed.), *The City in Late Imperial China*. Stanford, Calif.: Stanford Univ. Press.

Tsou, Ta-fan, Wu, Chih-wei, and Hsu, Wen-hui (1965), "Chin-pai nien lai chiu Chung-kuo liang-shih chia-ko ti pien-tung ch'u shih," Hsueh-shu yueh-kan. Cited in Faure (1978).

Wiens, T. B. (1982), *The Microeconomics of Peasant Economy: China, 1920–1940*. New York: Garland.

Wu, Cheng (1936). Wan-chung tao-mi ch'an-hsiao chih tiao-ch'a. Shanghai: Chiao-t'ung University.