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AN ANALYSIS OF THE CH'ING LAND TAX BURDEN, 1650-1865

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Introduction

In an agrarian economy, the purpose of land tax is to enable the government to acquire the means (i.e. food and clothing) to sustain the labor force which it hires or recruits. In the early T'ang period (618-906), while the adult male (ting) was the tax base, laborers were acquired by corvée (yung) and tax in kind was carried out separately for food (under the name of tsu) and cloth (under the name of tiao).[1] But this tax system together with the land allotment system finally ceased to function by the end of the eighth century.[2] Thereafter, the evolution of the land tax system during one thousand years or so was mainly a result of the development of the market system and population pressure. Peace time corvée was gradually replaced by "contractural" hiring in the market. Payment in kind was partly commuted into monetary payment. Land instead of labor gradually took on relative and absolute scaracity value and became the tax base.

During the Ch'ing period (1644-1911), the traditional land tax system inherited from Ming times went through its final stage of evolution. In terms of payment, the practice of commutation

(che-yin) was institutionalized. In terms of the tax base, the shifting of the incidence of the ting tax into a land tax (t'an-ting-ju-ti) definitely made land the sole tax base.

The Ch'ing land tax system was able to function smoothly by the end of the eighteenth century when the dynasty was at its prime of prosperity. However, during the second half of the nineteenth century, the land tax system had lost its efficiency so that it was not able to help provide more revenue for programs of industrialization which the government undertook in response to the impact of the West. The inflexibility of the land tax system may be accounted for one of the major institutional disadvantages which hindered the transition of traditional Chinese economy.

To investigate the weakness of this tax system, we should pay attention to the concept of tax burden.[3] The weakness of the Ch'ing land tax system is manifested in the gradual reduction of the tax burden. From the viewpoint of the government, the reduction of the tax burden meant that tax revenue decreased. The purpose of this paper is to trace this weakness to two practices: that of commutation and shifting of the incidence of labor services into land tax.

In the following paper, we shall first sketch briefly the basic features of the Ch'ing land tax system (Section 1). Then we shall provide a model to analyze the commutation practice and

the fixed tax quota and their impact on the tax burden (Section II). In order to implement the theoretical analysis, we shall in turn explain the way that the statistical data are used (Section III) and apply the theory to interpret the data (Section IV). Our conclusions are two-fold: (1) the tax burden had decreased enormously and (2) this decrease was owing to the lack of the automatically adjustable nature of the land tax system. Government revenue was affected, therefore, by factors which were not anticipated by the designers of the system. But this land tax system at least corresponded to the policy and the needs of the Ch'ing government prior to the beginning of the nineteenth century. In the second half of the nineteenth century, the Ch'ing land tax system had already lost its efficiency and it would inevitably give way to a new one in the course of institutional evolution. In the appendix, we shall briefly explain the nature of our primary data source.

I. Basic Features of 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 (1368-1644), the evolution of the land tax system had two major facets. On the one hand, labor service payment was absorbed into land tax (i.e. i-t'iao-pien or "single-whip" as known in Ming and t'an-ting-ju-ti as known in early Ch'ing). On the other hand, the

practice of commutation into silver (che-yin) had evolved. Since these were the two major characteristics which were adopted in the design of the Ch'ing land tax system, let us investigate their economic significance separately.

The Practice of Commutation

The Ch'ing land tax system had the following feature inherited from the Ming system. 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 was called the practice of commutation. The practice of commutation must arise for an obvious reason. In a large agrarian empire characterized by heterogeneity of crop regions (e.g. rice, wheat, millet etc.)[4] such as China, the central government must select one commodity as the standard of value for taxation purposes. 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 hand, of all the commodities, rice was the best proxy for money.[5] Thus for a non-rice growing region, commutation is an indispensable device.[6]

However, even for such rice growing regions as Sung-chiang and Su-chou which will be later analyzed in our paper, the commutation practice was used to increase the efficiency of the tax

system. This was due to the fact that in a large agrarian empire such as China, the land tax system itself was a device for "spatially oriented unilateral transfer." Let us use an example to illustrate this idea.

In Diagram 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 (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 (e.g. rice) produced by taxpayers in Sung-chiang and transferred to beneficiaries in Peking and Ta-t'ung. Assuming 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 consumption expenditures of C_1=30 and C_2=70 which are financed by the tax revenue.

The flow chart in Diagram 1a is split into a financial component in Diagram 1b and a real component in Diagram 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 regions, such as Su-chou and Sung-chiang,[7] to the poor regions.

The financial component is merely an institutional arrangement to accommodate the unilateral transfer. Notice that in Diagram 1b, the flows form 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 (i.e. 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 Diagram 2a, Sung-chiang transfers S_3=50 ounces of silver to Yunnan (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 Diagrams 2b and 2c. The rational pattern of real resources flow (see Diagram 2c) depends upon such factors as the comparative cost of production in various localities as well as the transportation cost between them.

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

resources utilization. The only way that 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 Diagrams 1a and 2a is to portray the operation of such a market system. The economic significance of the commutation practice is that it is a crucial part of an organizational design which leads to efficient patterns of spatical resources allocation associated with inter-regional unilateral resources 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, i.e. 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 75 percent (i.e. 75 percent of the tax quota is paid in silver). Our empirical data show that in the period from 1656 to 1865, the commutation rates were fairly stable (i.e. usually around 50 percent to 49 percent in the case of Su-chou and 64 to 63 percent in the case of Sung-chiang). What then accounts for the stability of the commutation rate?

Our conjecture is that part of the tax quota not commuted (i.e. paid in rice) was corresponding to those usages of rice which could be most efficiently handled under government auspices.

Typical items included in this category were: (1) storage in local official warehouses; (2) tributary grain shipped by government sponsored transport system (ts'ao-yun). Traditionally, these shipments were destined to strategically located warehouses serving the needs of the capital city and the garrisons in 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 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) of the late T'ang dynasty (formally announced in 780 A.D.) to the "single-whip" system (i-t'iao-pien-fa) of the late Ming dynasty (started from the 1520's). 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" (i.e. 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 (i.e. area of cultivation) as the primary object of taxation.[8]

This major principle of evolution in the tax system manifested itself in the absorption of labor services levy into the land tax. What emerged finally is 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 on 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)

This is shown by the straight line AB (i.e. the "idealized" tax line) in Diagram 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) and 2b units of tax on adult male (ting-yin).

According to Adam Smith, two basic principles in the design of a tax system are its productiveness (i.e. yielding adequate tax revenue) and administrative feasibility.[9] As far as productiveness 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.

From the viewpoint of administrative feasibility, the idealized system encountered a basic difficulty of tax evasion through under reporting of the number of adult males. In Diagram 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 horizotal indicating a situation of increasing ting without increasing tax (tzu-sheng jen-ting yung-pu chia-fu). 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 the practice of this sort must have been prevalent towards the end of the Ming dynasty, the Ch'ing ruler made all this official. The K'ang-hsi 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.[10] Soon after this decree was issued, a fixed ting tax quota (called ch'ang-o) 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 Diagram 3).[11] This historical tax base could not be changed except for minor reasons.[12]

In summary, the pre-modern 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-itao 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 its efficiency of unilateral transfer in a spatially integrated agrarian economy. These briefly sketched features will serve as background for our analysis below.[13]

II. A Theoretical Analysis of the Land Tax Burden

The twin features of the Ch'ing land tax system--i.e. the fixed tax quota on land and the fixed commutation rate--which were adopted in the early days of the Ch'ing dynasty had given the tax system an unexpected and undesirable property of inflexibility and rigidity. The net result was that the government revenue was inadequate. It is clear that with a relatively constant amount of land and a fixed tax quota, revenue can not keep up with the expansion of agricultural output as population increases. However, the difficulty is compounded because the fixed quota system operated under the fixed commutation rate, leads automatically to a lightening

of the tax burden in terms of rice when the price of rice increases. It is the purpose of this section to investigate the above issue analytically. We shall introduce, 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 section.

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 fulfill the quota is given by

$$2)\quad pQ = pR + S$$

In Diagram 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 (i.e. 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 on 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 (i.e. larger p). Thus at points A, A_1, and A_2, with the same tax payment in rice (OB), the tax payment in silver 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 disign of tax system were obviously aware of the fact that if the commutation price was fixed (i.e. if the commutation price represented by the line QM remains 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 (e.g. $A_1B < A_2B$). The opposite was true when the price of rice fell (e.g. $AB < A_1B$). It is for this reason that the central government stipulated an administrative procedure through which the commutation price could be changed. This procedure required the local officials to "memorialize" to the central government for the change of price.[14] 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.

In fact, the frequent change of the commutation price was

very difficult to administrate for a technical reason. The price of rice can fluctuate for various reasons, such as seasonal, secular, and more violent change due to short-run 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

$$3)\quad rQ = rR + S$$

In Diagram 4, suppose the tax pattern line according to the market price is QM. In case the commutation price is lower than the market price (i.e. $r < p$), 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 (i.e. $r > p$).

Analysis of 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 (i.e. $OC < OQ$). 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' and 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) $u = OC/OQ$ .....(degree of tax burden)

when $u < 1$, the tax burden is less than the quota. For example, if $u=.8$ 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, i.e. 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 Diagram 4,

5) $v = AB/ON'$ $(=BQ/OQ)$ ..... (commutation rate)

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

6) a. $u = 1 - vg$ where

b. $g = (p-r)/p$

In equation 6b, g is the degree of price gap, i.e. the price gap (p-r) as a fraction of the market price (p). Equation 6a states that tax burden is lighter when v is larger (i.e. when the commutation rate is high) and/or when g is large (i.e. 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.[15]

These equations provide the framework for empirical study. In Section III, we shall explain the nature of statistical data which will be used for this study. The application of these data to our theory will be presented in Section IV.

III. 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 is selected so that the land tax burden can be investigated in a long-term historical perspective. The two prefectures are selected for two reasons. On the one hand, they are quantitatively important as together their total land tax payment accounted for more than 10 percent of the total land tax of the country.[16] On the other hand, statistical data needed for our study (i.e. tax quota Q, tax payment in rice R and in silver S, and the market price p) are available.

At any moment in time, 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) in this given order. For we have

7) a. Commutation price $r = \frac{S}{Q-R}$ ..... By (3)

b. Price gap as a fraction of market price $g = \frac{p-r}{p}$ By (6b)

c. Commutation rate $v = \frac{AB}{OM'} = \frac{S}{rQ} \left(= \frac{Q-R}{Q}\right)$..... By (5)

d. Degree of tax burden $u = 1-vg$ ..... By (6a)

When Q, R, S, p are substituted in these equations, we can readily calculate the values of r, g, v, u. In addition to these indicators, we also need to verify the hypothesis that the tax quota (Q) per acre of land is relatively constant. As we have shown in Diagram 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, i.e.

8) $q = Q/A$

The values of p, r, g, v, u, q "identified"[17] in this way for the Su-chou and Sung-chiang prefectures are summarized in Table 1 for the indicated landmark years. The primary data sources and the procedure which we have used to calculate these parameters will be explained in the appendix.

(insert Table 1)

IV. Empirical Analysis of Tax Burden

The time series for the six indicators of Table 1 are shown in the three panels of Diagram 5.[18] The top panel contains the

time series u, v, and g needed to implement equation 6a (i.e. 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 Diagram 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 operating in these key taxpaying districts of south China.[19] The similarity between the two prefectures thus lends credibility to our theory.

Prior to 1865, the tax burden per mou (1 mou = .16 acre) remained practically stable. On the average it was about .3 shih (1 shih = 103 litres) which was about one seventh of the yield of rice per mou.[20] After 1865, owing to the tax reduction movement carried out during 1864-65.[21] the tax quota per mou was reduced to about .2 shih in the two prefectures. This verifies our hypothesis of fixed quota per unit land.

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

Diagram 5. The u-shaped characteristic of these curves immediately reveals that there were two distinct phases marked off by a turning point around 1820-1830. In the first long phase of approximately one hundred and sixty 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 30-40 years (1830-1865).

What is most striking was the severity of the decline in the first phase. In the case of Sung-chiang, for instance, the decline over one hundred and fifty years (1656-1810) was from 1.02 to .48, a drop of more than 50 percent. This means that in terms of rice, the tax collected was less than half of the original quota. This loss was partially recovered during the second phase. However, 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 Ch'ing period in the 1650's as the Ch'ing ruler inherited the Ming system, the burden of the quota system was realized to its full amount for a while. This can be seen from the fact that the u-curves begin from points which are very close (or even slightly higher) than its full amount (i.e. u = 1 shown by a horizontal line). The decline of this tax burden was a cumulative result of

imperceptible decreases which "crept in" annually (e.g. .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 which 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 hence they were not responsible to the fluctuation of the degree of the tax burden.

It may be observed in passing that the u-curve 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.[22] Second, Sung-chiang was more of a cotton growing region than

Su-chou,[23] and hence its crop pattern was more conducive to a higher commutation rate (see Section I). Thus the difference between the two prefectures reflects the difference of their roles in the spatially oriented unilateral resources 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). It is very apparent that the inverse u-shaped time pattern of g is explained mainly by the behavior of the market price. This is readily 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, therefore, the increase of the commutation price after 1810 and 1830 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 hundred-and-sixty-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 (see Section II), leaving the real impact of the tax burden completely at the mercy of variations of the monetary price level.

The variations 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.[24] The price level again decreased because of the import surplus and the silver export owing to 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 monetary factor. Such a conclusion is unwarranted because it fails to take into consideration adequacy 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.

A basic policy after the founding of the Ch'ing dynasty was to lower taxation for well-known political reasons.[25] The pacification of the Three Feudatories (San-fan) and then Taiwan in 1683 heralded the beginning of a long period known to historians as the age of great prosperity (sheng-Ch'ing) which ended with the

termination of the rule of Ch'ien-lung emperor 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.[26] Thus w_e see the lowering of the degree of tax burden (i.e. the u-curves in Diagram 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.[27]

The up turn of the degree of the tax burden after 1830 (see Diagram 5) 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 revenues was generated.[28] This pressure resulted in the up turn of the commutation price (r) in 1830 (see the lower panel of Diagram 5) which contributed to narrowing the price gap (g). At the same time, the commutation rate (v) began to drop (especially for Sung-chiang, see the top panel of Diagram 5). Both adjustments contributed to an increase in the degree of the tax burden.[29] 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

which was consistent with basic government objectives. Such a land tax system was obviously not a rational one, because it had to rely on an unpreditable accidental factor to achieve its function of producing 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 is least disruptive of the market system.[30] However, the administrative efficiency of a flexible land tax system (e.g. the assessment of land tax as a percentage of output rather than a fixed quota) is quite difficult to achieve, especially when the country is very large and characterized by deversified local conditions such as China. For this reason, after the Taiping Rebellion (1850-1864) the increasing government revenue was raised mainly by the very disruptive transit tax (likin) and a host of nuisance taxes (k'o-chuan tsa-shui). By 1908, the land tax accounted for only 35 percent of the total government revenue, a decline from about 75 percent in 1753.[31]

The transition of an agrarian economy into a modern industrialized society necessarily requires the use of agricultural surplus to finance industrialization. There are well documented evidences that during the Meiji Japan, this agricultural surplus was transferred to the industrial sector via a reformed and flexible land tax system. In the last two decades of the

nineteenth century the land tax accounted for over 80 percent of the government revenue of Japan.[32] On the contrary, the Ch'ing government lacked the far sightedness to launch a resolute drive for industrialization and modernization comparable to the Meiji government of Japan. A manifestation of that reluctance was the lack of enthusiasm for land tax reform and thus the taxation system was left in a highly chaotic state during the early Republic period (1911-1937).

Appendix

In this appendix, we want to describe the primary data source which we have used to compute the values of the parameters summerized in Table 1 in the text. As explained in Section III, this involves the collection of primary data of A (taxable acreage), Q (tax quota in 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 has a number of smaller administrative units, i.e. the counties (hsien).

For the primary data of the market price (p), we make use of the data supplied by several contemporary authors.[33] We have assume that a single price prevailed for all the counties in any one prefecture at any moment of time (i.e. we neglect the price variation between counties), because price differences between counties cannot exceed local transportation cost. Moreover, the prices selected for our two prefectures at different time points show a secular trend quite similar to that which has been traced out for the Ch'ing period by other authors.[34]

For the primary data, A, Q, R, S, we make use of the statistical data contained in the prefecture gazetteers (fu-chih) and the county gazetteers (hsien-chih) which are available for most of the counties and for most of the landmark years.[35] The

compilers of the local gazetteers often indicated explicity that they in turn, obtained their data from the Fu-i ch'uan-shu (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 landmark years, 1656-1710, 1725-1726, 1738-1750, 1830, 1865, in Table 1 indicate the approximate dates of the Fu-i ch'uan-shu. These years are selected because of the availability of all the data (A, Q, R, S) which we need. In case only a part of data is available the year is discarded.[36]

The taxable acreage (A) represents the total taxable cultivated acreage which included various grades of land generally classified as t'ien (rice paddy), ti (dry field), shan (hilly land), and tang (swampy land).[37] For the taxation purposes, the land of lower grades was converted to a certain amount of the first grade land. The practice was known as chun-shou (allowable for well cultivated land) or che-shih (converting to the taxable unit).[38] Therefore, the taxable acreage was different from the real spatial area.

The tax quota (Q) represents the tax quota in rice, known in recordes as p'ing-mi ("eqalized" quota of rice).[39] The local gazetteers pointed out that p'ing-mi included the absorption of

labor services payment (ting-yin) as well as tributary rice and its surcharge.[40] The local gazetteers also made it clear that p'ing-mi (i.e. the tax quota) was a tax obligation which could be fulfilled either by payment in rice (pen-se-mi) or payment in silver (che-se-yin)--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 (i.e. shih-cheng) 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, which will be available in duplicated form from the authors.

Footnotes

* The anthors feel grateful to the Concilium of International Studies at Yale University and the Social Science Research Council for the financial support to their research on Chinese economic history during 1974-1976, out of which this article was written.

1. A Glossary of Chinese terms and names used in this article is available in duplicated form from the authors.

2. For details of the tsu-yung-tiao system and the chün-t'ien system, see D. C. Twitchett, Financial Administration under the the T'ang Dynasty (Cambridge, 1963), Chapters I and II.

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

4. John L. Buck, Land Utilization in China (Nanking, 1937), Chapter II. Buck classified the crop regions in China into eight.

5. In the theory of money, before the age of matellic standard, a commodity which posesses the following properties is most likely to be selected as "money": 1) divisibility, 2) durability, 3) homogeneity, 4) discernibility (or familiarity) and 5) stability in quantity. The fact that rice more than any other commodity fulfills all these properties can be seen from the fact that during the Sino-Japanese War (1937-1945), rice was chosen as the standard of value for many transactions (including

compensation for civil servants) as the formal monetary system was disrupted by inflation.

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

7. 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 had noted it in his Jih-chih-lu (Daily notes), chüan (volume) 10. Some authors have tried to clarify the reason for this. See Chou Liang-hsiao, "Ming-tai Su-Sung ti-ch'ü te kuan-t'ien yü chung-fu wen-t'i" (The government land and its relations to the heavy tax burden in the Su-Sung areas in Ming times), Li-shih yen-chiu (Historical studies), 1957:10 (October 1957) 63-75. Wu Chi-hua, Ming-tai she-hui-ching-chi-shih lun-ts'ung (Studies on socio-economic problems of the Ming period, Taipei, 1970), the first two chapters in Part I, pp. 17-73. According to the later, the tax quota of Su-Sung areas together amounted to 13.68% of the countrywide total during the Ming period (p.45). Since the early Ch'ing tax quota was adopted from that of the later Ming, the situation remained the same. See Su-chou fu-chih (The gazetteer of Su-chou prefecture, 1853 ed.), 12: 18b-33b.

8. 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 that made it administratively

difficult to tax on the basis of population. However, the continuing emphasis on the compilation of land statistics culminated in the Yu-lin-t'u-ts'e (Fish-Scale Maps and Books) in the early Ming.

9. Adam Smith, An Inquiring into the Nature and Causes of the Wealth of Nations (The Modern Library edition, New York, 1965), pp. 769-778.

10. The decree is recorded in Ch'ing Sheng-tsu shih-lu (The veritable record of K'ang-hsi period, 1662-1722), 249:14b-16a.

11. This process started in 1716 and finished in 1745. See Ch'ing-ting ta-Ch'ing hui-tien shih-li (Precedents of the collected statutes of the Ch'ing dynasty, the Chia-ch'ing edition, 1801), 123:11b-16b.

12. In a locality, the tax quota can be changed for a few reasons: 1) some parts of the cultivated land become wasteland due to natural calamities; 2) newly reclaimed land which is subject to tax; 3) a change in the administrative unit boundary and hence a shift of the tax quota to correspond with the new boundary.

13. Our brief sketch of the historical outline of land tax system is a familiar story recognized by traditional historical analysis. The essential message conveyed by historians are three-fold in purposes: 1) non-realiability of the ting data as a measurement of adult male, especially under-estimation; 2) from a long-run historical perspective, the tax base in traditional

China had finally shifted from tax on people to 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 Ping-ti Ho, Studies on the Population of China, 1368-1953 (Cambridge, Mass., 1959), Chapter II; Yeh-chien Wang, Land Taxation in Imperial China, Chapters 2 and 3.

14. See Hu-pu tse-li (Regulations of the Board of Revenue, first compiled in 1776, reprint of the 1865 edition, Taipei, 1968), 19:8b.

15. As a 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

$vg = (1-BC/BQ)\ (BQ/OQ) = BQ/OQ - BC/OQ = CQ/OQ$, therefore,

$u = 1 - vg = 1 - CQ/OQ = OC/OQ$

16. See footnote 6.

17. In the language of econometrics, what we have shown in this section is the "identification" of the six parameters which are essential for our analysis. The meaning of "identification" is to make inference on the values of the parameters based on the observable magnitudes (i.e. in our model, A, Q, R, S, and p) under the assumption that the observable magnitudes are indeed produced

in a system which can be described by the model structure.

18. The years for which we have data are indicated by the rows of Table 1. Values for other years in Diagram 5 are based on the technique of interpolation.

19. The similarily of time patterns exhibited for the two prefectures can in most cases be supported by those of the smaller administrative units, namely, the counties of the two prefectures.

20. 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, 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 comp. Huang-ch'ao ching-shih wen-pien (Essays on the statecraft during the Ch'ing dynasty, 1827), 26:20a. In the nineteenth century, according to Tseng Kuo-fan, the yield per mou was from 1.5 to 2 shih, see Huang-ch'ao cheng-tien lei-tsuan (Classified documents of the Ch'ing dynasty, reprint, 1969), 8:4a. And according to Lin Tse-hsü, 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, see 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.

21. For the details of this movement, see Hsia Nai, "T'ai-p'ing t'ien-kuo ch'ien-hou Ch'ang-chiang ko-sheng chih t'ien-fu wen-ti" (The land tax problem of the Yangtze provinces before and after the Taiping Rebellion), Ch'ing-hua hsueh-pao (The Tsing Hua Journal), 10.2 (April 1935), 409-474.

22. In 1825, T'ao Chu, governer of Kiangsu, proposed to the central government that the shipment of government grain should take the sea route. See Ch'ing Hsüan-tsung shih-lu (The veritable record during the Tao-kuang period, 1821-1850), 84:26a-27b; also see Sung-chiang fu hsu-chih (1884 ed.), 13:5b-6a. For the details, See Ho Ch'ang-ling, Chiang-su hai-yun ch'uan-an (The complete decuments of the sea transportation from Kiangsu, c. 1830).

23. Ch'uan Han-sheng, "Ya-p'ien chan-cheng ch'ien Chiang-su te mien-fang-chih-yeh" (The cotton industry in Kiangsu before the Opium War), in the author's Chung-kuo ching-shih-shih lun-ts'ung, (studies on Chinese economic history Hong Kong, 1972), pp. 626-627.

24. Ch'uan Han-sheng, "Mei-chou pai-yin yü shih-pa shih-chi Chung-kuo wu-chia ke-ming te kuan-hsi" (American silver and the price revolution in the eighteenth century China), in the author's Chung-kuo ching-chi-shih lun-ts'ung, 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, 5.2 (1972), 354.

25. Ch'ing Shih-tsu shih-lu (The veritable record of the Shun-chih period, 1644-1661), 6:9b-10b.

26. 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.

27. Ch'en Ch'i-yuan, Yung-hsien-chai pi-chi (Notes of Yung-hsien-chai, reprint, Taipei, 1960), 6:8a. Also see Su-chou fu-chih (1883 ed.), 12:51b-52a. Pao Shih-ch'en, An-wu ssu-chung (Four works of Pao Shih-ch'en, 1846), 25A:30a.

28. 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 Chang-ling, Huang-ch'ao ching-shih wen-pien, 27:29a. But this stock of silver gradually drained out, as in the 1830's, the government began to find it difficult to keep fiscal balance, see Chu Hsieh, Chung-kuo ts'ai-cheng wen-ti (The fiscal problems in China, Shanghai, 1934), pp. 70-72.

29. After the Taiping Rebellion, the tax reduction movement resulted in the decrease of tax quota for the Yangtze provinces. However, these reductions were in a nature of temporary relief and could not be regarded as evidences contraditory to a trend for higher taxes as seen from the up swing of the u-curves which started 30 years earlier.

30. For example, See Henry George, Progress and Poverty (New York: Robert Schalkenbach Foundation, 1966), pp. 413-414.

31. For the history of likin, see Lo Yu-tung, Chung-kuo li-chin-shih (The history of likin in China, Shanghai, 1936). Also see, Ho Lieh, Li-chin chih-tu hsin-t'an (A Reinvestigation on Likin, Taipei, 1972). For a discussion of surcharge on land tax during the last decades of Ch'ing period, see, Yeh-chien Wang, Land Taxation in Imperial China, pp. 61-66; for changes of tax structure, see Wang, p. 80.

32. See Harry T. Oshima, "Meiji Fiscal Policy and Agricultural Progress," in William W. Lockwood ed., The State and Economic Enterprise in Japan, (Princeton, New Jersey, 1965), pp. 357-381. Also see Kazushi Ohkawa and Henry Rosovsky," The Role of Agriculture in Modern Japanese Economic Development," Economic Development and Cultural Change, IX, 1, part II (October 1960), 61-62.

33. Ch'uan Han-sheng, Chung-kuo ching-chi-shih lun-ts'ung, pp. 477-478, 510; Liu I-cheng, "Chiang-su ko-ti ch'ien-liu-pai-nien-chien chih mi-chia" (Price of rice in Kiangsu during a period of one thousand and six hundred years), Shih-hsüeh tsa-shih (Journal of History), 2.3 (September 1930), 5-8; Hsia Nai, "T'ai-p'ing t'ien-kuo ch'ien-hou," p. 469.

34. Yeh-chien Wang, "The Secular Trend," Chart 5 in p. 362.

35. In 1645, the second year of the Ch'ing dynasty, the government first announced that the tax quota of the Wan-li period

(1573-1620) in the late Ming should be adopted. Although we have some data for this year, these data are excluded from Table 1 because they are incomplete in their coverage.

36. Thus an interval (e.g. 1656-1710) is shown whenever the data revision of the Fu-i ch'uan-shu occurred for different counties and different years, or when the data needed are available in different years. It should also be noted that the Fu-i ch'üan-shu was also revised in 1775 and 1795. However, the statistics of the tax quota (Q) for Su-chou prefecture are not available, therefore, these data are not used. Moreover, the data of 1818 is also available for Su-chou. Since the calculation of indicators of tax burden reveals that they are the same as those of 1830, thus these data are not used.

37. 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.), chüan 11; Sung-chiang fu-chih (1817 ed.), chüan 22.

38. For example, see Sung-chiang fu-chih (1663 ed.), 7: 1b-2a; Sung-chiang fu-chih (1817 ed.), 21:40a-43b. According to Wang Chen, land which is already cultivated is called shou (i-keng yüeh-shou), see Nung-shu (Book on agriculture, Taipei reprint of Ssu-ku-ch'üan-shu chen-pen), 2:4a. For the taxation purposes, shou was usually used as an opposite of huang, which meant the cultivated land that had become wasteland. But the huang was not

exempted from taxation. Instead, it was reduced to a certain amount and taxes to be borne by the cultivated land. For an explanation of this, see Chiang-ning fu-chih (1811 ed.), 14:3a. For examples of tax quota of these categories (e.g. shou p'ing-mi and huang-p'ing-mi), see Su-chou fu-chih (1824 ed), 8:17a; 40b.

39. The historical origin of the term p'ing-mi first appeared in records during the 1430's when governor Chou Ch'en 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, to each original unit of tax quota in rice, known as cheng-mi. The total of hao-mi and cheng-mi 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'ü," p. 70.

40. The details of allotment can be seen in some local gazetteers, for example, see Su-chou fu-chih (1824 ed.), chüan 11.

Table 1. Parameters for Tax Burden Analysis

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

Su-chou							Sung-chiang						
year	p	r	g	v	u	q	year	p	r	g	v	u	q
1656-1710	.8	.885	-.106	.497	1.053	.288	1656-1662	.8	.820	-.025	.644	1.016	.289
1725-1726	1.27	.889	.300	.488	.854	.304	1775	1.70	.581	.658	.633	.585	.298
1738-1750	1.45	.741	.498	.492	.760	.303	1795	2.75	.610	.778	.632	.509	.298
1830	3.7	.707	.808	.495	.600	.265	1810	3.5	.627	.820	.628	.485	.290
1865	2.5	1.124	.550	.492	.730	.163	1875	2.5	1.130	.548	.563	.692	.179

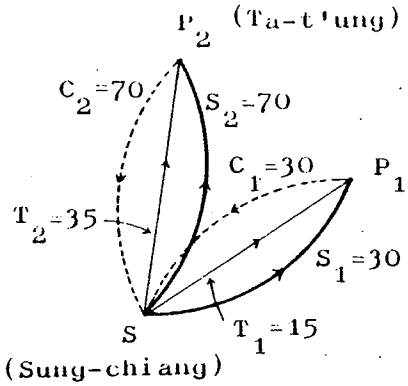
Source: See Appendix

Diagram 1.
Spatial Pattern of
Unilateral Transfer

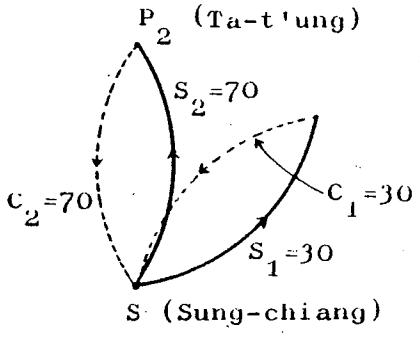
Spatial unilateral transfer from taxpayers at S to beneficiaries at P

Commodity outflow from taxpayers at S to beneficiaries at P

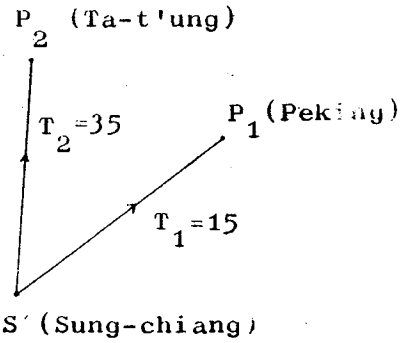
Payment in silver in interregional trade



1a) Spatial flow associated with unilateral transfer

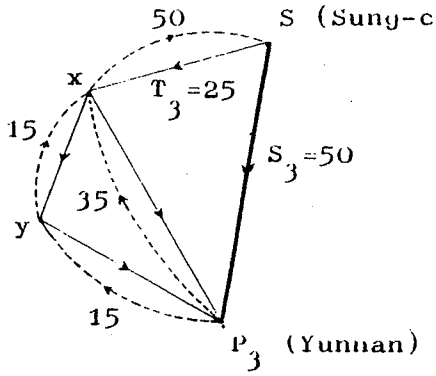


1b) Financial component

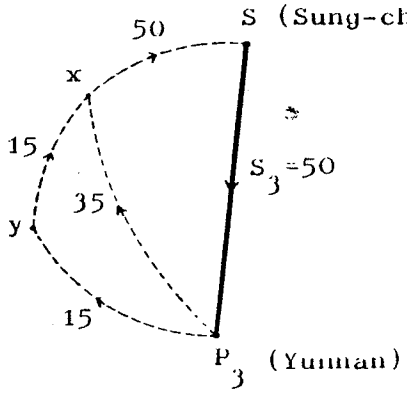


1c) Real component

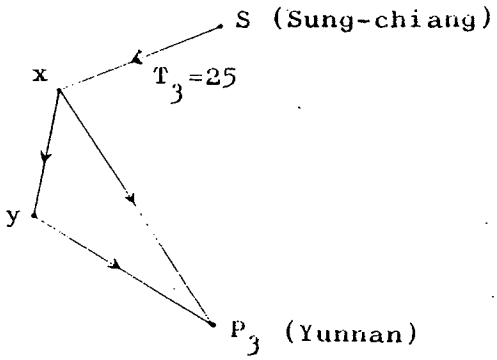
Diagram 2.
Rational Pattern of
Interregional Resources
Flows Associated with
Unilateral Transfer



2a) Interregional resources flows associated with unilateral transfer



2b) Financial component



2c) Real component

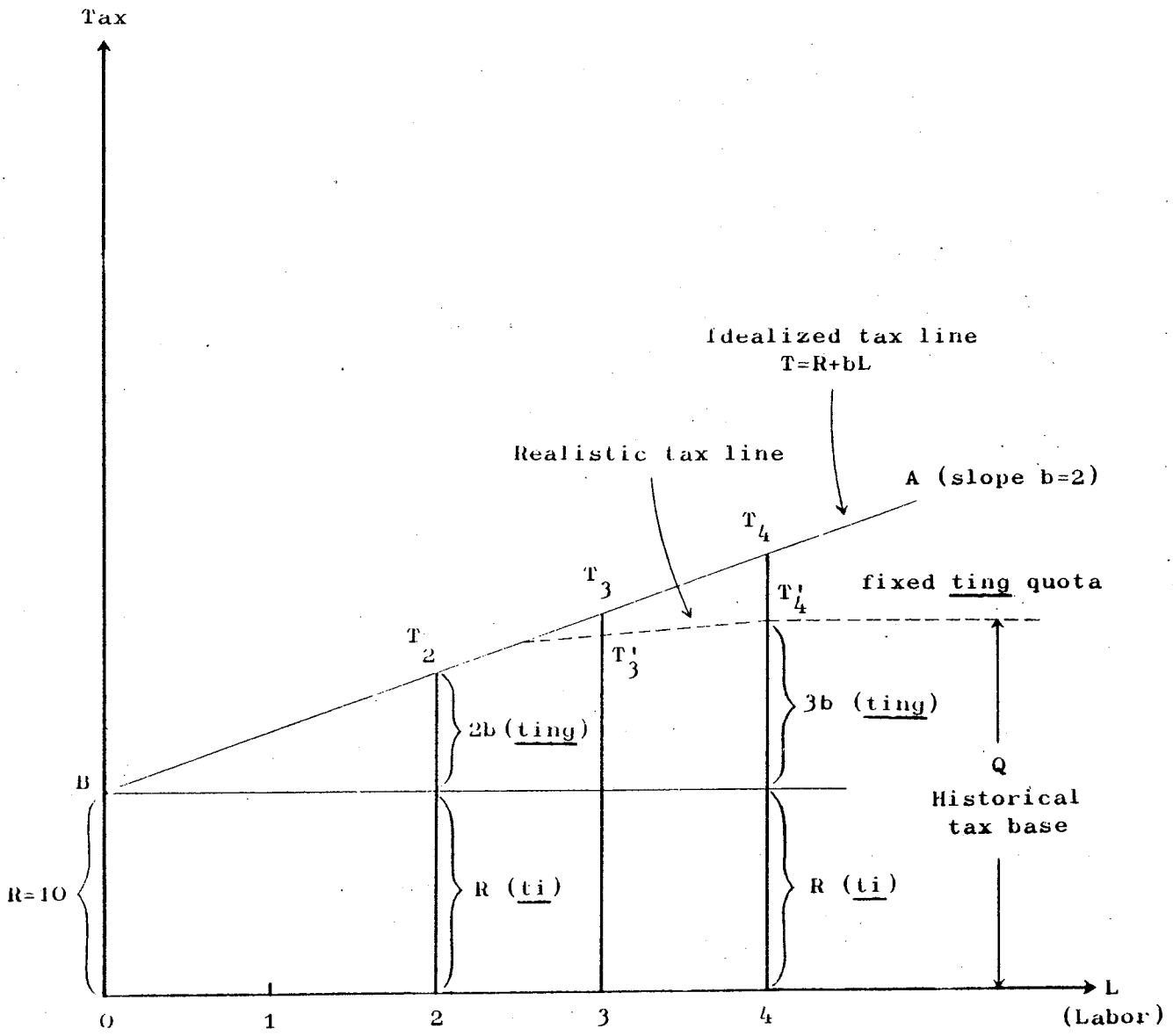


Diagram 3. The Idealized Tax Line and the Realistic Tax Line

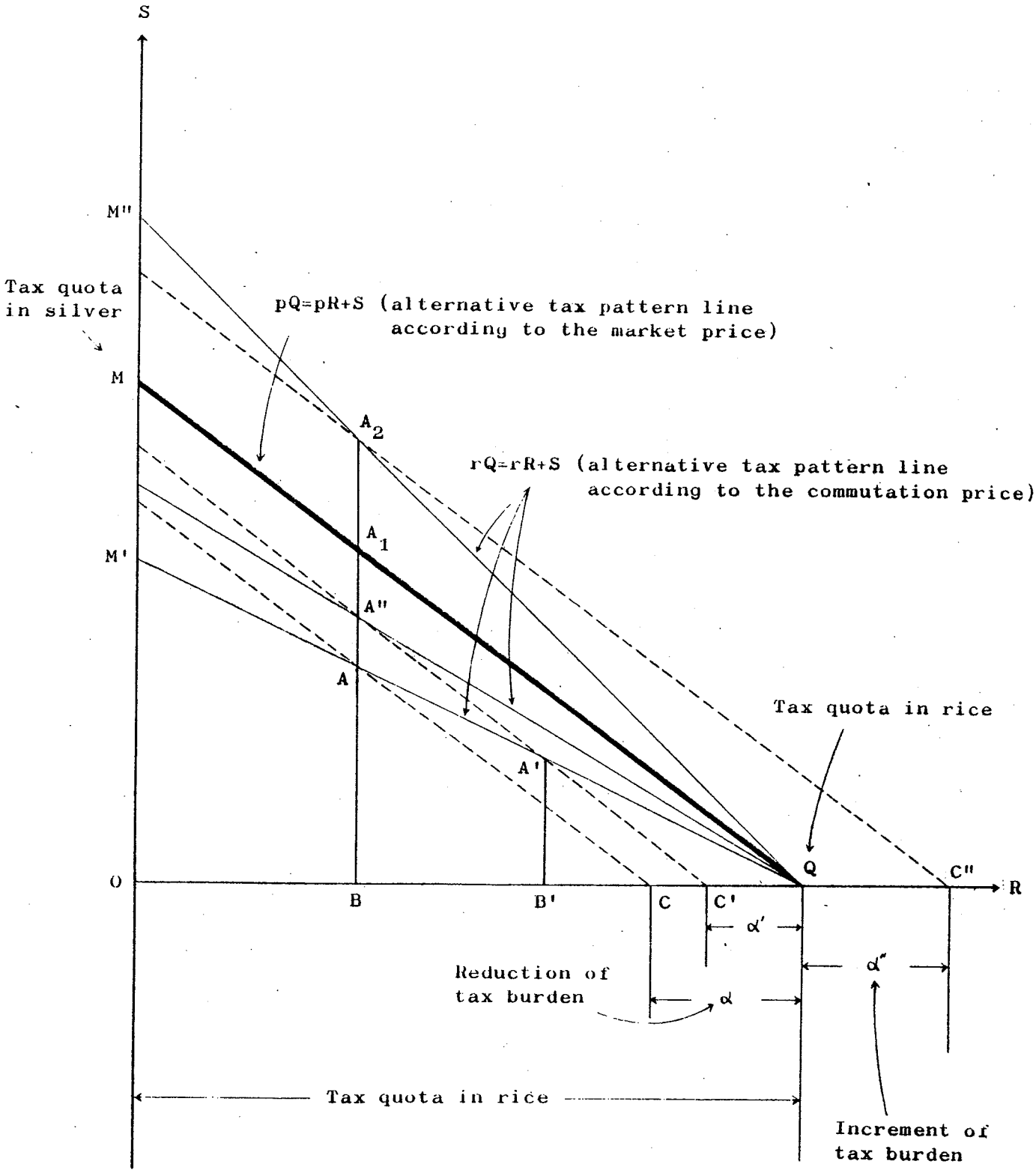


Diagram 4. Tax Payment Pattern and Tax Burden

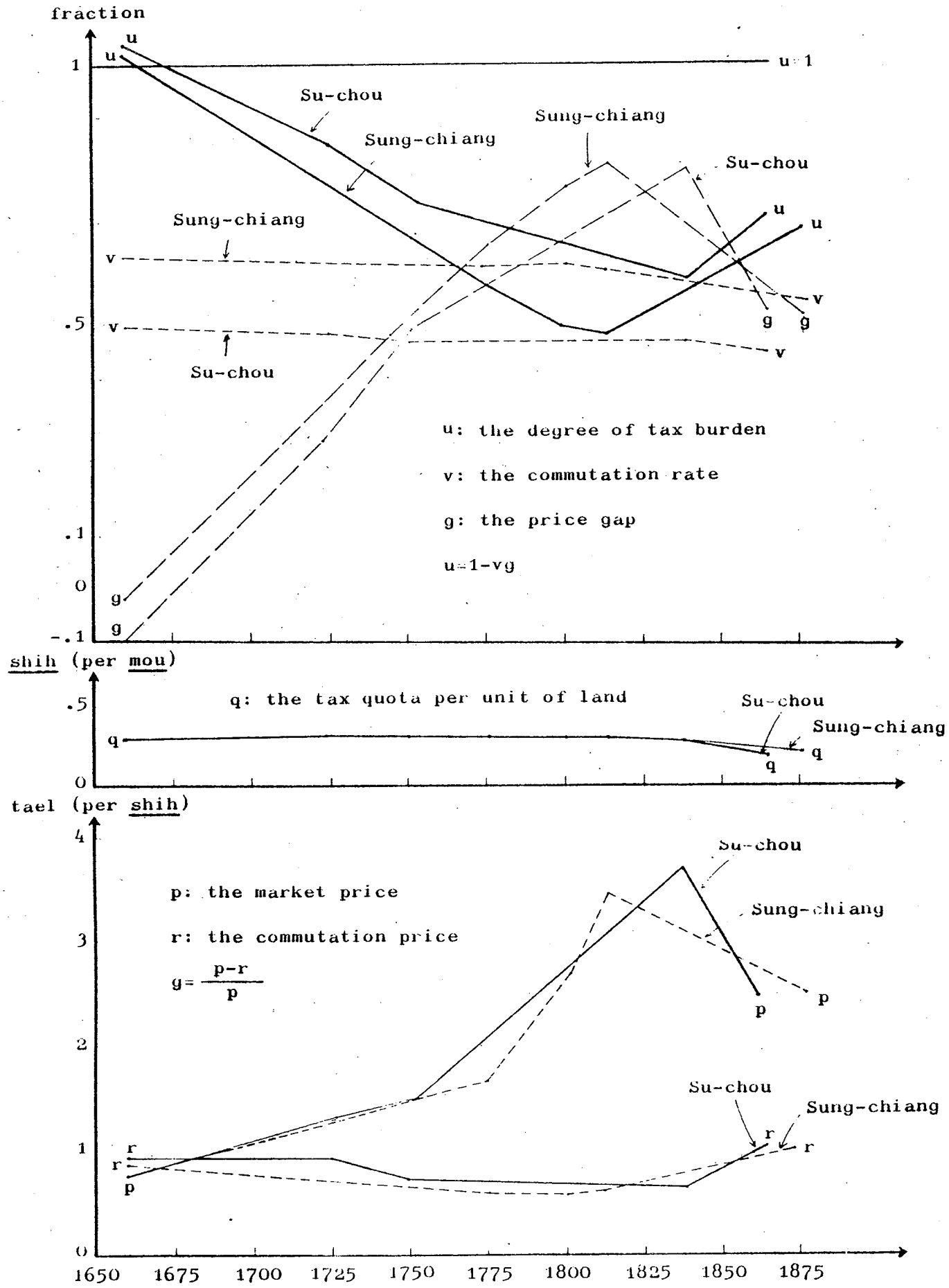


Diagram 5. The Trends of Degree of Tax Burden and other Indicators