An Analysis of the Land Tax Burden in China, 1650-1865

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This article was originally published in *Journal of Economic History*, Vol. XXXVII, No. 2 (June 1977), pp. 359-381. (Chinese terms and names are not available in the original text, but are added in this version. Footnotes are rearranged under each page and tables are added in the appendix.)

INTRODUCTION

In an agrarian economy, the purpose of land taxation is to enable the government to acquire sustenance (food and clothing) for the labor force it hires or recruits. In the early T'ang 唐 period (618-906) when the adult male (*ting*丁) was the tax base, laborers were acquired by corvée (*yung* 庸) and tax in kinds was levied separately for food (under the name *tsu* 租) and cloth (under the name of *tiao*調). But this tax system, together with the closely related land allotment system, finally ceased to function by the end of the eighth century.[1] Thereafter, the evolution of the land tax system was mainly due to the development of the market system and to population pressure. Peacetime corvée was gradually replaced by "contractual" hiring in the market; payment in kind was partly commuted into monetary payment. Land gradually took on relative and absolute scarcity value and replaced labor as the tax base. During the Ch'ing 清period (1644-1911) the traditional land tax system inherited from Ming 明 times (1368-1644) underwent its final stage of evolution: the practice of commutation (*che-yin* 折銀) was institutionalized, and the shifting of the incidence of the ting tax into land (*t'an-ting-ju-ti* 攤丁入地) established land as the sole tax base.

The Ch'ing land tax system functioned smoothly through the end of the eighteenth century when the dynasty was at its prime of prosperity. By the second half of the nineteenth century, however, this system had lost its efficiency and was unable to help increase revenue for government programs of industrialization undertaken in response to the impact of the West. The land tax system's inflexibility may be accounted one of the major institutional disadvantages that hindered the transition of the traditional Chinese economy.

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[1] For details of the *tsu-yung-tiao* and *chŭn-t'ien* 均田 systems, see D. C. Twitchett, *Financial Administration under the T'ang Dynasty* (Cambridge, 1963), chs. 1-2.

To investigate the weakness of this tax system, we should pay attention to the concept of tax burden.[2] The weakness of the Ch'ing land tax system is manifested in the gradual reduction of the tax burden which, from the viewpoint of the government, meant that tax revenue decreased. The purpose of this paper is to trace this weakness to two practices: that of commutation, and of the shifting of the incidence of labor services into land tax.

We shall first sketch briefly the basic features of the Ch'ing land tax system, then provide a model to analyze the commutation practice and the fixed tax quota and their impact on the tax burden. In order to implement the theoretical analysis, we shall in turn explain how our statistical data are used, and apply the theory to interpret the data. (In the appendix we briefly discuss the nature of our primary data source.)

Our conclusions are twofold: (1) the tax burden had decreased enormously and (2) this decrease resulted from the lack of automatic adjustability of the land system. Government revenue was affected, therefore, by factors unanticipated by the designers of the system, which had at least corresponded to the policy and the needs of the Ch'ing government prior to the nineteenth century. In the second half of the nineteenth century, the Ch'ing land tax system had already lost its efficiency; it would inevitably give way to a new system in the course of institutional evolution.

BASIC FEATURES OF THE LAND TAX SYSTEM DURING CH'ING TIMES

The Ch'ing land tax system was an adoption and modification of the Ming system. During the long period of Ming there were two major developments in the evolution of the land tax system: labor service payment was absorbed into the land tax *i-tiao-pien* 一條鞭 or "single whip" as known in Ming, and *t'an-ting-ju-ti* as known in early Ch'ing, and the practice of commutation into silver (*che-yin*). Since these were the two chief characteristics adopted in the design of the Ch'ing land tax system, let us investigate their economic significance separately.

The Practice of Commutation

From the Ming system the Ch'ing land tax system inherited the feature that although a tax quota for a piece of land was stipulated in terms of rice (or other kinds of grain depending on the crop regions), the fulfillment of that tax obligation involved payment in rice or payment in silver. The latter, the practice of commutation, arose for an obvious reason. In a large agrarian empire characterized by heterogeneity of crop regions (for example, rice, wheat, millet, etc.) such as China, the central government

[2] For a recent discussion on this topic, see Yeh-chien Wang, *Land Taxation in Imperial China, 1750-1911* (Cambridge, Mass., 1973), pp. 110-128.

must select one commodity as the standard of value for taxation purposes.[3] Because of its intrinsic properties rice was the natural candidate. On the one hand, the government wanted to stock rice for supporting soldiers and for famine relief; on the other, of all the commodities rice was the best proxy for money.[4] Thus, for a non-rice growing region commutation is an indispensable device.[5]

Even for such rice-growing regions as Sung-chiang 松江 and Su-chou 蘇州 (which will be analyzed later in our paper) the commutation practice was used to increase the efficiency of the tax system since the land tax system itself was a device for "spatially oriented unilateral transfers." Let us use an example to illustrate this idea.

In Figure 1a suppose Sung-chiang, represented by a point (or "vertex") S, is to pay a total tax payment of 100 ounces of silver, of which $S_1 = 30$ ounces will be spent in Peking (P_1) and $S_2 = 70$ ounces in Ta-t'ung 大同 (P_2). This spatial pattern of unilateral transfer ($S_1 = 30$, $S_2 = 70$) in terms of silver is merely an accounting device to accommodate a commodity transfer (rice) produced by taxpayers in Sung-chiang and transferred to beneficiaries in Peking and Ta-t'ung. If one assumes the price of rice is 2 ounces of silver, then the amount of rice transfer to Peking is $T_1 = 15$, and to Ta-t'ung, $T_2 = 35$. This real resources transfer is facilitated by the merchants who make the actual rice shipment to the beneficiaries in Peking and Ta-t'ung. These beneficiaries make consumptions of $C_1 = 30$ and $C_2 = 70$ which are financed by the tax revenue.

The flow chart in Figure 1a is split into a financial component in Figure 1b and into a real component in Figure 1c. The real component indicates the ultimate objective of this spatially oriented unilateral transfer. When a politically unified country is large and is characterized by differentiated regional land fertility as in China, real resources are routinely transferred out of the rich region, such as Su-chou and Sung-chiang, to the poor regions.[6]

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[3] John L. Buck, *Land Utilization in China* (Nanking, 1937), ch. 2. Buck classified eight crop regions.

[4] In the theory of money, before the age of a metallic standard a commodity processing the following properties is most likely to be selected as "money": 1) divisibility, 2) durability, 3) homogeneity, 4) discernibility (familiarity), and 5) stability in quantity. That rice, more than any other commodity, has all these properties can be inferred from the fact that during the Sino-Japanese War (1937-45), rice was chosen as the standard of value for many transitions, including compensation for civil servants, as the formal monetary system was disrupted by inflation.

[5] Under rare circumstances the government might require the special products of a region to be used for purposes of tax payment.

[6] That the tax burden of Su-chou and Sung-chiang areas was the heaviest in the country has been well known since Ku Yen-wu 顧炎武 noted it in his *Jih-chih-lu* 日知錄 (Daily notes), vol. 10. Some authors have tried to clarify the reason for this: see Chou Liang-hsiao 周良霄, "Ming-tai Su-Sung ti-ch'ű te kuan-t'ien yű chung-fu wen-t'i 明代蘇松地區的官田與重賦問題 (The government land and its relations to the heavy tax burden in the Su-Sung areas in Ming times), *Li-shih-yen-chiu* 歷史研究 (Historical Studies), 10 (Oct. 1957), 63-75; Wu Chi-hua 吳緝華, *Ming-tai she-hui-ching-chi-shih lun-ts'ung* 明代社會經濟史論叢 (Studies on socio-economic problems of the Ming

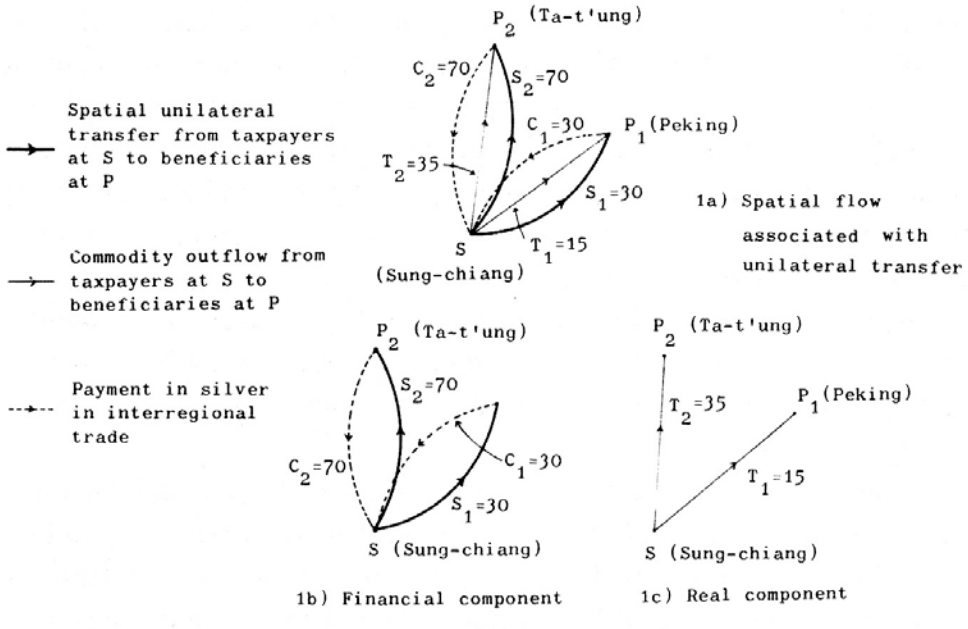

Figure 1: Spatial Pattern of Unilateral Transfer

The financial component is merely an institutional arrangement to accommodate the unilateral transfer. Notice that in Figure 1b, the flows from a closed circuit, in that at every vertex, S, P_1, and P_2, the total inflow of silver equals total outflow. This shows that the unilateral transfer is being carried out with the use of silver as the primary accounting device (for example, silver is the means of payment as well as the standard of value).

A rational pattern of inter-regional resources flows associated with unilateral transfer can be a very complicated phenomenon. In Figure 2a, Sung-chiang transfer S_3 = 50 ounces of silver to Yunnan 雲南 (P_3). The tax money is being used by the latter to acquire goods produced in localities x and y different from Sung-chiang. These localities will in turn spend the income so generated to acquire commodity shipments from Sung-chiang. The financial component and the real component of this pattern are shown in Figures 2b and 2c. The rational pattern of real resources flow (see Figure 2c) depends upon such factors as the comparative cost of production in various localities was well as the transportation cost between them.

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period; Taipei, 1970), first two chs. in Part I, pp. 17-73. According to the latter, the tax quota of Su-Sung areas together amounted to 13.68 percent of the countrywide total during the Ming period (p. 45). Since the early Ch'ing tax quota was adopted from that of the late Ming, the situation remained the same. See *Su-chou fu-chih* 蘇州府志 (The gazetteer of Su-chou prefecture; 1853 ed.), 12: 18b-33b.

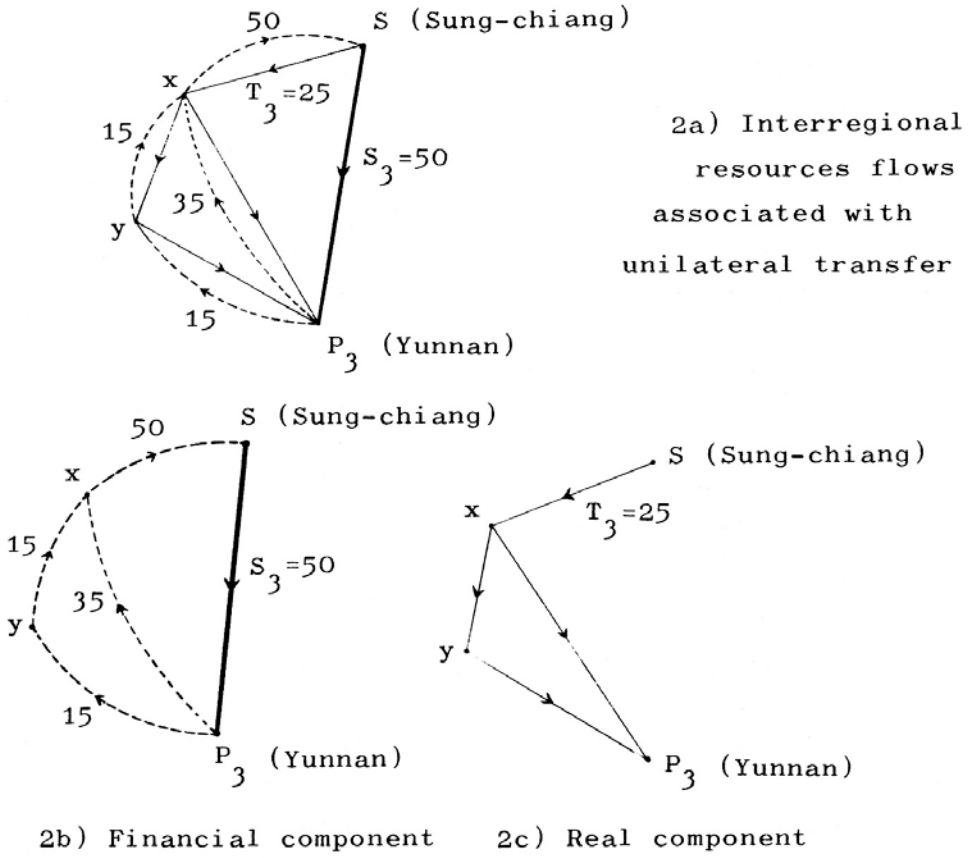

Figure 2: Rational Pattern of Interregional Resource Flows Associated with Unilateral Transfer

Since the land tax in an agrarian economy is the major form of taxation, a primary criterion to evaluate its efficiency must be whether or not it leads to an optimal spatial pattern of resource utilization. The only way this optimal pattern can be realized is by making use of the market system in which the merchants guided by the price system play a key role. The purpose of Figures 1a and 2a is to portray the operation of such a market system. The economic significance of the commutation practice is a crucial part of an organizational design that leads to efficient patterns of spatial resource allocation associated with inter-regional unilateral resource transfer. It is conducive to a full utilization of the market system.

A major question we should now raise is the following. Suppose the total tax quota of Sung-chiang is 100 bags of rice or 200 ounces of silver per year. The total payment in silver is 150 ounces, for example, out of the rice quota of 100 units, 75 units are to be commuted into silver (150 ounces), hence only 25 units of rice must actually be paid in rice. The commutation rate is, therefore, 75 percent. Our empirical data show that in the period from 1656 to 1865 the commutation rates were fairly

stable (usually around 50 percent to 49 percent in the case of Su-chou, and 64-63 percent in the case of Sung-chiang). What then accounts for the stability of the commutation rate?

Our conjecture is that the non-commuted tax payment (for example, that paid in rice) corresponded to those usages of rice that could be most efficiently handled under government auspices. Typical items included in this category were storage in local official warehouses and the shipment of tributary grain by the government sponsored transport system (*ts'ao-yun* 漕運). Traditionally, these shipments were destined to strategically located warehouses serving the needs of the capital city and the garrisons on the frontier. The major characteristic of non-commuted payment in rice was that it required neither a market system nor merchants to achieve its well defined and obvious spatial patterns of allocation. Thus what lies behind the stable commutation rate is the stability of the ratio of "two streams of spatial rice flows" – one most efficiently served by the market system and the other most efficiently served by government means.

The Absorption of Labor Service Levy by the Land Tax

The principle of land taxation in traditional China went through a long process of transformation, or evolution, from the "two-tax" system (*liang-shui-fa* 兩稅法) of the late T'ang dynasty (formally announced in 780 AD) to the "single whip" system of the late Ming dynasty (beginning in the 1520s). In these seven hundred or so years China gradually experienced population pressure and intensive land cultivation, so that land instead of labor gradually took on scarcity value. The emergence of "economic rent" (for example, the emergence of land as a major capital asset in an agrarian economy) and the administrative feasibility of land assessment naturally led to the selection of land (for example, area of cultivation) as the primary object of taxation.[7]

This leading principle of evolution in the tax system manifested itself in the absorption of the labor services levy into the land tax. What emerged finally was a mixed system in which a "tax on labor" was imposed on a "tax on land." Let us first portray this idealized system analytically.

When the tax on an adult male of b units of rice is added to a tax of R units of rice per unit of land, the total amount of tax per unit of land cultivated by L units of adult males is given by

(1) $T = R + bL$ (e.g., $R = 10$, $b = 2$)

[7] The abandonment of the earlier system of *tsu-yung-tiao* prevailing in the early T'ang dynasty was due directly to the lack of accurate population statistics, which made it administratively difficult to tax on the basis of population. The continuing emphases on the compilation of land statistics, however, cumulated in the *Yŭ-lin-t'u-ts'e* 魚鱗圖冊 (Fish-scale maps and books) in the early Ming.

This is shown by the straight line AB in Figure 3, where units of adult male (L) are measured on the horizontal axis. This line indicates an idealized situation in which the levy on labor services (bL) is added to the tax on land (R). For example, with L = 2, the total tax payment of T_2 consists of R units of land tax (*ti-shui* 地稅) and 2b units of tax on adult males (*ting-yin* 丁銀).

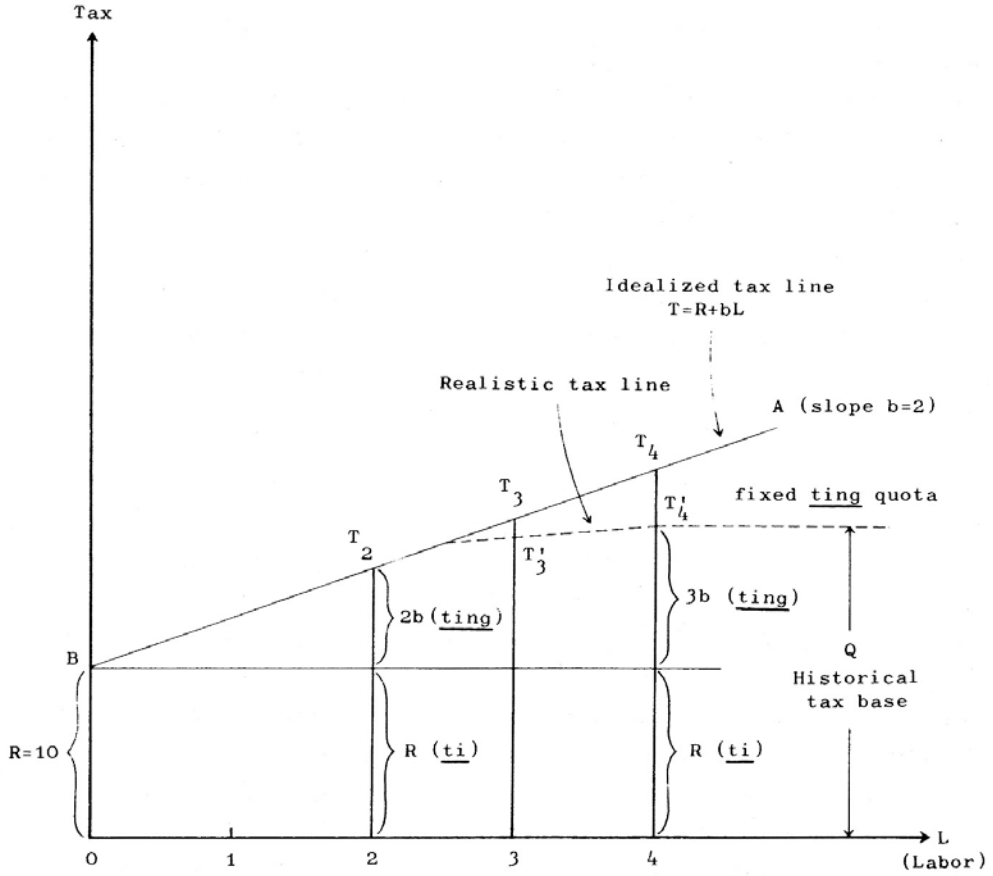

Figure 3: The Idealized Tax Line and the Realistic Tax Line

According to Adam Smith, two basic principles in the design of a tax system are its productivity and administrative feasibility.[8] As far as productivity is concerned, the idealized system provides for an increasing tax revenue whenever the land is being more intensively cultivated due to population pressure. Obviously, without the labor tax (bL) in equation 1, a fixed land tax per unit of land (R) will clearly be inadequate to maintain the tax yield as a fixed proportion of output and/or economic rent when land is more intensively cultivated.

[8] Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Modern Library ed.; New York, 1965), pp. 769-778.

From the viewpoint of administrative feasibility, the idealized system encountered a basic difficulty of tax evasion through underreporting of the number of adult males. In Figure 3, after T_2 the realistic tax line is shown by the dotted curve T'_3 T'_4, with $T'_3 < T_3$ and $T'_4 < T_4$. Moreover, after T'_4 the realistic tax line becomes horizontal, indicating a situation of increasing *ting* without increasing tax (*tzu-sheng jen-ting yung-pu chia-fu* 滋生人丁永不加賦). For example, after point T'_4, with four or more adult males cultivating land the actual payment remains three *ting*. Hereafter the tax payment of R + 3b will be paid regardless the intensity of cultivation.

While such a practice must have been prevalent towards the end of the Ming dynasty, the Ch'ing ruler made all this official. The K'ang-hsi 康熙 emperor (1662-1722), under the guise of a benevolent ruler, took a decisive action in 1712 to freeze the tax quota of *ting* at the level of 1711 and finally eliminated the possibility of increasing tax revenue from this source altogether.[9] Soon after this decree was issued, a fixed ting tax quota (called *ch'ang-o*常額) was officially adopted at different times for different localities and allotted to the land tax to form the historical tax base (in our example, R + 3b at the point T'_4 in Figure 3).[10] This historical tax base could not be changed except in minor ways.[11]

In summary, the premodern Chinese land tax system went through a process of transformation during the course of more than seven hundred years. What began with a tax on people in the *tsu-yung-tiao* system in early T'ang times gave way under population and administrative pressures to a fixed tax quota on land symbolized as the "single whip." This principle of taxation was combined with a commutation practice to enhance the efficiency of unilateral transfer in a spatially integrated agrarian economy. These briefly sketched features will serve as background for our analysis below.[12]

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[9] The decree is recorded in *Ch'ing sheng-tsu shih-lu* 清聖祖實錄 (The veritable record of K'ang-hsi period, 1662-1722), 249: 14b-16a.

[10] The process began in 1716 and finished in 1745. See *Ch'in-ting ta-Ch'ing hui-tien shih-li* 欽定大清會典事例 (Precedents of the collected statutes of the Ch'ing dynasty; China-ch'ing 嘉慶 edition; 1801), 123: 11b-16b.

[11] In a given locality the tax quota could be changed if some parts of the cultivated land became wasteland due to natural calamities; if newly reclaimed land became subject to tax; or if the administrative unit boundary were changed.

[12] Our brief sketch of the historical outline of the land tax system is a familiar story recognized by traditional historical analysis. The essential message covered by historians is threefold: 1) unreliability, especially underestimation, of the *ting* data as a measurement of adult males, 2) from a long-term historical perspective, the tax base in traditional China had finally shifted from a tax on people to a tax on land; 3) the land tax system using land area as its base was rather inflexible and hence a basic cause of corruption. See Pont-ti Ho, *Studies on the Population of China, 1368-1853* (Cambridge, Mass., 1959), ch. 2; Yeh-chien Wang, *Land Taxation in Imperial China*, chs. 2-3.

A THEORETICAL ANALYSIS OF THE LAND TAX BURDEN

The twin featuring of the Ch'ing land tax system – the fixed tax quota on land and the fixed commutation rate – which were adopted in the early days of that dynasty had given the tax system an unexpected and undesirable property of rigid inflexibility which finally resulted in inadequate government revenue. It is clear that with a relatively constant amount of land and a fixed tax quota, revenue could not keep pace with the expansion of agricultural output as population increased. Moreover, the difficulty was compounded because the fixed quota system, operated under the fixed commutation rate, led automatically to a lightening of the tax burden in terms of rice when the price of rice rose. In this section we propose to investigate the above issue analytically by introducing in succession the concepts of tax quota and tax payment pattern, the commutation price, the degree of tax burden, and the commutation rate. The theoretical analysis of this section will be statistically implemented in the next.

Tax Quota and Tax Payment Pattern

Let the tax payment in rice be R and the tax payment in silver be S. Suppose the tax quota in rice is Q and that the market price of rice in silver is p. Then the alternative pattern of tax payment which fulfills the quota is given by

(2) $pQ = pR + S$

In figure 4, let R (S) be measured on the horizontal (vertical) axis. The quota in rice is represented by the distance OQ on the horizontal axis. The term pQ (quota in silver) is represented by the distance OM on the vertical axis. The alternative patterns of tax payment satisfying equation (2) are represented by the points in the straight line QM. Every point on this tax pattern line is equivalent in value to the tax quota in rice (OQ) or in silver (OM).

When the quota in rice (OQ) is fixed, any change in the price of rice (p) will lead to a shift of the tax payment line. The straight lines QM' and QM" represent the system of tax payment lines with the same quota. A higher line in this system indicates a higher price of rice (that is, larger p). Thus at points A, A_1, and A_2, with the same tax payment in rice (OB), the tax payment in sliver is larger as the price increases ($AB < A_1B < A_2B$).

Commutation Price

The alternative tax pattern lines (QM, QM', QM") portray an idealized situation in which the rate of converting rice into silver for tax payment purposes reflects the market price of rice. Those who were responsible for the design of the tax system were obviously aware of the fact that if the commutation price were fixed (that is, if

the line QM remained unchanged) and failed to reflect the fluctuating market price, the taxpayers would gain at the expense of the government treasury when the market price of rice increased (for example, $A_1B < A_2B$). The opposite was true when the price of rice fell (for example, $AB < A_1B$). For this reason the central government stipulated an administrative procedure that enabled the commutation price to be changed but that also required the local officials to "memorialize" the central government for the change of price.[13] Such an administrative procedure was adopted for the obvious reason of protecting the government treasury on the one hand and the taxpayers on the other from the arbitrary decision of local officials.

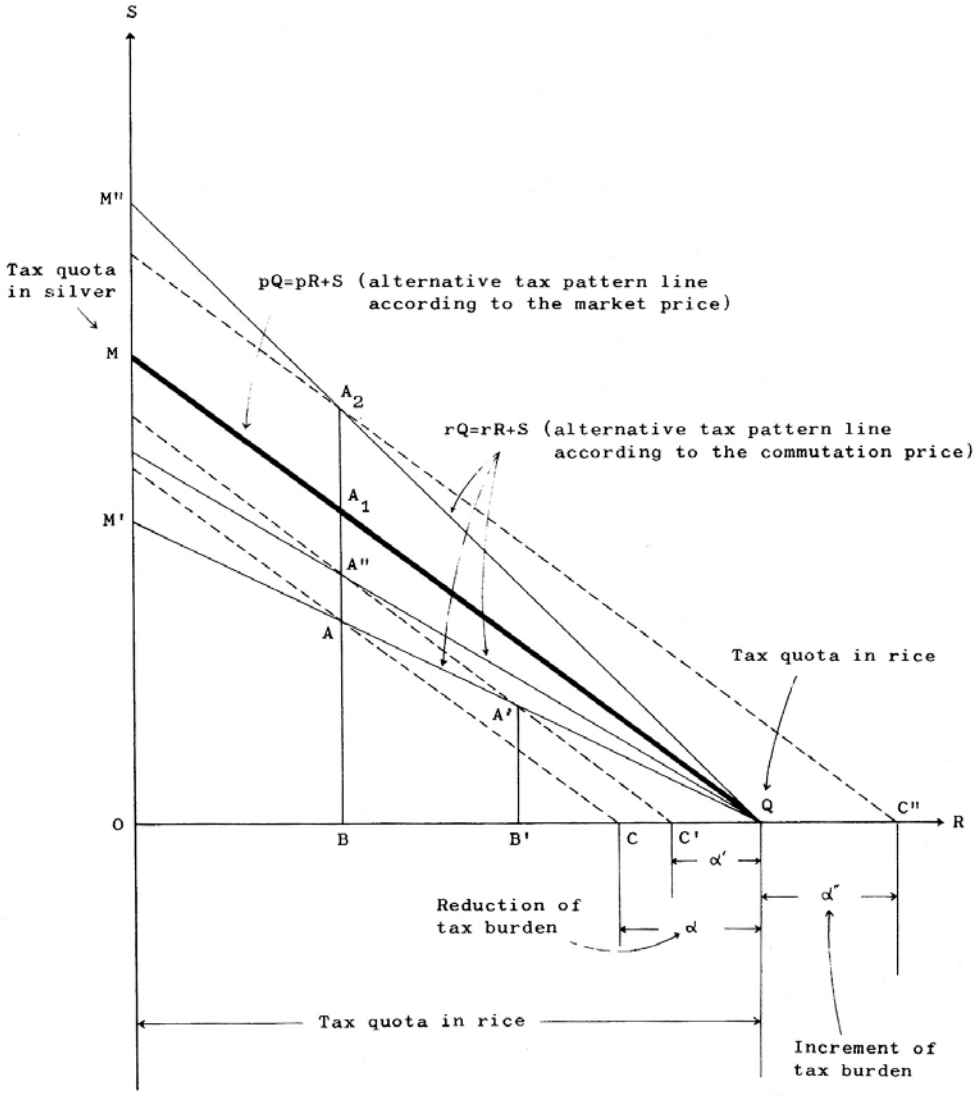

Figure 4: Tax Payment Pattern and Tax Burden

[13] See *Hu-pu tse-li* 戶部則例 (Regulations of the Board of Revenue; first compiled 1776, reprint of the 1865 edition; Taipei, 1968), 19: 8b.

In fact, the frequent change of the commutation price was very difficult to administer because of a technical consideration. The price of rice can fluctuate for various reasons, such as seasonal, secular, and more violent change due to crop failure. Without very elaborate statistical techniques, it is virtually impossible to make frequent adjustment of the commutation price.

Suppose the government announces a commutation price of rice (r) according to which a portion of tax quota in rice is to be commuted into silver. Then the alternative pattern of tax payment is given by

(3) $rQ = rR + S$

In Figure 4, suppose the tax pattern line according to the market price is QM. In case the commutation price is lower than the market price ($r < p$), then the tax pattern line corresponding to r is represented by a straight line such as QM' which is lower than QM. Conversely, the straight line QM" represents the case in which the commutation price is higher than the market price ($r > p$).

Analysis of the Tax Burden

Let us analyze the impact on the tax burden when the commutation price is less than the market price.

Suppose A is a typical point on the tax pattern line QM' determined by the commutation price. We can draw a straight dotted line AC parallel to QM, the tax pattern line determined by the market price. Let AC intersect the horizontal axis at C. Since OB represents tax payment in rice, and since AB units of tax payment in silver have an exchange value of BC units of rice, the total tax payment in rice is OC, which falls short of the quota ($OC < OQ$). The distance $CQ = \alpha$ represents the amount of the reduction of the tax burden.

Notice that the magnitude of the reduction of tax burden is determined by two factors, namely, the actual amount of tax payment in rice OB and the gap between the market price and the commutation price ($p - r$). Thus if the government insists that a larger amount of rice OB' be paid ($OB' > OB$), the tax payment point is A'. In this case, the value of tax payment in rice is OC', hence the reduction of tax burden α' becomes smaller ($\alpha' < \alpha$).

Suppose the government makes an upward adjustment of the commutation price. Now the tax pattern line is QA". Because of the narrowing of the price gap ($p - r$), the reduction of the tax burden is again smaller ($\alpha' < \alpha$). Furthermore, when the commutation price is higher than the market price, the tax payment line QM" is higher than the line QM. At the tax payment point A_2, there is now an increase of tax burden to the amount of α".

In order to measure the degree of actual tax burden we can express the amount

of the tax burden as a fraction of the tax quota. For example, at point A the degree of the tax burden is

(4) $u = OC/OQ$

When $u < 1$, the tax burden is less than the quota. For example, if $u = 0.8$ then the taxpayers only have to pay 80 percent of the quota.

Commutation Rate

When the commutation price is less than the market price ($r < p$), the actual tax burden becomes lighter when the taxpayers have the privilege of making more tax payments in silver. Let us denote the extent, or degree, of this privilege by v; that is, v is payment in silver expressed as a fraction of the tax quota in silver computed at the commutation price. Thus at point A in Figure 4,

(5) $v = AB/OM' (= BQ/OQ)$

This ratio v is the commutation rate, which was fairly stable through time for reasons already discussed. There is a logical relation between this rate and the degree of tax burden u:

(6a) $u = 1 – vg$ where

b) $g = (p – r) / p$

In equation 6b, g is the degree of price gap, or the price gap ($p – r$) as a fraction of the market price (p). Equation 6a states that the tax burden is lighter when v is larger (that is, when the commutation rate is high) and/or when g is large (that is, when the degree of price gap is large). Notice that when the commutation price is less than the market price ($r < p$), u is a positive fraction because both v and g are positive fractions.[14]

These equations provide the framework for empirical study. We shall now explain the nature of the statistical data used in this study.

IDENTIFICATION OF PARAMETERS

The empirical implementation of our theory is based on the data of Su-chou and Sung-chiang prefectures for more than two hundred years (1656-1865) covering most of the Ch’ing dynasty. This two-hundred-year period was selected so that the land tax burden could be investigated in a long-term historical perspective. These prefectures were chosen for two reasons: they are quantitatively important, as together their

[14] As diagrammatic proof of this result, we have
P = OM/OQ, r = OM'/OQ hence
G = (p – r)/p = (MM'/OQ)/(OM/OQ) = MM'/OM = 1 - OM'/OM = 1 – AB/A_1B = 1 –BC/BQ.
On the other hand
V = AB/OM' = BQ/OQ, then
Vg = (1 – BC/BQ) = BQ/OQ – BC/OQ = CQ/OQ; therefore
U = 1 –vg = 1 – CQ/OQ = OC/OQ.

payments accounted for more than 10 percent of the total land tax of the country;[15] and the statistical data needed for our study – tax quota Q, tax payment in rice R and in silver S, and the market price p – are available for these prefectures.

For any given date the quadruplet numbers (Q, R, S, p) constitute the primary data needed for our study. When they are available, we can in turn identify the four indicators (r, g, v, u) for we have

(7a) commutation price $r = S / (Q – R)$ by (3);

b) price gap as a fraction of market price $g = (p – r) / p$ by (6b);

c) commutation rate $v = AB/OM' = S/rQ$ $(= (Q-R)/Q)$ by (5);

d) degree of tax burden $u = 1-vg$ by (6a).

In addition to these indicators we also need to verify the hypothesis that the tax quota (Q) per acre of land was relatively constant. As we have shown in Figure 3, after the point T'_4 a historical tax base (or quota) is fixed once and for all. To verify this hypothesis we need the additional primary data of acreage of land (A), based on which we can compute the tax quota per unit of land:

(8) $q = Q/A$

The value of p, r, g, v, u, q "identified" in this way for the Su-chou and Sung-chiang prefectures are summarized in Table 1 for the indicated benchmark years.[16] The primary data sources and the procedure we have used to calculate these parameters are explained in the appendix.

EMPIRICAL ANALYSIS OF TAX BURDEN

The time series for the six indicators of Table 1 are shown in the three panels of Figure 5.[17] The top panel contains the time series u, v, and g needed to implement equation 6a ($u = 1 - vg$) for the analysis of the degree of tax burden. The tax quota per unit of land (q) is shown in the middle panel; the market price (p) and the commutation price (r) are shown in the lower panel.

Note that the time series for each indicator for both prefectures are shown in the same panel of Figure 5. Thus there are altogether six pairs of time series for the six indicators. It should be stressed that the patterns of time trend for the two prefectures are quite similar for every pair. This similarity not only facilitates our discussion but, more importantly, it indicates that the same set of socio-economic forces was in fact

[15] See note 6.

[16] In the language of econometrics, what we have shown in this section is the "identification" of the six parameters that are essential for our analysis. "Identification" is to infer the values of the parameters from their observable magnitudes (in our model, A, Q, R, S, and p) under the assumption that the observable magnitudes are indeed produced in a system that can be described by the model structure.

[17] The years for which we have data are indicated by the rows of Table 1. Values for other years in Figure 5 are derived by interpolation.

operating in these key taxpaying districts of south China.[18] The similarity between the two prefectures thus lends credibility to our theory.

Table 1: Parameters for Tax Burden Analysis

Su-chou						
year	p	r	g	v	u	q
1656-1710	0.80	0.885	-0.106	0.497	1.053	0.288
1725-1726	1.27	0.889	0.300	0.488	0.854	0.304
1738-1750	1.45	0.741	0.498	0.492	0.760	0.303
1830	3.70	0.707	0.808	0.495	0.600	0.265
1865	2.50	1.124	0.550	0.492	0.730	0.163
Sung-chiang						
year	p	r	g	v	u	q
1656-1662	0.80	0.820	-0.025	0.644	1.016	0.289
1775	1.70	0.581	0.658	0.633	0.585	0.298
1795	2.75	0.610	0.778	0.632	0.509	0.298
1810	3.50	0.627	0.820	0.628	0.485	0.290
1875	2.50	1.130	0.548	0.563	0.692	0.179

p: the market price; r: the commutation price; g: the price gap;
v: the commutation rate; u: the degree of tax burden; q: the tax quota per unit of land.
Source: See Appendix.

Prior to 1865 the tax burden per *mou*畝 (1 *mou* = 0.16 acre) remained practically stable. On the average it was about 0.3 *shih* 石 (1 *shih* = 103 litres), which was about one seventh of the yield of rice per *mou*.[19] After 1865, owing to the tax reduction movement carried out during 1864-1865, the tax quota per *mou* was reduced to about 0.2 *shih* in the two prefectures.[20] This verifies our hypothesis of a fixed quota per unit of land.

Let us now concentrate on the time patterns of the degree of tax burden as shown by the u-curves in the top panel of Figure 5.

[18] The similarity of time patterns exhibited for the two prefectures can in most cases be supported by that of the smaller administrative units, namely, the counties of the two prefectures.

[19] The yield of rice per *mou* in these prefectures was approximately 2 *shih* during the Ch'ing dynasty. In the late seventeenth century, according to Ch'i Fu 靳輔, an able male could cultivate 12-13 *mou* of rice paddy; the annual output from that amount of good land was about 30 *shih* and from poor land about 20 *shih*. See Ho Ch'ang-ling 賀長齡, comp., *Huang-ch'ao ching-shih wen-pien* 皇朝經世文編 (Essays on statecraft during the Ch'ing dynasty; 1827), 26: 20b. In the nineteenth century, according to Tseng Kuo-fan 曾國藩, the yield per *mou* was from 1.5 to 2 *shih*. See *Huang-chao cheng-tien lei-tsuan* 皇朝政典類纂 (Classifed documents of the Ch'ing dynasty; reprint, Taipei, 1969), 8: 4a. And according to Lin Tse-hsŭ 林則徐, in the south during the normal years the yield per *mou* was 5 *shih* of unhusked rice, which equaled 2.5 *shih* of husked rice (ibid., 1: 9b). During the Ch'ing period, only one crop of rice was produced annually in Kiangsu province, see *Su-chou fu-chih* (1883 ed.), 12: 33b.

[20] For the details of this movement, see Hsia Nai 夏鼐, "T'ai-ping t'ien-kuo ch'ien-hou Ch'ang-chiang ko-sheng chih t'ien-fu wen-t'i 太平天國前後長江各省之田賦問題 (The land tax problem of the Yangtze provinces before and after the Taiping Rebellion), *Ch'ing-hua Hsűeh-pao* 清華學報 (The Tsing Hua Journal), 10 (April 1935), 409-474.

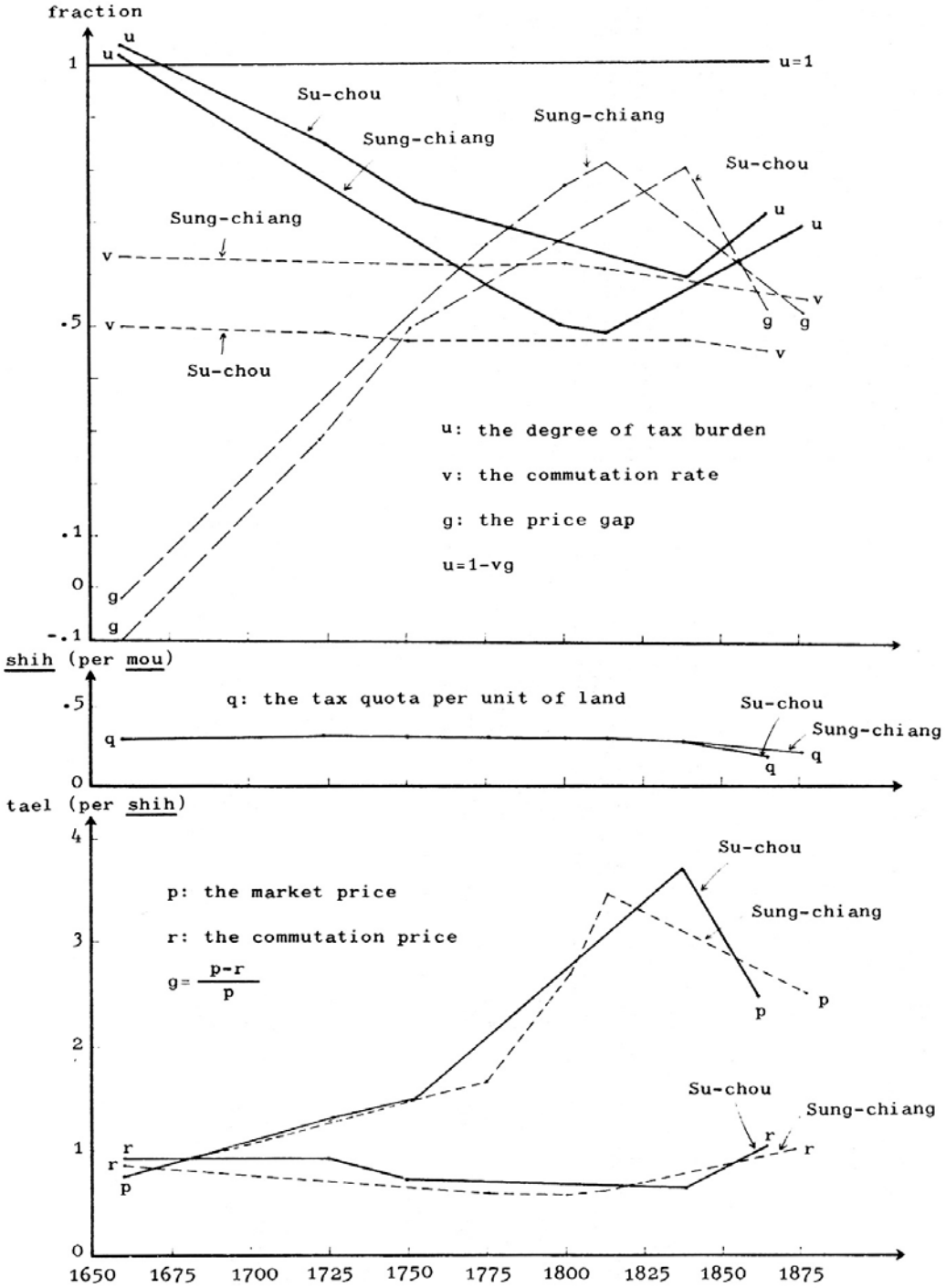

Figure 5: Trends of Degree of Tax Burden and Other Indicators
Source: Table 1.

The u-shaped characteristics of these curves immediately reveal that there were two distinct phases marked off by a turning point around 1820-1830. In the first long phase of approximately 160 years (1650-1820) there had been a persistent and uninterrupted decline in the degree of the tax burden. After the turning point this trend was reversed as the degree of the tax burden began to increase consistently over a

time span of some 30 or 40 years (1830-1865).

What is most striking is the severity of the decline in the first phase. In the case of Sung-chiang, for instance, the decline over 150 years (1656-1810) was from 1.02 to 0.48, a drop of more than 47 percent. This means that in terms of rice, the tax collected was less than half of the original quota. Although this loss was partially recovered during the second phase, even in 1875 the loss was more than 30 percent.

The fluctuation and especially the decline of tax revenue in such enormous magnitudes was clearly not anticipated by the original designers of the land tax system. At the beginning of the 1650s, when the Ch'ing ruler inherited the Ming system, the burden of the quota system was fully realized for a while. This can be inferred from the fact that the u-curves begin from points that are very close to, or even slightly higher than, its full amount (that is, u = 1 shown by a horizontal line). The decline of this tax burden was a cumulative result of imperceptible decreases that 'crept in" annually, such as 0.0036 in the case of Sung-chiang.

Of the two major explanatory variables g (the price gap) and v (the commutation price), it is apparent that it was the former that was mainly responsible for the fluctuation of the degree of the tax burden. This is clearly seen from the equation u = 1 – vg and the inverse u-shaped character of the g-curves which also have turning points in 1810 and 1830, coinciding with those of the u-curves. On the contrary, the dotted v-curves indicate that the commutation rates were very stable – 49 percent in the case of Su-chou and 63 percent in the case of Sung-chiang – and thus they were not responsible for the fluctuation of the degree of the tax burden.

It may be observed in passing that the u-curves of Sung-chiang lies consistently below that of Su-chou, indicating that the tax burden of the former was consistently lower. This difference between the two prefectures can be explained mainly by the fact that the commutation rate of Sung-chiang was consistently higher than that of Su-chou. Our conjecture is that Sung-chiang had a higher commutation rate for two reasons. First, the direct government acquisition of rice in Su-chou was higher because it was situated closer to the canal system, which until 1825 was the main route for the shipment of government rice to the north.[21] Second, Sung-chiang was more of a cotton growing region than Su-chou, and thus its crop pattern was more conducive to a higher commutation rate.[22] Thus the difference between the two

[21] In 1825 T'ao Chu 陶澍, governor of Kiangsu, proposed to the central government that the shipment of government grain should take the sea route. See *Ch'ing Hsűan-tsung shih-lu* 清宣宗實錄 (The veritable record during the T'ao-kuang 道光 period, 1821-1850), 84: 26a-27; also see *Sung-chiang fu-chih hsű-chih* 松江府志續志 (The continued gazetteer of Sung-chiang prefecture, 1884 edition), 13: 5b-6a. For the details, see Ho Ch'ang-ling 賀長齡, *Chiang-su hai-yűn ch'űan-an* 江蘇海運全案 (The complete document of sea transportation from Kiangsu; c. 1830).

[22] Ch'uan Han-sheng 全漢昇, "Ya-p'ien chan-cheng ch'ien Chiang-su te mien-fang –chih-yeh 鴉片戰爭前江蘇的棉紡織業 (The cotton industry in Kiangsu before the Opium War), in the author's

prefectures reflects the differences of their roles in the spatially oriented unilateral resource transfer.

Let us now look at the market price curves and the commutation price curves in the lower panel illustrating the time patterns of the two variables p and r which lie behind the price gap (g). Apparently the inverse u-shaped time pattern of g is explained mainly by the behavior of the market price, as can readily be seen from the fact that the p-curves are also inverse u-shaped with the turning points in 1810 and 1830. In contrast, the r-curves are fairly stable before the turning points and rise slightly after. The increase of the commutation price after 1810 and 1830 therefore contributed somewhat to the narrowing of the price gap (g) and to the increasing degree of the tax burden during the second phase.

The above analysis demonstrates that the enormous fluctuation of the degree of the tax burden in the 160 year period was due mainly to a "monetary" event unforeseen by the original designers of the Ch'ing land tax system. After the rice quota was rigidly fixed, they also adopted an inflexible commutation rate (v) and commutation price (r) for administrative and other reasons, leaving the real impact of the tax burden completely at the mercy of variations of the monetary price level. The variation of the long-run trend of the price level is a monetary phenomenon. Prices increased throughout the eighteenth century and up until 1825 because of the export surplus and the increase in the quantity of silver.[23] The price level again decreased because of the import surplus and the silver export resulting from the Opium War episode. But whatever the monetary causes of the fluctuation of the price level might have been, it is clearly an exogenous event unanticipated from the viewpoint of the design of a rational tax system.

CONCLUSION

It should not be concluded from the above analysis that the time trend for tax burden during the two hundred years was determined solely by an accidental factor. Such a conclusion is unwarranted because it fails to take into consideration adequately of the government revenue. It is obvious that the adverse effect on revenue of the lowering of tax burden in the first phase must have been at least consistent with overall government policy and hence acceptable.

Chung-huo ching-chi-shih lun-ts'ung 中國經濟史論叢 (Studies on Chinese economic history; Hong Kong, 1972), pp. 626-627.

[23] Ch'uan Han-sheng 全漢昇, "Mei-chou pai-yin yű shih-pa shih-chi Chung-kuo wu-chia ke-ming te kuan-hsi 美洲白銀與十八世紀中國物價革命的關係 (American silver and the price revolution in eighteenth-century China)", in ibid., pp. 475-508. Cf. Yeh-chien Wang, "The Secular Trend of Prices during the Ch'ing Period, 1644-1911," *The Journal of the Institute of Chinese Studies of the Chinese University of Hong Kong*, 5 (1972), p. 354.

A basic policy after the founding of the Ch'ing dynasty was to lower taxation for well-known political reasons.[24] The pacification of the Three Feudatories (San-fan 三藩) and then of Taiwan in 1683 heralded the beginning of a long period known to historians as the age of great prosperity of Ch'ing (*sheng-Ch'ing* 盛清) which ended with the termination of the rule of the emperor Ch'ien-lung乾隆 in 1795. Peace and prosperity provided a favorable background to realize the political end of lowering the tax burden. A sequence of imperial orders was issued to exempt regular tax payment.[25] Thus we see the lowering of the degree of the tax burden (the u-curves in Figure 5) is quite consistent with the overall political objectives. The tax system not only yielded adequate government revenue but was in fact functioning smoothly, as can be seen from the high tax fulfillment rate which prevailed in this period.[26]

The upward turn of the degree of the tax burden after 1830 happens to coincide with the beginning of the politically much more turbulent period of the nineteenth century. The shortage of government revenue became more acute as the pressure for higher revenue was generated.[27] This pressure resulted in the upward turn of the commutation price (r) in 1830 which contributed to narrowing the price gap (g). At the same time, the commutation rate (v) began to drop, especially for Sung-chiang (see top panel of Figure 5). Both adjustments contributed to an increase in the degree of the tax burden.[28] Thus, again, we see that the increase in the degree of the tax burden brought about by the price decrease in this period was consistent with government objectives to raise revenue.

The above analysis shows that in both phases of the change of the tax burden the monetary factors operated in a direction consistent with basic government objectives. Such a land tax system was obviously not a rational one, because it had to rely on an unpredictable accidental factor to achieve its function of producing

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[24] *Ch'ing Shih-tsu shih-lu* 清世祖實錄 (The veritable record of the Shun-chih 順治 period, 1644-1661), 6: 9b-10a.

[25] In 1725 an amount of 300,000 taels for Su-chou and 150,000 taels for Sung-chiang was reduced permanently. Again, in 1737, a total amount of 200,000 taels for the two prefectures together was reduced. See *Su-chou fu-chih* (1883 ed.), 12: 34a-35b, 38b-39a.

[26] Ch'en Ch'i-yuan 陳其元, *Yung-hsien chai pi-chi* 庸閒齋筆記 (Notes of Yung-hsien-chai, reprint, Taipei, 1960), 6: 8a. Also see *Su-chou fu-chih* (1883 ed.), 12: 51b-52a; and Pao Shih-ch'en 包世臣, *An-wu ssu-chung* 安吳四種 (Four works of Pao Shih-ch'en; 1846), 25A: 30a.

[27] In 1780 the stock of silver in the treasury of the Board of Revenue reached 70 million taels, which was the largest amount ever accumulated during the Ch'ing period. See Ho Ch'ang-ling, *Huang-ch'ao ching-shih wen-pien*, 27: 29a. But this stock of silver gradually drained out as, in the 1830s, the government began to find it difficult to keep fiscal balance. See Chu Hsieh 朱偰, *Chung-kuo ts'ai-cheng wen-ti* 中國財政問題 (The fiscal problem in China; Shanghai, 1934), pp. 70-72.

[28] After the Taiping Rebellion the tax reduction movement resulted in the decrease of tax quota for the Yangtze provinces. These reductions, however, were in the nature of temporary relief and could not be regarded as evidence contradictory to a trend for higher taxes, as seen from the upswing of the u-curves that started 30 years earlier.

adequate revenue.

Those who advocate a "single tax system" believe that the government should rely exclusively on land tax for revenue because, aside from yielding adequate revenue, it entails minimum disincentive effect and at least disruptive of the market system.[29] The administrative efficiency of a flexible land tax system (for example, the assessment of land tax as a percentage of output rather than as a fixed quota) is, however, quite difficult to achieve, especially when the country is very large and characterized by diversified local conditions such as China's. For this reason, after the Taiping Rebellion (1850-1864) the increasing government revenue was raised mainly by the very disruptive transit tax (*likin* 釐金) and a host of nuisance taxes (*k'o-chuan tsa-shui* 苛捐雜稅). By 1908 the land tax accounted for only 35 percent of the total government revenue, a decline from about 75 percent in 1753.[30]

The transition of an agrarian economy into a modern industrialized society necessarily requires the use of agricultural surplus to finance industrialization. There is well documented evidence that during the Meiji era in Japan this agricultural surplus was transferred to the industrial sector via a reformed and flexible land tax accounted for over 80 percent of the government revenue of Japan.[31] The Ch'ing government, on the contrary, lacked the farsightedness to launch a resolute drive for industrialization and modernization comparable to that of the Meiji government of Japan. A manifestation of that reluctance was the lack of enthusiasm for land tax reform. Thus the tax system was left in a highly chaotic state during the early republican period (1911-1937).

APPENDIX

In this appendix we describe the primary data source that we have used to compute the value of the parameters summarized in Table 1 in the text. As explained above, this involves the collection of primary data of A (taxable acreage), Q (tax quota of rice), R (tax payment in rice), S (tax payment in silver), and p (the market price of rice) for the Su-chou and Sung-chiang prefectures. Each of these prefectures had a

[29] For example, see Henry George, *Progress and Poverty* (New York, 1966 rpt.), pp. 413-414.

[30] For the history of *likin* see Lo Yu-tung 羅玉東, *Chung-kuo li-chih-shih* 中國釐金史 (The history of likin in China; Shanghai, 1936). Also see Ho Lieh 何烈, *Li-chin shih-tu hsin-t'an* 厘金制度新探 (A reinvestigation of likin; Taipei, 1972). For a discussion of surcharge on land tax during the last decades of Ch'ing period, see Yeh Chine-Wang, *Land Taxation in Imperial China*, pp. 61-66; for changes of tax structure, see p. 80.

[31] See Harry T. Oshima, "Meiji Fiscal Policy and Agricultural Progress," in William W. Lockwood ed., *The State and Economic Enterprise in Japan* (Princeton, 1965), pp. 357-381. Also see Kuzushi Ohkawa and Henry Rosovsky, "The Role of Agriculture in Modern Japanese Economic Development," *Economic Development and Cultural Change*, 9 (Oct. 1960), pp. 61-62.

number of smaller administrative units, the counties (*hsien* 縣)

For the primary data of the market price (p) we make use of the data supplied by several contemporary authors.[32] Neglecting the price variation between counties, we assumed that a single price prevailed for all the counties in any one prefecture at any moment of time because price differences between counties cannot exceed local transportation cost. Moreover, the price selected for our two prefectures at different time points show a secular trend quite similar to that which has been traced for the Ch'ing period by other authors.[33]

For the primary data, A, Q, R, S, we make use of the statistical data contained in the prefecture gazetteers (*fu-chih*府志) and the county gazetteers (*hsien-chih*縣志) which are available for most counties and for most of the benchmark years.[34] The compilers of the local gazetteers often indicated explicitly that they, in turn, obtained their data from the *Fu-i ch'űan-shu* 賦役全書 (The complete book of taxation and labor services) which provided the statutory information of taxation for the Ch'ing period. The periodic revision of the latter as reflected in the local gazetteers is the basis for our identification of the time dimension for our data. For example, the "times" shown for the benchmark years 1656-1710, 1725-1726, 1738-1750, 1830, and 1865 in Table 1 indicate the approximate dates of the *Fu-i ch'űan-shu*. These years were selected because of the availability of all the data (A, Q, R, S) we needed; when only a part of the data was available the year was discarded.[35]

The taxable acreage (A) represents the total taxable cultivated acreage which included various grades of land generally classified as *t'ien*田 (rice paddy), *ti*地 (dry land), *shan*山 (hilly land), and *tang*蕩 (swampy land).[36] For taxation purposes, the land of lower grades was converted to a certain amount of the first grade land; this practice was known as *chun-shou* 準熟 (allowable for well cultivated land) or *che-shih* 折實 (converting to the taxable unit).[37] Therefore, the taxable acreage was

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[32] Ch'űan Han-sheng, *Chung-kuo ching-chi-shih lun-ts'ung*, pp. 477-478, 510. Liu I-cheng 柳詒徵, "Chiang-su ko-ti ch'ien-liu-pai-nien-chien chih mi-chia 江蘇各地千六百年間之米價 (Price of rice in Kiangsu during a period of 1600 years), *Shih-hsűen tsa-chih* 史學雜誌 (Journal of History), 2 (Sept. 1930), pp. 5-8; Hsia Nai, "T'ai-p'ing t'ien-kuo ch'ien-hou…", p. 469.

[33] Yeh Chien-Wang, "The Secular Trend", p. 362, chart 5.

[34] In 1645, the second year of the Ch'ing dynasty the government first announced that the tax quota of the Wan-li 萬曆 period (1573-1620) in the late Ming should be adopted. Although we have some data for this year, they are excluded from Table 1 because they are incomplete in their coverage.

[35] Thus an interval (for example, 1656-1710) is shown whenever the data revision of the *Fu-i ch'űan-shu* occurred for different counties and different years, or when the data needed were available in different years. It should also be noted that the *Fu-i ch'űan-shu* was also revised in 1775 and 1795. The statistics of the tax quota (Q) for Su-chou prefecture, however, are not available. Although the data of 1818 are available for Su-chou, the calculation of indicators of tax burden reveals them to be the same as those of 1830; thus these data were not used.

[36] In fact, for each type of land there are sub-classifications for the purpose of taxation. For the number of grades of land in the 18 counties of the two prefectures, see *Su-chou fu-chih* (1824 ed.), vol. 11 and *Sung-chiang fu-chih* (1817 ed.), vol. 22.

[37] For example, see *Sung-chiang fu-chih* (1663 ed.), 7: 1b-2a; *Sung-chiang fu-chih* (1817 ed.), 21: 40a-

different from the real spatial area.

The tax quota (Q) represents the tax quota in rice, known in records as *p'ing-mi* 平米 ("equalized" quota of rice).[38] The local gazetteers pointed out that *p'ing-mi* included the absorption of labor service payment (*ting-yin*丁銀) as well as tributary rice and its surcharges.[39] The local gazetteers also made it clear that *p'ing-mi* (the tax quota) was a tax obligation that could be fulfilled either by payment in rice (*pen-se-mi* 本色米) or payment in silver (*che-se-yin* 折色銀) — corresponding to our definition of R and S. This practice of commutation was typically described in the local gazetteers in the following way: "For total taxable obligation of *p'ing-mi* [Q] of so many bushels, the actual collection [that is, *shih-cheng* 實徵] consists of *pen-se-mi* [R] in so many bushels and *che-se-yin* [S] in so many taels."

The primary data and the parameters derived from these data according to our theoretical model for the two prefectures with their counties are listed in a set of four tables in below. (The original text said: These tables are in duplicated form upon requested to the authors.)

43b. According to Wang Chen 王禎, land already cultivated is called *shou* 熟 (*i-keng yűeh-shou* 已耕曰熟), see *Nung-shu* 農書 (Book on agriculture; reprint of *Ssu-ku-ch'uan-shu chen-pen* 四庫全書珍本; Taipei), 2: 4a. For taxation purposes, *shou* 熟 was usually used as an opposite of *huang* 荒, which meant cultivated land that had become wasteland. But *huang* was not exempted from taxation; instead, its quota was reduced to a certain amount to be borne by the cultivated land. For an explanation of this, see *Chiang-ning fu-chih* 江寧府志 (The gazetteer of Chiang-ning prefecture) (1811 ed.), 14: 3a. For example of tax quota of these categories (for example, *shou p'ing-mi* 熟平米 and *huang-p'ing-mi* 荒平米), see *Shu-chou fu-chih* (1824 ed.), 8: 17a, 40b.

[38] The historical origin of the term *p'ing-mi* is found in records during the 1430s when governor Chou Ch'en 周忱 initiated a program of tax equalization. His method was to allot equally the amount of rice charged for wastage during the process of transportation, known as *hao-mi* 耗米. The total of *hao-mi* and *cheng-mi* 正米 (normal rice) was given the name of *p'ing-mi* and became the basic tax quota. This practice was carried on through the Ch'ing dynasty. See Chou Liang-hsiao, "Ming-tai Su-Sung ti-ch'u…", p. 70.

[39] The details of allotment can be found in some local gazetteers; for example, *Su-chou fu-chih* (1824 ed.), vol. 11.

Appendix Table 1: Primary Data of Su-chou Fu

A: Taxable acreage in *mou*. R: Tax payment in rice in *shih*.
Q: Tax quota I rice in *shih*. S: Tax payment in silver in tael.

Year (1) 1645				
Place	A	Q	R	S
Wu-hsien 吳縣	714,889	157,193		
T'ai-hu 太湖				
Ch'ang-chou 長洲	1,326,216	454,039		
Yuan-ho 元和				
K'un-shan 崑山	1,171,499	369,544		
Hsin-yang 新陽				
Ch'ang-shou 常熟	1,761,554	418,345		
Chao-wen 昭文				
Wu-chiang 吳江	1,302,872	438,059		
Chen-tse 震澤				
Su-chou Fu 蘇州府	6,273,749	1,813,400	893,956	756,598

Year (2) 1656-1710				
Place	A	Q	R	S
Wu-hsien 吳縣	714,721	164,198	78,415	53,323
T'ai-hu 太湖				
Ch'ang-chou 長洲	1,326,165	454,039	223,080	181,250
Yuan-ho 元和				
K'un-shan 崑山	1,131,442	351,951	178,289	172,191
Hsin-yang 新陽				
Ch'ang-shou 常熟	1,646,879	395,211	204,797	197,089
Chao-wen 昭文				
Wu-chiang 吳江	1,311,989	424,286	219,005	204,986
Chen-tse 震澤				
Su-chou Fu 蘇州府	6,268,011	1,803,905	913,187	853,176

Year (3) 1725-1726				
Place	A	Q	R	S
Wu-hsien 吳縣				
T'ai-hu 太湖				
Ch'ang-chou 長洲	717,876	239,063		
Yuan-ho 元和	616,582	216,582		
K'un-shan 崑山	600,220	175,421	88,864	87,955
Hsin-yang 新陽	574,967	176,562	89,441	87,598
Ch'ang-shou 常熟				
Chao-wen 昭文				
Wu-chiang 吳江	638,805	203,569	105,077	75,843
Chen-tse 震澤	679,238	220,901	114,023	81,944
Su-chou Fu 蘇州府				

Appendix Table 1 (continued)

Year (4) 1738-1750				
Place	A	Q	R	S
Wu-hsien 吳縣	716,901	157,228		
T'ai-hu 太湖				
Ch'ang-chou 長洲	716,108	238,911	116,130	106,699
Yuan-ho 元和	615,543	216,502	112,635	93,820
K'un-shan 崑山	597,869	161,414	81,504	55,464
Hsin-yang 新陽	571,962	161,504	81,348	54,930
Ch'ang-shou 常熟				
Chao-wen 昭文				
Wu-chiang 吳江	640,574	203,272	104,333	65,162
Chen-tse 震澤	625,985	221,451	113,664	71,051
Su-chou Fu 蘇州府	6,227,640	1,796,642		

Year (5) 1830				
Place	A	Q	R	S
Wu-hsien 吳縣	644,114	148,503	73,843	56,852
T'ai-hu 太湖	72,736	6,744	3,353	3,070
Ch'ang-chou 長洲	711,890	233,071	115,087	73,802
Yuan-ho 元和	603,792	210,788	109,832	65,115
K'un-shan 崑山	588,676	159,875	80,528	57,740
Hsin-yang 新陽	566,700	161,475	81,334	58,284
Ch'ang-shou 常熟	927,574	216,470	108,690	72,176
Chao-wen 昭文	769,014	175,762	87,537	58,556
Wu-chiang 吳江	644,720	202,174	103,768	66,784
Chen-tse 震澤	683,025	221,204	113,537	72,883
Su-chou Fu 蘇州府	6,212,244	1,736,180	877,513	585,276

Year (6) 1865				
Place	A	Q	R	S
Wu-hsien 吳縣	644,033	92,884	46,187	56,843
T'ai-hu 太湖	72,736	5,016	2,494	3,070
Ch'ang-chou 長洲	711,677	125,795	65,472	73,779
Yuan-ho 元和	603,728	118,130	61,934	65,107
K'un-shan 崑山	588,676	103,573	52,169	57,740
Hsin-yang 新陽	571,700	102,118	51,436	58,284
Ch'ang-shou 常熟	927,506	150,176	77,468	72,173
Chao-wen 昭文	769,014	124,010	63,979	58,556
Wu-chiang 吳江	644,678	121,158	62,185	66,779
Chen-tse 震澤	683,025	131,552	67,522	72,883
Su-chou Fu 蘇州府	6,216,777	1,074,418	550,850	585,227

Source and notes:*

*The volume and page number of the gazetteers from which the data are taken are indicated in the footnotes of these tables. For example, an indication of source *Wu-chiang HC* (1747), 4:25a-b gives the following information: 1) HC stands for a county gazetteer; FC for a prefecture gazetteer, 2) (1747) stands for the year of publication of the gazetteer, and 3) 4:25a-b indicates volume 4, page 25a-b (front and back page).

(1) The figures of Su-chou Fu total are4 for the year 1645, since the figures of the counties are not available for this year, those of 1620 are taken for reference, see *Su-chou FC* (1824), 8:14a-15b; 17a-b.

(2) The figures of Wu-hsien are for the year 1656; Ch'ang-chou, 1671; K'un-shan, 1704; Ch'ang-shou,

1710; Wu-chiang, 1679; and Su-chou Fu , 1687, see *Wu HC* 吳縣志(1933), 45:19b-23b; 46:12b; *K'un-Hsin ho-chih* 崑新合志(1880), 6:9b; *Ch'ang-Chao ho-chih* 常昭合志(1797), 3:10b; *Wu-chiang HC* 吳江縣志 (1747), 4:2b; 13: 21a-22a.

(3) *Wu HC* (1933), 46:18a, 9b-10a; *K'un-Hsin ho-chih* (1880), 6:11a-b; *Wu-chiang HC* (1747), 4: 25a-b; 13:23b; *Chen-tse HC* 震澤縣志(1746), 4:5a; 10:3b. The county boundary was rearranged in 1725-26.

(4) *Wu HC* (1933), 45: 32a; 46:21b; 47:16b; *K'un-Hsin ho-chih* (1880), 6:16a; *Wu-chiang HC* (1747), 13:23b; 26a-27a; *Chen-tse HC* (1746), 10:6b-7a; *Su-chou FC* (1824), 8:40b. The figures of K'un-shan and Hisn-yang are for the year 1749, others are for the year 1738.

(5) and (6) *Su-chou FC* (1883), 12:46b-48b; 60b-62a. For only the total figures of *ting-yin* 丁銀 and *tsa-pan-yin* 雜辦銀 are mentioned in these two years and the amounts remain the same, therefore, the data for the year 1735 are taken and added on to the payment of silver (S) of each county, see *Su-chou FC* (1824), 8:37a-38a.

(6) Payment in silver includes officially stipulated surcharge, known as *hao-yin* 耗銀, but not includes additional charge for the leap year, which occurs seven times during nineteenth years according to the lunar calendar. The amount of the latter category is rather small and can be neglected.

Appendix Table 2: Primary Data of Sung-Chiang Fu

A: Taxable acreage in *mou*. R: Tax payment in rice in *shih*.
Q: Tax quota I rice in *shih*. S: Tax payment in silver in tael.

Year (1) 1645				
Place	A	Q	R	S
Hua-t'ing 華亭	1,889,982	595,174		
Feng-hsien 奉賢				
Lou hsien 婁縣				
Chin-shan 金山				
Shang-hai 上海	1,471,342	389,399		
Nan-hui 南匯				
Ch'ing p'u 青浦	752,138	227,913		
Ch'uan-sha 川沙				
Sung-chiang Fu 松江府	4,123,464	1,211,487		

Year (2) 1656-1662[a]				
Place	A	Q	R	S
Hua-t'ing 華亭	1,079,997	310,657	105,999	164,474
Feng-hsien 奉賢				
Lou hsien 婁縣	860,187	284,516	105,546	143,691
Chin-shan 金山				
Shang-hai 上海	1,482,856	388,404	139,413	212,108
Nan-hui 南匯				
Ch'ing p'u 青浦	810,232	227,913	80,357	121,649
Ch'uan-sha 川沙				
Sung-chiang Fu 松江府	4,233,273	1,211,492	431,314	641,907

Appendix Table 2 (continued)

Year (3)1775[b]				
Place	A	Q	R	S[c]
Hua-t'ing 華亭	521,295	157,158	55,277	87,481
Feng-hsien 奉賢	523,667	149,808	48,424	56,716
Lou hsien 婁縣	456,940	160,148	60,966	56,643
Chin-shan 金山	371,456	119,790	49,223	41,342
Shang-hai 上海	753,994	215,926	71,380	83,236
Nan-hui 南匯	702,410	168,289	69,614	62,743
Ch'ing p'u 青浦	705,209	213,487	76,782	79,585
Ch'uan-sha 川沙				
Sung-chiang Fu 松江府	4,034,974	1,184,609	431,668	437,830

Year (4) 1795				
Place	A	Q	R	S
Hua-t'ing 華亭	520459	156,890	55,161	60,256
Feng-hsien 奉賢	523667	149,470	48,352	59,409
Lou hsien 婁縣	457765	160,396	61,077	59,564
Chin-shan 金山	371485	119,791	49,223	43,410
Shang-hai 上海	750355	214,855	70,978	87,057
Nan-hui 南匯	701080	167,909	69,455	65,734
Ch'ing p'u 青浦	701786	212,234	76,216	83,113
Ch'uan-sha 川沙				
Sung-chiang Fu 松江府	4026600	1,181,548	430,464	458,548

Year (5) 1810[d]				
Place	A	Q	R	S
Hua-t'ing 華亭	520,612	156,939	55,183	61,281
Feng-hsien 奉賢	523,713	149,484	48,358	60,180
Lou hsien 婁縣	450,127	157,671	59,393	59,896
Chin-shan 金山	370,786	119,547	49,114	43,955
Shang-hai 上海	684,914	199,179	64,438	81,907
Nan-hui 南匯	653,384	156,687	64,765	62,292
Ch'ing p'u 青浦	701,968	212,291	76,242	84,250
Ch'uan-sha 川沙	104,863	24,456	10,221	9,803
Sung-chiang Fu 松江府	4,010,371	1,176,257	427,717	463,612

Year (6) 1875				
Place	A	Q	R	S
Hua-t'ing 華亭	519,818	87,530	39,060	60,862
Feng-hsien 奉賢	523,713	79,545	35,497	60,105
Lou hsien 婁縣	451,255	84,419	37,612	59,501
Chin-shan 金山	367,072	72,221	32,177	43,395
Shang-hai 上海	685,259	118,669	49,595	81,008
Nan-hui 南匯	653,326	128,187	53,572	62,224
Ch'ing p'u 青浦	706,802	122,202	55,591	84,545
Ch'uan-sha 川沙	104,834	20,410	8,530	9,791
Sung-chiang Fu 松江府	4,012,084	713,187	311,038	462,253

Source and notes:

(1) *Sung-chiang FC* (1663), 7:1b-2a.

(2) *Ibid*., 7:7b-8a; 8b-10a.

(3) *Sung-chiang FC* (1817), 21:44a-45b.

(4) *Ibid.*, 21:48b-49b.
(5) *Ibid*., 21:52b-53a.
(6) *Sung-chiang fu hsü-chi* 松江府續志 (1884), 11:2b-4b.

a. In 1656, the county area of Hua-t'ing was divided into Hua-t'ing and Lou-hsien, see *Sung-chiang FC* (1663), 7:7a.
b. In 1726, the county boundary was further rearranged, for details see *Sung-chiang FC* (1817), 21:28b.
c. The officially stipulated surcharge (i.e., *hao-yin*) was not included in the record, therefore, the amounts of payment in silver for this year (1775) might be slightly under-estimated.
d. In 1810, Ch'uan-sha was established, see *Nan-hui HC* (1879), 4:20b.

Appendix Table 3: Su-chou Fu: Indicators for Tax Burden analysis

p: the market price. v: The commutation rate.
r: the commutation price. u: The degree of tax burden.
g: the price gap. q: the tax quota per unit of land.

Year (2) 1656-1710						
Place	p	r	g	v	u	q
Wu-hsien 吳縣	0.8	0.621	0.223	0.522	0.883	0.229
T'ai-hu 太湖	.					
Ch'ang-chou 長洲	0.8	0.784	0.020	0.509	0.990	0.342
Yuan-ho 元和						
K'un-shan 崑山	0.8	0.991	-0.238	0.493	1.117	0.311
Hsin-yang 新陽						
Ch'ang-shou 常熟	0.8	1.035	-0.293	0.481	1.141	0.239
Chao-wen 昭文						
Wu-chiang 吳江	0.8	0.998	-0.247	0.484	1.119	0.323
Chen-tse 震澤						
Su-chou Fu 蘇州府	0.8	0.957	-0.196	0.494	1.187	0.287
Weighted Average	0.8	0.885	-0.106	0.497	1.053	0.288

Year (3) 1725-1726						
Place	p	r	g	v	u	q
Wu-hsien 吳縣						
T'ai-hu 太湖						
Ch'ang-chou 長洲						0.333
Yuan-ho 元和						0.351
K'un-shan 崑山	1.27	1.016	0.200	0.493	0.901	0.292
Hsin-yang 新陽	1.27	1.005	0.208	0.493	0.898	0.307
Ch'ang-shou 常熟						
Chao-wen 昭文						
Wu-chiang 吳江	1.27	0.770	0.393	0.483	0.810	0.318
Chen-tse 震澤	1.27	0.766	0.396	0.484	0.808	0.325
Su-chou Fu 蘇州府						
Weighted Average	1.27	0.889	0.300	0.488	0.854	0.304

Appendix Table 3 (continued)

Year (4) 1738-1750						
Place	p	r	g	v	u	q
Wu-hsien 吳縣						0.219
T'ai-hu 太湖						
Ch'ang-chou 長洲	1.45	0.869	0.401	0.513	0.795	0.333
Yuan-ho 元和	1.45	0.903	0.377	0.479	0.820	0.351
K'un-shan 崑山	1.45	0.694	0.521	0.495	0.742	0.269
Hsin-yang 新陽	1.45	0.685	0.527	0.496	0.739	0.282
Ch'ang-shou 常熟						
Chao-wen 昭文						
Wu-chiang 吳江	1.45	0.636	0.561	0.487	0.727	0.317
Chen-tse 震澤	1.45	0.659	0.545	0.486	0.735	0.353
Su-chou Fu 蘇州府						0.288
Weighted Average	1.45	0.741	0.498	0.492	0.760	0.303

Year (5) 1830						
Place	p	r	g	v	u	q
Wu-hsien 吳縣	3.7	0.761	0.794	0.503	0.601	0.231
T'ai-hu 太湖	3.7	0.761	0.794	0.503	0.601	0.231
Ch'ang-chou 長洲	3.7	0.625	0.831	0.506	0.580	0.327
Yuan-ho 元和	3.7	0.644	0.825	0.479	0.605	0.349
K'un-shan 崑山	3.7	0.727	0.803	0.496	0.602	0.272
Hsin-yang 新陽	3.7	0.727	0.803	0.496	0.602	0.284
Ch'ang-shou 常熟	3.7	0.669	0.819	0.498	0.593	0.233
Chao-wen 昭文	3.7	0.663	0.821	0.502	0.588	0.228
Wu-chiang 吳江	3.7	0.678	0.816	0.487	0.603	0.313
Chen-tse 震澤	3.7	0.676	0.817	0.487	0.602	0.323
Su-chou Fu 蘇州府	3.7	0.681	0.815	0.495	0.597	0.279
Weighted Average	3.7	0.707	0.808	0.495	0.600	0.265

Year (6) 1865						
Place	p	r	g	v	u	q
Wu-hsien 吳縣	2.5	1.217	0.513	0.502	0.743	0.144
T'ai-hu 太湖	2.5	1.217	0.513	0.502	0.742	0.068
Ch'ang-chou 長洲	2.5	1.147	0.541	0.511	0.724	0.176
Yuan-ho 元和	2.5	1.158	0.536	0.475	0.746	0.195
K'un-shan 崑山	2.5	1.123	0.550	0.496	0.727	0.175
Hsin-yang 新陽	2.5	1.149	0.540	0.496	0.732	0.178
Ch'ang-shou 常熟	2.5	0.992	0.603	0.484	0.709	0.162
Chao-wen 昭文	2.5	0.975	0.610	0.484	0.705	0.161
Wu-chiang 吳江	2.5	1.132	0.547	0.486	0.735	0.187
Chen-tse 震澤	2.5	1.138	0.544	0.486	0.736	0.192
Su-chou Fu 蘇州府	2.5	1.117	0.553	0.487	0.731	0.172
Weighted Average	2.5	1.124	0.550	0.492	0.730	0.163

Source of the price (p):

(2) Ch'uan Han-sheng 全漢昇, *Chung-kuo ching-chi-shih lun-ts'ung* 中國經濟史論叢 (Studies on Chinese Economic History), (Hong Kong, 1972), p. 510, Cf. Liu I-cheng 柳詒徵, "Chiang-su ko-ti ch'ien-liu-pai-nien-chien chih mi-chia 江蘇各地千六百年間之米價 (Price of rice in Kiangsu during a period of one thousand and six hundred years)," *Shih-hsüeh ts'a-chih* 史學雜誌, 2.3 (September 1930), p. 5.

(3) Ch'uan Han-sheng, p. 521. The average of the prices in three months in 1725 is taken.

(4) Liu I-cheng, p. 6. In 1748, the price of rice rose to 2 taels per *shih*, but it was a special case, see

Ch'uan Han-sheng, p. 483, pp. 547-566.

(5) Liu I-cheng, p. 7, the price was based on a memorial of T'ao Chu 陶澍 around 1825. In 1831, it is said that the price of rice was 5,000 cash per *shih*.

(6) Hsia Nai 夏鼐, "T'ai-p'ing t'ien-kuo ch'ien-hou Ch'ang-chiang ko-sheng chih t'ien-fu wen-t'i 太平天國前後長江各省之田賦問題 (The land tax problem of the Yangtze provinces before and after the Taiping Rebellion)," *Ch'ing-hua hsüeh-pao* 清華學報, 10.2 (April 1935), p. 469.

Appendix Table 4: Sung-chiang Fu: Indicators for Tax Burden Analysis

p: the market price. v: The commutation rate.
r: the commutation price. u: The degree of tax burden.
g: the price gap. q: the tax quota per unit of land.

Year (2) 1656-1662						
Place	p	r	g	v	u	q
Hua-t'ing 華亭	0.8	0.803	-0.003	0.695	1.002	0.287
Feng-hsien 奉賢						
Lou hsien 婁縣	0.8	0.802	-0.002	0.629	1.001	0.330
Chin-shan 金山						
Shang-hai 上海	0.8	0.851	-0.063	0.641	1.041	0.261
Nan-hui 南匯						
Ch'ing p'u 青浦	0.8	0.824	-0.030	0.647	1.019	0.281
Ch'uan-sha 川沙						
Sung-chiang Fu 松江府	0.8	0.822	-0.027	0.644	1.017	0.286
Weighted Average	0.8	0.820	-0.025	0.644	1.016	0.289

Year (3) 1775						
Place	p	r	g	v	u	q
Hua-t'ing 華亭	1.70	0.564	0.668	0.648	0.567	0.301
Feng-hsien 奉賢	1.70	0.559	0.647	0.677	0.562	0.286
Lou hsien 婁縣	1.70	0.571	0.664	0.619	0.589	0.350
Chin-shan 金山	1.70	0.585	0.655	0.589	0.614	0.322
Shang-hai 上海	1.70	0.575	0.661	0.670	0.558	0.286
Nan-hui 南匯	1.70	0.635	0.562	0.587	0.633	0.239
Ch'ing p'u 青浦	1.70	0.582	0.657	0.641	0.579	0.302
Ch'uan-sha 川沙						
Sung-chiang Fu 松江府	1.70	0.581	0.658	0.636	0.582	0.293
Weighted Average	1.70	0.581	0.658	0.633	0.584	0.298

Year (4) 1795						
Place	p	r	g	v	u	q
Hua-t'ing 華亭	2.75	0.592	0.784	0.648	0.492	0.301
Feng-hsien 奉賢	2.75	0.587	0.786	0.677	0.486	0.285
Lou hsien 婁縣	2.75	0.599	0.782	0.619	0.567	0.350
Chin-shan 金山	2.75	0.615	0.776	0.589	0.543	0.322
Shang-hai 上海	2.75	0.605	0.780	0.669	0.479	0.286
Nan-hui 南匯	2.75	0.667	0.757	0.586	0.557	0.239
Ch'ing p'u 青浦	2.75	0.611	0.778	0.641	0.502	0.302
Ch'uan-sha 川沙						
Sung-chiang Fu 松江府	2.75	0.610	0.778	0.636	0.505	0.293
Weighted Average	2.75	0.610	0.778	0.632	0.509	0.298

Appendix Table 4 (continued)

Year (5) 1810						
Place	p	r	g	v	u	q
Hua-t'ing 華亭	3.5	0.602	0.828	0.648	0.464	0.301
Feng-hsien 奉賢	3.5	0.595	0.830	0.676	0.439	0.285
Lou hsien 婁縣	3.5	0.609	0.826	0.623	0.486	0.350
Chin-shan 金山	3.5	0.624	0.821	0.589	0.517	0.322
Shang-hai 上海	3.5	0.607	0.826	0.677	0.441	0.290
Nan-hui 南匯	3.5	0.677	0.806	0.587	0.527	0.239
Ch'ing p'u 青浦	3.5	0.619	0.823	0.641	0.473	0.302
Ch'uan-sha 川沙	3.5	0.688	0.803	0.582	0.533	0.233
Sung-chiang Fu 松江府	3.5	0.619	0.823	0.636	0.477	0.293
Weighted Average	3.5	0.627	0.820	0.628	0.485	0.290

Year (6) 1875						
Place	p	r	g	v	u	q
Hua-t'ing 華亭	2.5	1.255	0.498	0.554	0.725	0.168
Feng-hsien 奉賢	2.5	1.364	0.454	0.553	0.749	0.151
Lou hsien 婁縣	2.5	1.271	0.491	0.554	0.728	0.187
Chin-shan 金山	2.5	1.083	0.566	0.554	0.686	0.196
Shang-hai 上海	2.5	1.172	0.531	0.582	0.691	0.173
Nan-hui 南匯	2.5	0.833	0.666	0.582	0.612	0.196
Ch'ing p'u 青浦	2.5	1.269	0.492	0.545	0.732	0.172
Ch'uan-sha 川沙	2.5	0.824	0.670	0.582	0.610	0.194
Sung-chiang Fu 松江府	2.5	1.149	0.540	0.564	0.696	0.177
Weighted Average	2.5	1.130	0.548	0.563	0.692	0.179

Source of the price (p):

(2), Ch'uan Han-sheng, p. 510.

(3), (4), (5), Liu I-cheng, pp. 6-8. It has said that after 1755, the normal price of rice was 1,400 to 1,500 cash per *shih*; after 1785 the price was from 2,700-2,800 cash per *shih* to 3,400-3,500 cash per *shih*; around 1800 the price was about 3,000 to 4,000 cash per *shih*. The cash-silver ration fluctuated through time. In general, before 1786, one tael of silver could be exchanged for 800-900 cash; while after, it could be exchanged for slightly more than 1,000 cash. See Ch'uan Han-sheng, pp. 477-478. For the period (3), we take 1,450 cash per *shih* and convert it into silver by 850 cash; for (4), 2,750 cash converted by 1,000 cash; for (5) 4,000 cash converted by 1,150 cash.

(6)The price of 1864 was shown in Table 3 is used here.