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# Dual Landownership as Tax Shelter: How Did the Chinese Solve Ricardo's Problem?

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## Abstract

A conventional theme of the literature on customary land tenure is that multiple ownership and complex tenure systems are obstacles to agricultural development. By studying the persistence of dual landownership in preindustrial China, I hypothesize that complex property norms could be the endogenous outcome of collective choice under institutional constraints, thus may not be inefficient *per se*. Dual ownership acted as a tax shelter for heavily taxed peasants who colluded with lightly taxed gentry to maximize the value of land. I show empirically that as gentry's tax privilege declined after the tax reform, peasants started to consolidate landownership. The dual owner system provided a solution to the land-use inefficiency problem emphasized by David Ricardo: Under unequal taxation, land would end up owned by those with stronger political influence and preferential tax rates rather than by those best able to use it.

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\*Contact: [hyang6@gmu.edu](mailto:hyang6@gmu.edu) I am grateful to the Economic History Association for their generous Dissertation Fellowship. I am indebted to the support from my dissertation committee – John Nye, Alex Tabarrok, and Carlos Ramirez. I would especially like to thank Yoram Barzel for a long discussion of the preliminary ideas of the paper. David Friedman pointed me to his lecture notes about David Ricardo's work. I also want to thank Kang Chao, Mark Koyama, and Tianyang Xi for their suggestions.

*“Rent often belongs to those who, after many years of toil, have realised their gains, and expended their fortunes in the purchase of land or houses; and it certainly would be an infringement of that principle which should ever be held sacred, the security of property, to subject it to unequal taxation.”*

– David Ricardo

## 1 Introduction

Rules of tenure define how property rights to land are to be allocated. The basic economic efficiency criterion for land-use allocation is land value maximization. In an agrarian society, the value of agricultural land is determined by two factors, agricultural productivity and land tax. On the one hand, those with the best farming skills are able to generate the highest output, but may face high land tax rates. On the other hand, those who have political power often enjoy tax privilege, but may not have good farming skills. Therefore, how should property rights be efficiently allocated under the conflicting conditions? This is a problem David Ricardo was concerned with.<sup>1</sup>

This paper provides a solution to Ricardo’s problem that had been used in China from the late Ming Dynasty till the Communist land reform. The solution is dual landownership<sup>2</sup>. Under dual landownership, land was divided into subsoil (*tian di*) and topsoil (*tian mian*). Subsoil properties and topsoil properties were separately sold or collateralized in the land market. Subsoil properties tended to be owned by lightly-taxed gentry households who took the responsibility of paying the land tax<sup>3</sup>. Topsoil properties tended to be owned by heavily-taxed commoner (peasant) households who managed day-to-day farming. While subsoil owners held the official land titles, they did not interfere with agricultural production, but rather collected a ground rent from topsoil owners.

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<sup>1</sup>In *On the principle of Political Economy and Taxation*, David Ricardo wrote: “And if it be considered, that land, regarded as a fit subject for exclusive taxation, would not only be reduced in price, to compensate for the risk of that taxation, but in proportion to the indefinite nature and uncertain value of the risk, would become a fit subject for speculations, partaking more of the nature of gambling, than of sober trade, it will appear probable, that the hands into which land would in that case be most apt to fall, would be the hands of those, who possess more of the qualities of the gambler, than of the qualities of the sober-minded proprietor, who is likely to employ his land to the greatest advantage.”

<sup>2</sup> Some scholars use the concept “One field Two Masters” System. Some call it secondary landlordism system.

<sup>3</sup>The concept of gentry refers for a social class called shenshi or shenjin, meaning variously degree-holders, literati, scholar-bureaucrats or officials.

Economic historians use the concept of the agricultural ladder to describe the hierarchy of a land tenure system from wage laborers at the lowest rung, to sharecroppers and tenants on intermediate rungs, and to sole owners at the top rung (Alston and Ferrie 2008 ). The Chinese dual owner system stands between fixed-rent tenancy and sole ownership. Although the collection of a fixed ground rent makes dual ownership appear as an ordinary fixed-rent tenancy, dual ownership differs from fixed-rent tenancy on several major aspects: First, topsoil owner was not subject to eviction threat as long as the ground rent was paid. Second, once the ground rent was set between the topsoil owner and the subsoil owner, it could never be increased. Third, subsoil owners were not responsible for land improvement.

Interestingly, the Chinese way to solve Ricardo's problem was an application of the Ricardian principle of comparative advantage. In the Qing Dynasty, households were divided into gentry households and commoner(peasant) households. Gentry households enjoyed tax privileges, but did not have good farming skills. While gentry households had a comparative advantage in tax reductions, peasant households had a comparative advantage in farm management. To maximize the value of land, the peasants and the gentry entered into a perpetual lease which assigned the former the full responsibility of farm management and assigned the latter the full responsibility of tax payment. The perpetual lease defined the peasants as topsoil owners and the gentry as subsoil owners.

I hypothesize that dual ownership acted as a tax shelter for heavily taxed peasant households who colluded with lightly taxed gentry households to maximize the value of land<sup>4</sup>. To explain the mechanism of the hypothesis, I construct a simple model and discuss the conditions that give rise to dual ownership. The separation of topsoil and subsoil arises if the peasant becomes the sole residual claimant of agricultural production and the gentry becomes the sole residual claimant of tax payment. The model has an important implication: The dual owner system exhibits separation of ownership and control. The operation of topsoil is completely independent from the ownership structure of subsoil. Under the dual ownership system, topsoil owners are responsible for land

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<sup>4</sup>It should be noted that tax shelter was not only sought by commoners, but also by lower-ranked gentry who enjoyed less tax privileges than higher-ranked gentry. As long as there is a differential tax rate between the two parties, dual ownership arrangement could be formed.

improvement and agricultural investment. According to the Fisher Separation Theorem, regardless of the ownership structure of subsoil, topsoil owners can make *optimal* investment decisions. Thus, the dual owner system did not impede agricultural investment.

To test the tax shelter hypothesis, I exploit a dataset constructed from the land transaction and rent collection archives of Confucius's Lineage in the Qing Dynasty. I find that as the gentry's comparative advantage in tax reductions declined after the *tanding rumu* tax reform in mid Qing, peasants tended to consolidate landownership and become sole owners. Moreover, dual ownership was more likely to arise on double cropped plots than annually cropped plots due to peasants' greater comparative advantage in managing double cropping systems.

The implication of the hypothesis contributes to an ongoing debate on whether the dual owner system was one of those complex property norms that caused the relative decline of Chinese agriculture in the preindustrial period<sup>5</sup>. Comparing the Chinese customary property norms with the Anglo-American private property system, some scholars claim that the Chinese customary tenure systems were inefficient. Brenner and Isett (2002) claim that in the Yangzi delta absentee landlords extracted high levels of surpluses from the agricultural sector but had little incentive to invest in production due to the dual owner system. Macauley (2009) argues that dual ownership provided security for tenants, but made land transactions and tax collection difficult. Objecting to this line of argument, Pomeranz (2010) responds that the Chinese property systems seem to have facilitated transfers of usage rights to those who were positioned to make the best use of the land.

More broadly, this paper is related to the literature on the role of customary tenure system and indigenous property norms in economic development. A conventional theme of this literature is that complex customary systems of land tenure, including multiple ownership and lack of official titles, are obstacles to land transactions and agricultural investment (De Soto 1989, Besley 1995, Yoo and Steckel 2010). These studies usually take the customary tenure systems as exogenously given. Following Conning and Robinson (2007), my paper shows that customary property rights can be

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<sup>5</sup>There is a large literature along this line. For instance, some posit that the custom of partitioning on inheritance resulted in small fragmented holdings that impeded economy of scale. Huang (1985) considers the lack of managerial farming an important cause of agricultural stagnation based on the fact that most landlords were rental landlords rather than managerial landlords. Some think that the problem of Chinese property system is the restrictions on the transaction of land. Some argue that the custom of "conditional sales" (*dian*) that guaranteed the seller an interminable right of redemption at zero interest was the cause of inefficiency (Zhang 2011, Ellickson 2012).

the endogenous outcome of collective choices under certain political constraints and institutional constraints, thus may not be inefficient *per se*.

The paper is organized as follows: Section 2 provides the historical background of dual ownership. Section 3 summarize the literature on dual ownership. Section 4 constructs a simple model to explain the mechanism of dual ownership. Section 5 provides an empirical test of the model. Section 6 concludes.

## 2 Historical Background

### 2.1 The Dual Owner System

The separation of topsoil and subsoil had been one of the central features of the Chinese land market from the late 16th century to the early 20th century (Pomeranz 2010, Yang 1988). The dual owner system spread over China and was especially popular in the advanced areas, including much of the Yangzi delta. Due to a lack of statistics in the early periods, only limited regional estimation about the distribution of dual ownership could be obtained. In a study based on the land registration book (*yu lin ce*) from the Kang Xi period (1661-1722), Zhang (1988) estimated that 95% of the lands in Anhui Province had separate subsoil rights and topsoil rights. Dual landownership persisted in the Republican period and was eventually ended by the Communist Land Reform. Besides mainland China, dual ownership was also popular in the pre-British New Territories of Hong Kong and pre-colonial Taiwan. Figure 1 shows the estimated proportion of land under dual ownership in each province in the 1930's according to the National Land Survey<sup>6</sup>.

Figure 1 about here.

An important feature of the dual owner system is a high level of absentee proprietorship. According to the estimation of a scholar in the 18th century, 40% - 50% of the landlords (subsoil owners) in the Yangzi delta lived in the cities; 30% - 40% lived in towns, and only 10% - 20% lived in villages (Bernhardt 1992). The high degree of absentee landlordism generated several problems.

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<sup>6</sup>The figure was likely to have underestimated the proportion of dual ownership, especially in the Southern provinces. The estimation excluded leases that did not stipulate contract duration. However, in South China, many perpetual leases didn't specify contract duration. These contracts were in fact dual ownership contracts.

First, as topsoil owners lived close to their properties and subsoil owners lived in towns and cities, the shipment of in-kind rent from rural areas to urban areas involved large transportation costs. No matter who had to pay the shipment costs, this arrangement seemed to be costly<sup>7</sup>. Second, because subsoil owners lived far away from their properties, topsoil owners could take advantage of information asymmetry and under-report harvest. Their purpose was to obtain *ex-post* rent reduction by renegotiating with subsoil owners. Rent renegotiations and rent disputes were costly<sup>8</sup>.

## 2.2 Tax Inequality

In the Qing Dynasty, effective land tax rates were determined by two factors, the social status of the taxpayer and the transaction costs of tax collection. The higher the social status of a taxpayer, the lower the effective tax rate he faced<sup>9</sup>. The higher the transaction costs of tax collection, the higher the effective tax rate.

Different social classes faced different effective land tax rates. Gentry households were closely connected with official hierarchy and enjoyed preferential effective tax rates<sup>10</sup>. Land tax was comprised of two parts, the grain tax and the *di-ding* quota (labor services). Gentry households had lower rates than commoner households in both the grain tax and the *di-ding* quota<sup>11</sup>. For instance, in the mid 19th century, commoner households in the Suzhou area paid the grain tax three to four times higher than the gentry households. In northern Jiangsu, some gentry households were exempted from grain tax payment, but the commoners paid 6,000-7,000 cash per *shi*. Table 1 demonstrates the inequality of the *di-ding* quota between gentry households and commoner households in several counties from different provinces in the 1900's:

Table 1 about here.

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<sup>7</sup>If the contract stipulated that the topsoil owner was responsible for shipping the rent, why didn't the topsoil owner contract with someone living closer to the property? If the subsoil owner was responsible for collecting the rent from rural areas to the cities, why didn't he move closer to his own properties and manage the land by himself?

<sup>8</sup>In extreme cases, rent disputes might develop into rent-resistance movements.

<sup>9</sup>After 1750, the amount of tax a landowner paid was determined by the product of a fixed land tax quota and effective tax rate. Amount of land tax = Land tax quota \* effective tax rate (Wang 1973).

<sup>10</sup>The gap between the rates of gentry households and commoner households varied widely among districts.

<sup>11</sup>Reported land area and land grades can be manipulated, and were often affected by the social status of taxpayers. It was not uncommon for powerful gentry landowners and large lineages to bribe tax officers to under-report the size and grade of their lands. The underpaid tax quota due to tax fraud was transferred to smaller landowners and made the inequity in collection rates even greater.

Besides the social status of taxpayers, variations in the transaction costs of tax collection also generated inequality of effective rates between urban areas and rural areas. The backward conditions in transportation made the costs of tax collection differ between urban areas and rural areas. In the Qing dynasty, local governments were located in urban areas. To enforce tax payment in the countryside, local governments set up rural tax collection stations to ship the grain tax to the cities. The additional enforcement costs and shipping costs in the countryside were borne by the taxpayers living in those areas. Therefore, rural areas had higher tax rates than urban areas.

Table 2 about here.

### 3 Literature

#### 3.1 Theories about the Origin of Dual Ownership

Chinese historians have proposed various theories to explain the historical origins of dual landownership, ranging from the initial partition of property rights over uncultivated lands, financial stress, to rent default prevention (Yang 1998).

The first theory emphasizes the initial partition of property rights over uncultivated lands. A supportive evidence is the prevalence of dual ownership in newly cultivated areas<sup>12</sup>. The rationale of the hypothesis is that landownership was initially divided between landowners and tenants in the process of cultivation. Instead of cultivating the land by themselves, landowners rented out the land to tenants. Conditional on land improvement, topsoil right was ceded to tenants as compensation for their labor input and fixed investment<sup>13</sup>. Two issues arise from this analysis: First, why didn't the cultivators claim the land by themselves since there was no regulation that prohibited them from being landowners<sup>14</sup>? Second, subsoil owners could not increase rent unless they purchased the

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<sup>12</sup> See Tao Wu, *New Form of Dual Ownership and Land Tenure Relations in Qing Jiangnan*, for a discussion on the increasing distribution of dual ownership after the Taiping Rebellion. Another well cited evidence is the popularity of dual ownership in the newly cultivated areas of Taiwan. The indigenous Taiwanese landowners claimed the wastelands and became subsoil owners. The Han immigrants who cultivated the land became topsoil owners

<sup>13</sup>In many tenancy contracts found in Taiwan, tenants were required to have their own farming tools and draft cattle to be qualified as cultivators.

<sup>14</sup>A Taiwanese historian Wu Congmin noticed that "It seems that the only thing the subsoil owners needed was the land title... It wasn't difficult to obtain the land title. Why didn't the topsoil owners apply for the title by themselves?"



topsoil right from the topsoil owners. Why didn't subsoil owners have the incentive to purchase topsoil right and gain from the increased yields after soil was improved?

The financial stress theory argues that peasants who initially had sole ownership of land sold subsoil right to gentry under financial stress. As a result, owner-cultivators "deteriorated" into topsoil owners. Supportive evidence is found in land mortgage contracts: Subsoil right was sold by peasants who initially had sole ownership of land. However, this theory does not explain why peasants sold subsoil right but kept topsoil right, not vice versa.

The rent default prevention theory claims that to prevent rent default problems landlords required tenants to pay security deposit. The security deposit arrangement evolved into the purchase of topsoil. As the amount of security deposit rose, tenants acquired more control of land. Eventually, tenants became topsoil owners when the amount of security deposit equaled the price of topsoil. This theory, however, cannot explain why tenants didn't climb further up the tenancy ladder and became the sole owner of land.

The above three theories discuss the initial assignment of property right by analyzing three approaches to separate topsoil and subsoil: The first assumes that the gentry and the peasant divided the ownership of an initially uncultivated parcel. The second assumes that the peasant initially had sole ownership and ceded the subsoil right to the gentry. The third assumes that the gentry initially had sole ownership and ceded the topsoil right to the peasant. According to the Coase Theorem, regardless of the initial assignment of property right, the resource should end up with the party who can use it most efficiently, if there are no impediments to bargaining. Therefore, the problem with these theories is that they fail to explain why the separation of topsoil and subsoil prevailed as an efficient arrangement between the peasant and the gentry.

To put it differently, the problem with these theories is the same with some of the hypotheses in the literature on British open fields- they do not explain why the institution *persisted* for hundreds of years. As McCloskey(1980) points out: "...studying the origin of open fields or of anything else is antiquarianism unless it is accompanied by evidence connecting the origin with persistence." Thus, what needs to be explained is the persistence of dual landownership despite the transaction cost of rent collection, i.e. the cost of shipping grain rent from rural areas to cities and the cost of rent

disputes.

### 3.2 The Credit Constraint Theory

Before elaborating on the tax shelter hypothesis, there is still one more alternative hypothesis that needs to be addressed- the credit constraint hypothesis. Topsoil owners did not climb up the agricultural ladder to acquire sole ownership because of the credit constraint. The rationale is that subsoil owners can be viewed as investors who provided finance to agricultural production. Gentry households had a comparative advantage in accessing the credit market as opposed to peasant households. Therefore, gentry households became investors (subsoil owners) and peasant households became farm managers (topsoil owners). The hypothesis seems plausible, as it is well known that credits in preindustrial China were prohibitively expensive<sup>15</sup>. Rather than the previous hypotheses that emphasize the origin of dual ownership, this one deals with the persistence issue. However, several problems with this hypothesis should be pointed out.

First, why did dual landownership emerge in late Imperial China rather than earlier times? And why was dual landownership more popular in advanced areas rather than backward areas? Presumably credits were more expensive in earlier times and in more backward areas. Secondly, it is not always true that subsoil owners were wealthier and had better access to credit market than topsoil owners. In fact, it was a common practice that wealthy merchants who had lower political status and faced relatively high land tax rates, sold or “donated“ large quantities of their land to privileged gentry families for tax evasion purpose. These merchant landowners had no problem in accessing credit market. Rather, they chose to remain topsoil owners to avoid the tax burden. Finally, the mortgage loan market of topsoil and subsoil functioned well in advanced areas. All sorts of mortgage loan contracts in land financing have been found in recent years. These evidence weakens the credit constraint hypothesis.

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<sup>15</sup>Credit costs were on the order of 10% per month or 100% per year-in effect ten to twenty times higher than in Europe (Rosenthal and Wong 2011).

## 4 Theory

### 4.1 The Tax Shelter Hypothesis

I hypothesize that dual landownership persisted because it acted as a tax shelter for heavily taxed peasant households who colluded with lightly taxed gentry households to maximize the value of land<sup>16</sup>. The rationale of the hypothesis follows Barzel (1997) on divided ownership: The value of agricultural land is determined by agricultural productivity and land tax payment. While peasant households had a comparative advantage in agricultural production, gentry households had a comparative advantage in tax reductions. To maximize the value of land, the peasants and the gentry entered into a perpetual lease which assigned the former the full responsibility of farm management and assigned the latter the full responsibility of tax payment. Because of the non-traded farming skills<sup>17</sup> of the peasant and the non-traded social status of the gentry<sup>18</sup>, the dual owner system best utilizes the peasant's comparative advantage in farm management and the gentry's comparative advantage in tax reductions. Thus the dual owner system enabled the peasant class and the gentry class to jointly maximize the land value under unequal taxation. The hypothesis explains not only why subsoil owners tended to be gentry households, but also why subsoil owners tended to be urban dwellers. As section 2.2 points out, there were tax rate differentials between cities and villages due to the transaction costs of tax collection in the countryside.

The dual owner system has a substitute institutional arrangement that also took advantage of tax rate differentials- tax brokerage (*bao lan*). Tax brokerage was an underground arrangement between a gentry broker and commoner taxpayers. On the one hand, the gentry broker paid land taxes on behalf of the commoners or other less privileged proprietors in exchange for a brokerage fee. On the other hand, the gentry broker bargained with local government officials to obtain a lower tax rate. This practice, executed at the expense of the tax revenues of local governments,

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<sup>16</sup>To form a tax shelter by establishing a coalition between a heavily taxed party and a lightly taxed party has a long history in China. According to *Song Hui Yao Ji Gao*, in the Tang Dynasty, heavily taxed landowners colluded with the lightly taxed noble families by entering a rental contract, to avoid the tax burden. This suggests that dual ownership may have even existed in the Song Dynasty.

<sup>17</sup>Eswaran and Kotwal (1986) emphasize that the selection of tenancy of contract depends on market imperfections, such as non-traded farming skills.

<sup>18</sup>Some may argue that purchase of offices provided a channel for commoners to become gentry. But it should be noted that the costs of purchasing offices were often beyond the means of a peasant.

was largely illegal (Bernhardt 1992). Banned by the government, the arrangement of tax brokerage involved higher risk than the dual owner system<sup>19</sup>. Due to the risk of transaction, the duration of a tax brokerage contract should be shorter than that of a dual ownership contract. This is true because dual ownership is in fact a perpetual lease.

The dual owner system is analogous to today's corporate tax shelter in a number of ways: First, just as a corporate tax shelter lacks any significant economic substance in production, a subsoil owner performed no substantial role in day-to-day farm management. Second, just as a corporate tax shelter is designed to be replicated multiple times for use by different participants, a subsoil owner contracted with multiple topsoil owners for tax shelter practices. Third, just as a corporate tax shelter relies on the use of tax-exempted parties to deflect tax liability from the taxable party, dual ownership relied on the tax privilege of gentry to deflect tax liability from commoners.

## 4.2 A Model

This section presents a simple model to describe the mechanism of the tax shelter<sup>20</sup>. Consider a mutual agreement over the operation of a parcel between a peasant and a gentry who seek to jointly maximize the value of the parcel. We assume that the value of the parcel is determined by agricultural productivity and land tax. The gentry and the peasant both supply effort to manage the parcel and to lower the tax payment. The set-up of the model largely follows the double-sided moral hazard model in Bhattacharyya and Lafontaine (1995), but adds tax payment as an additional dimension.

Agricultural output is given by  $F(e, l)$ . The first argument is the managerial input (effort) of the peasant, while the second argument is the managerial input (effort) of the gentry. Regular Inada conditions hold that  $F(0, l) = F(e, 0) = 0$ ,  $F'_e > 0$ ,  $F'_l > 0$ ,  $F''_e < 0$  and  $F''_l < 0$ . The effective tax burden is measured by  $T_0 - T(r, \tau)$ , where  $T_0$  is a default lump sum tax, and  $r$  is the effort of

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<sup>19</sup>Even though the government knew that dual ownership also generated losses of tax revenue, dual ownership was legal most of the time. The tolerance towards dual ownership was probably due to the difficulty to distinguish perpetual lease from ordinary fixed-rent tenancy.

<sup>20</sup>The reason for using a static model rather than a dynamic model is to focus on the mechanism of tax inequality. A dynamic model would place a lot of emphasis on eviction threat and renewal of contract, which is not the focus of this paper. Since this is not a dynamic model, we cannot distinguish permanent tenancy from ordinary fixed-rent tenancy.

peasant in reducing tax, and  $\tau$  is the effort of gentry in reducing tax. We could think about the effort as under-report of land area and grade, petition to local governments for tax reduction, or participation in a protest against tax burden. Similarly, we assume  $T_r' > 0$ ,  $T_\tau' > 0$ , and  $T_r'' < 0$ ,  $T_\tau'' < 0$ <sup>21</sup>.

The gentry and the peasant agree on a rent distribution scheme  $\{R, \alpha\}$ , where  $R \geq 0$  is a fixed amount paid by the peasant to the gentry, and  $\alpha$  is the share of rent allocated to the gentry. They share the tax burden by distribution scheme  $\beta$ . The peasant will pay a tax equal to  $T_0 - \beta T(r, \tau)$ .

For managerial input  $e$  and  $r$ , the peasant suffers a disutility  $c(e)$  and  $s(r)$ .  $c'(e) > 0$ ,  $s'(r) > 0$  and  $c''(e) > 0$ ,  $s''(r) > 0$ . Analogously, the gentry suffers from disutility  $C(l)$  and  $S(\tau)$  for managerial efforts he puts in. For simplicity, we assume all inputs can be infinitely supplied.

We can write the gentry's problem as:

$$\begin{aligned} & \max_{l, \tau, \alpha, \beta} R - T_0 + \alpha F(e, l) + \beta T(r, \tau) - C(l) - S(\tau) \\ \text{s.t. } & (1 - \alpha)F(e, l) - R + (1 - \beta)T(r, \tau) - c(e) - s(r) \geq u_0, \\ & (1 - \alpha)F_e' - c'(e) = 0 \\ & (1 - \beta)T_r' - s'(r) = 0 \end{aligned}$$

Without loss of generality, we assign the initial land title to the gentry. The gentry's problem in the above program involves his or her input  $\{l, \tau\}$  and a distribution scheme  $\{\alpha, \beta\}$ . The gentry maximizes his or her share of from the land yielding net of the tax quota he or she is responsible for. The equation  $(1 - \alpha)F(e, l) - R + (1 - \beta)T(r, \tau) - c(e) - s(r) \geq u_0$  describes the participation constrain of the peasant (IR). The other two equations with respect to  $e$  and  $r$  characterize the peasant's best response to the distribution scheme  $\{\alpha, \beta\}$  (IC). Following Bhattacharyya and Lafontaine (1995), we obtain the following optimal distribution scheme:

$$\begin{aligned} \alpha^* &= \frac{(F_l')^2[(1 - \alpha^*)F_{ee}'' - c''(e)]}{(F_e')^2[\alpha^*F_{ll}'' - C''(l)] + (F_l')^2[(1 - \alpha^*)F_{ee}'' - c''(e)]}; \\ \beta^* &= \frac{(T_r')^2[(1 - \beta^*)T_{rr}'' - s''(r)]}{(T_e')^2[\beta^*T_{\tau\tau}'' - S''(\tau)] + (T_r')^2[(1 - \beta^*)T_{rr}'' - s''(r)]}. \end{aligned}$$

To establish the result straightforwardly, we assume that both agricultural production and tax reduction follow the Cobb-Douglas technology, i.e.  $F(e, l) = e^\theta l^{1-\theta}$  ( $0 < \theta < 1$ ), and  $T(r, \tau) =$

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<sup>21</sup>We do not impose any constraint on the value  $T(\infty, \infty)$ . When the inputs are large,  $T_0 - T(r, \tau)$  can be negative. In this case, government subsidize a region hit by famine.

$r^\sigma \tau^{1-\sigma}$  ( $0 < \sigma < 1$ ). Here  $\theta$  is the output elasticity of the peasant and  $1-\theta$  is the output elasticity of the gentry. Similarly,  $\sigma$  is the tax reduction elasticity of the peasant, and  $1-\sigma$  is the tax reduction elasticity of the gentry. Moreover, the disutility functions are convex,  $c(e) = \frac{m_1 e^2}{2}$ ,  $C(l) = \frac{m_2 l^2}{2}$ ,  $s(r) = \frac{n_1 r^2}{2}$ , and  $S(\tau) = \frac{n_2 \tau^2}{2}$ . Then the share allocated to the gentry in equilibrium is:

$$\alpha^* = \frac{1}{1 + \sqrt{\frac{\theta(1+\theta)}{(1-\theta)(2-\theta)}}} \quad (1)$$

$$\beta^* = \frac{1}{1 + \sqrt{\frac{\sigma(1+\sigma)}{(1-\sigma)(2-\sigma)}}} \quad (2)$$

1. When  $\alpha \rightarrow 0$  and  $\beta \rightarrow 1$ , land would be completely divided into topsoil and subsoil. That is, the peasant becomes the sole residual claimant of agricultural production and the gentry becomes the sole residual claimant of tax payment. This occurs when  $\theta \rightarrow 1$  and  $\sigma \rightarrow 1$ : the peasant has a comparative advantage in increasing productivity and the gentry has a comparative advantage in reducing tax burden. 2. When  $\alpha \rightarrow 1$  and  $\beta \rightarrow 1$ , the gentry owns the right to both topsoil and subsoil. This happens when the gentry has a significant advantage in both farm management and tax exemption:  $\theta \rightarrow 0$  and  $\sigma \rightarrow 1$ . 3. When  $\alpha \rightarrow 0$  and  $\beta \rightarrow 0$ , the peasant has sole ownership of the parcel. This happens when the peasant has significant comparative advantage in farm management and tax exemption. 4. Finally, when  $0 < \alpha < 1$  and  $0 < \beta < 1$ , the optimal scheme features the traditional sharecropping: each of the two parties obtain a share of the agricultural output and pays a share of the tax<sup>22</sup>.

Now I turn to the comparative static. I analyze the impact of the following on the ownership structure: (a) the effect of variations in the relative elasticity of the peasant's managerial effort. (b) the effect of variations in the relative elasticity of the peasant's tax reduction effort. I then move on to discuss an important implication of the model- the separation of ownership and control.

**Proposition 1.** *Ceteris paribus, landownership should be increasingly divided into topsoil and subsoil as the relative elasticity of peasant's managerial effort increases.*

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<sup>22</sup>The case that  $\alpha \rightarrow 1$  and  $\beta \rightarrow 0$  is unlikely, as it would imply that the gentry specializes in cultivation and the peasant specializes in paying the tax.

This is a straightforward implication of equations (1) and (2): As  $\alpha$  converges to 0 and  $\beta$  converges to 1, the ownership of land would be increasingly divided into topsoil and subsoil. This happens when the relative elasticity of the peasant's managerial effort  $\theta$  is close to 1. The implication is that the ownership of land is more likely to be divided, if the peasant's managerial effort has a greater impact on the value of the land.

This prediction is supported by two facts. The first is that dual ownership was more often observed on paddy fields than cotton fields, because the irrigation and daily maintenance of paddy fields required the peasant to supply more intensive managerial effort (Bernhardt 1992). The second fact is that landownership was more likely to be divided under multiple cropping system, because multiple cropping systems required greater managerial effort than annual cropping systems. Section 5 provides a test about this.

**Proposition 2.** *Ceteris paribus, landownership should be increasingly divided into topsoil and subsoil as the relative elasticity of peasant's tax reduction effort decreases.*

Similarly, when the tax reduction elasticity of the gentry ( $1 - \sigma$ ) is close to 1, the peasant would put little effort in dealing with the land tax. The peasant and the gentry then specialize in the business they each have comparative advantage in.

This prediction is supported by the evidence that dual ownership was observed on “polder land” (*cao tian*) but not on “sandy land” (*sha tian*) in the regions adjacent to rivers or lakes<sup>23</sup>. Polder land, enclosed by a high and thick hard-packed mud wall, was fully cultivated and subject to taxation. Sandy land was newly claimed land on emerging floodplain that was not yet subject to taxation. Compared with polders, the relative importance of peasants' tax evasion effort in operating sandy land is greater, because peasants could more easily hide information about the size of sandy lands due to the uncertainty of floods. Therefore, dual landownership was more likely to be found on polder land.

**Proposition 3.** *The division of subsoil and topsoil exhibits separation of ownership and control.*

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<sup>23</sup>A land survey in the county of Changshu, Suzhou and Wuxi found that dual ownership widely existed on polder lands but not on sandy fields (He 1977, Page 33042).

When the division of labor occurred as described above, subsoil owners did not interfere with agricultural production even though they held the official land titles. It was the topsoil owners who operated production and made investment. Dual ownership exhibits separation of ownership and control. According to the Fisher Separation Theorem, topsoil owners should be able to make investment decisions that maximize the present value of agricultural production, independent of subsoil owners' preferences. This implication is supported by two facts, subdivision of subsoil and consolidation of topsoil.

Subsoil properties were often subdivided and jointly owned by multiple subsoil owners. Bernhardt (1992) finds that a subsoil owner's "subsoil portfolio" consisted of many "shares" of subsoil properties dispersed over a broad area<sup>24</sup>. The dilution of subsoil ownership could increase rent collection cost and generate collective action problems among subsoil owners. However, the benefit of joint ownership is to align the interests of subsoil owners in dealing with rent disputes, a problem getting increasingly rampant in late Qing Dynasty. To deal with rent-resistance problems, the allied subsoil owners jointly hired bailiffs or later organized "rent bursaries" to collect rent.

Despite the complex subsoil ownership structure, topsoil owners had incentives to consolidate adjacent topsoil properties to achieve economy of scale. Evidence is found in topsoil contracts: In the Ming and the Qing Dynasties, all parcels were assigned with unique registration numbers by the local tax offices. Adjacent parcels had consecutive registration numbers. Based on the registration numbers specified in the topsoil contracts, I find that adjacent topsoil properties were often purchased together. In support of my finding, Chao (2006) notices that in Jiangsu Province, peasants purchased fragmented topsoil properties from different absentee landowners to consolidate the topsoil properties<sup>25</sup>. For instance, 10 topsoil owners in Changzhou County were managing topsoil properties leased by 48 absentee landowners in the year of 1676.

Sometimes topsoil owners sublet their properties instead of cultivating the land by themselves. This type of topsoil owner was called secondary landlord. Secondary landlords charged a fixed

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<sup>24</sup>For instance, a family surnamed Qu owned land scattered over 60 percent of Pinghu Country. And between 1772 and 1886, a landlord family of Yuanhe County purchased 490 small separate plots (totally 990) located in forty different polders. (Page 17).

<sup>25</sup>Note that the name of the topsoil contract is *pi tian yue*, which means whole sale land contract. The name could mean that several top soil properties were being sold together.



topsoil rent from the subtenants. They were managers of farms who looked for subtenants, intervened with agricultural production, evicted shirking cultivators and made agricultural investments. Consequently, secondary landlords lived close to their properties to supervise production. The sublease between secondary landlords and subtenants usually had short durations.<sup>26</sup> In this scenario, the Fisher Separation Theorem still holds, since secondary landlords' management decisions were independent of subsoil owners' preferences. Which social classes were likely to become secondary landlords? Wealthier commoner households who had better access to credit market than poor peasant households but faced higher tax rates than gentry households were likely to become secondary landlords. The presence of secondary landlords suggests that the operation of farm was further divided into agricultural production, finance of capital and tax payment. If wealthier commoners' comparative advantage in providing finances was not large enough, there would not have been a separate class of secondary landlords arising from topsoil owners.

## 5 An Empirical Test: Dual Landownership on Confucius's Manors

This section uses data constructed from the archives of Confucius's Lineage in Shandong to test the first two propositions of the model: 1) As the gentry's comparative advantage in tax reductions declined after the tax reform in mid Qing, commoners started to consolidate ownership and became sole owners. 2) Dual ownership was more likely to arise on double cropped plots than annually cropped plots due to peasants' greater comparative advantage in managing double cropping systems.

Confucius's Lineage was one of the most prestigious feudal landlord in Chinese history. In the Qing Dynasty, the lineage possessed the largest private rural estate (*min tian*) in China<sup>27</sup>. They were also controlling large amount of public land (*guan tian*)<sup>28</sup>. There were two types of manors operated by the lineage, private manors and public manors. Private manors were taxed at rate lower than the prevalent rate faced by commoners<sup>29</sup>. Public manors were tax-exempted.

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<sup>26</sup>see Tan (1993), Sandy Land in the Pearl delta of the Qing Dynasty.

<sup>27</sup>Their properties were located in four provinces (Shandong, Henan, Zhili and Jiangsu).

<sup>28</sup>In 1705, there were 5,014 tenants working on the public land in the city of Qufu. In 1760, the number of tenants increased to 10,243. The Shandong Provincial Government, official Info base of Shandong Province. See <http://www.infobase.gov.cn/bin/mse.exe?seachword=&K=a&A=71&run=12> (accessed on 05/15/2012)

<sup>29</sup>The land tax rates faced by commoners in Shandong Province during the late 19th century were as follows: In Heze County, the di-ding tax was 0.026 tale per mu and rice 0.38 sheng per mu. In Donghe County, 0.029 tale per

Both sole ownership and dual ownership existed on private manors and public manors. Dual ownership takes the form of perpetual fixed-rent tenancy contract. Three features help us identify a dual ownership contract. 1)The tenants paid a large sum of “security deposit” that was equivalent to the price of topsoil. 2)The tenants paid a ground rent that was said to be fixed for “a thousand years”; 3) The tenants could sublet and transfer their holdings without the permission of the lineage; 4) The tenants could decide cropping systems and crop mix. The lineage’s sole ownership takes the form of share tenancy. Under share contract, the lineage provided seeds, draft animals and farming tools. The lineage aided with production and took half of the output at harvest. If the tenants shirk, the lineage can evict the tenant. The tenants could not transfer their holdings without the lineage’s permission. Thus, sharecropping characterizes the lineage’s sole ownership of land.

## 5.1 The Impact of Tax Reforms on Dual Ownership

The *tanding rumu* tax reform in the middle of the Qing Dynasty significantly reduced the tax rate differential between the gentry and the commoners. The tax reform abolished informal taxes and surcharges, lowered peasants’ tax burden and reduced tax evasions of wealthy gentry households<sup>30</sup>. The reform was initiated by the Yongzheng Emperor in 1723 , but did not finish until 1883 in some regions, due to local resistance. In the districts of Confucius’s Manors, the *tanding rumu* tax reform was launched in 1742 under the reign of Emperor Qianlong (1711-1799). The reform lowered the tax burden of commoners and reduced the tax privilege of Confucius’s decedents. The low tax rates lasted through the end of Qianlong Period.

The model predicts that as the gentry’s comparative advantage in tax reduction fell after the tax reform, the topsoil owners had an incentive to consolidate ownership and become the sole owners of land. That is because, if the land tax collected by the state fell below the ground rent collected by the lineage, the topsoil owners would have an incentive to terminate the perpetual lease with the lineage and switch to pay land tax to the state.

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mu and 0.71 sheng per mu. In Yutai, 0.024 tale per mu, and rice 0.13 shen per mu. The private manors had a lower di-ding tax. The manors enjoyed a tax reduction at 9 li per mu. See Lai Huimin, *Imperial Power and Nobilities in the Qing Dynasty*, page, 125)

<sup>30</sup>This paper does not investigate the details of the *tanding rumu* tax reform. For a description of the reform, see Kent Deng, *Fact or Fiction? Re-examination of Chinese Premodern Population Statistics* <http://eprints.lse.ac.uk/22353/1/wp76.pdf>

Just as the model predicts, Confucius's Lineage started to dispose of the subsoil properties to less privileged households immediately after the tax reform. The disposal of subsoil properties lasted through the end of the Qianlong period due to the persisting low tax policy. Since private manors were subject to taxation and public manors were tax-exempted, the lineage's comparative advantage in tax reduction of private land declined faster than of public land. Subsoil properties from private manors should be sold. Table 3 lists the information on subsoil transactions recorded in the archives of land transactions of the lineage.

Table 3 about here.

Under the reign of Emperor Jiaqing (1796-1820), a series of tax evasion and appropriation scandals in Shandong Province were disclosed in 1806-1809<sup>31</sup>. Corruption and budget deficit in Shandong was so serious that the emperor investigated into the tax collection systems of Shandong and required the local governments to balance the budget. Consequently, the local governments reassessed tax base and increased land taxes across the province. Large quantities of unregistered land were discovered and incorporated in the tax base. The reform reduced peasants' comparative advantage in tax evasion by increasing the monitoring intensity of tax collection.

As the model predicts, landownership should be increasingly divided into topsoil and subsoil as the peasants' comparative advantage in tax evasion decreases. The land transaction documents in Confucius's Lineage recorded such a trend: Immediately following the tax reform, commoners and lower-ranked gentry landowners "donated" the previously unregistered land to Confucius's Lineage to avoid the increasing tax burden in exchange for the tax shelter benefits.<sup>32</sup> Some of the land documents specified that the increasing tax burden was the reason for donating land. This practice divided ownership into topsoil and subsoil and let the lineage become the subsoil owner.

Table 4 about here.

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<sup>31</sup>See Zhu (2001), Studies on Budget Deficit in the Jiaqing Period.

<sup>32</sup>Presumably some of the lower-ranked gentry landowners were secondary landlords who had better access to credit market than poorer peasants.

## 5.2 The Impact of Double Cropping on Dual Ownership

Wheat-soybean double cropping began to spread in northern China during the late Ming through the early Qing period<sup>33</sup>. Wheat-soybean double cropping refers to planting soybeans directly into wheat stubble after harvesting winter wheat. Double cropping requires intensive input of labor<sup>34</sup>. According to the *Handbook of Agriculture and Mulberry (Nong Sang Jing)* written in 1705, tenants on double cropped fields need to work almost 10 months annually.

The technical know-how and managerial skills associated with wheat-soybean double cropping were more complex than annual cropping. Successful operation of the double cropping system requires peasants' timely decisions and careful day-to-day farm management. Tenants' proper selection of winter wheat varieties was the first step. An ideal wheat variety in a double cropping system matures early enough to permit timely establishment of soybeans, and consistently produces high yields of high-quality grain. Second, every effort must be made to get the wheat harvest and the soybeans seeded as early as possible. Soybean planting date is crucial in determining the productivity of the system. Third, the straw remaining after wheat harvest needs to be rearranged. While excessive amounts of straw can interfere with the soybean planting, some wheat stubble should be left to provide mulch cover for the soybean crop. Fourth, the proper selection of soybean varieties is crucial too. Early-maturing varieties do not yield as well as later-maturing varieties, but late-maturing varieties might not avoid the first killing freeze.

Since the relative elasticity of peasants' managerial effort was higher under double cropping, double cropped land should be more likely to be divided into topsoil and subsoil than annually cropped land.

## 5.3 Data and Descriptive Statistics

To test the predictions, I construct a plot-level dataset from the rent collection records of eleven public manors operated by Confucius's Lineage. Rent collection records contain information on

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<sup>33</sup>See Li Lingfu (1995) for a discussion about the history of the invention of wheat-soybean double cropping.

<sup>34</sup>Chao (1986) points out that "the Chinese methods of fertilization and multi-cropping are so labor consuming that they yield a considerably lower average output per man-hour than other, simpler methods of fertilization and annual cropping."

ownership of the plot, size of plot, type of grain, amount of ground rent, etc<sup>35</sup>. The dataset are independently pooled cross sections<sup>36</sup>.

Table 5 about here.

The statistics of cropping systems on Confucius’s manors are summarized in Table 6. Except the last one, the other columns are all annual cropping systems. Table 7 summarizes the main variables.

Table 6 about here.

Table 7 about here.

## 5.4 The Choice of Dual Ownership

In this section, I outline a probit model to estimate the effects of cropping systems on landownership. The problem is described by the latent variable model:

$$Dualownership_i^* = X'_{1i}\beta_0 + Doublecropping_i\beta_1 + TaxReduction_i\beta_2 + \epsilon_i \quad (3)$$

$Dualownership_i^*$  is the propensity of dividing ownership into topsoil and subsoil.  $Doublecropping$  is a dummy variable indicating the choice of double cropping system.  $TaxReduction$  is a dummy variable indicating the period of low land tax under the reign of Emperor Qianlong.  $X'_{1i}$  is a vector of control variables, including size of a plot, natural disasters<sup>37</sup>, and kinship variable  $Kong$ .  $\epsilon_i$  is a normally distributed random error with zero mean and unit variance. Results from the probit model are presented in Table 8:

Table 8 about here.

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<sup>35</sup>Since the landlords only maintained the records they were concerned about, the information on tenants was limited. I do not observe the wealth, labor input, and other household characteristics of tenants. Thus, I do not know if the topsoil owner was a secondary landlord or a topsoil cultivator.

<sup>36</sup>I am not able to track the plots over time, since rent collection records were based on units of tenants rather than plots. Therefore, time-series data is not available.

<sup>37</sup>I lag shock by one period since shocks in  $t - 1$  would affect contractual choice in  $t$ .

The regression results show that tax reduction has a significantly negative effect and double cropping has a significantly positive effect on the probability of having dual ownership on a plot. The tax reduction effect means that under the Qianlong Reign, when land tax burden of commoners was low, landownership was less likely to be divided. The double cropping effect means that when land was operated under double cropping systems, landownership was more likely to be divided. This is consistent with the prediction that as peasants' comparative advantage in tax reductions/farm management increases/decreases, landownership tend to be more consolidated/divided. The variable *size* has a significantly negative effect on the probability of having dual ownership, probably because smaller plots were more likely to be divided into topsoil and subsoil due to tenants' credit constraints. Kinship relation and natural disasters don't have significant effect on landownership.

## 5.5 Omitted Variable Bias

In this section I consider the possibility that the adoption of wheat-soybean double cropping is endogenous to land ownership due to omitted variable bias. Tenant's idiosyncratic managerial ability is not directly observable.<sup>38</sup> The sample doesn't provide good proxy on tenant's managerial ability. On the one hand, managerial ability could affect the decision to double crop the land. On the other hand, managerial ability could also have impact on ownership. A tenant with better managerial ability may need less managerial directions and aids from landlords, thus more likely to become independent topsoil owner.

In this section, I outline a bivariate probit model that allows for the possibility of endogeneity. Suppose the tenant decides to double crop by comparing costs and benefits using a net benefit function or latent index that is linear in covariates and excluded instruments, with a random

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<sup>38</sup>Another potential source of missing variable bias is the unavailability of proxy for soil quality. I do have information on the quality of lands under perpetual fixed-rent contract, but I don't observe the quality of lands under share tenancy contract. The amount of ground rent was based on the quality of soil. There were three types of soils: top-quality soil, medium-quality soil and low-quality soil. It seems natural to assume that high-quality soils were more suitable for double cropping. But I find that many low-quality plots adopted double cropping as well. Therefore, I think that the missing variable on soil quality under share tenancy would not generate serious bias in the results.

component or error term,  $\mu_i$ . The determination of *Doublecropping* can be specified as:

$$Doublecropping_i^* = X_{2i}'\gamma_0 + Z_i\gamma_1 + \mu_i \quad (4)$$

$Z_i$  is an instrumental variable that increases the benefits of adopting wheat-soybean double cropping system. The tenant will double crop the plot if the net benefits of double cropping are positive:  $Doublecrop_i^* > 0$ . Following the latent variable model in equation (3), an outcome of our primary interest is the choice of ownership. The model is identified by assuming that  $Z_i$  is independent of these components, and that the random components are normally distributed. Hence,  $E[\mu_i] = E[\epsilon_i] = 0$ ,  $var[\mu_i] = var[\epsilon_i] = 1$  and  $cov[\mu_i, \epsilon_i] = \rho$ . The exogeneity condition is stated in terms of the correlation coefficient  $\rho$ . The null hypothesis is  $\rho = 0$ . If we fail to reject the null hypothesis, then we can conclude that the dummy variable *Doublecropping* is exogenous and the probit model (3) is the appropriate specification.

This bivariate probit system is identified if the instrument  $Z_i$  is correctly chosen. I choose the price of wheat as the instrumental variable<sup>39</sup>. If the price of wheat is a valid instrument, then (1) it must be a determinant of the cropping system, but (2) it must not be a determinant of ownership, i.e., it must not be correlated with the error term  $\epsilon_i$ . It is straightforward to show that it meets the first criterion. If the price of wheat goes up, tenants would have an incentive to increase wheat-soybean double cropping. In a simple probit model that explains the probability of adopting wheat-soybean double cropping technology, the t-statistic on *Wheat Price* is 3.44. Thus the credibility of our bivariate probit results turns on our assumption that the price of wheat did not directly impact divided ownership. Wheat price might impact the value of land. But it seems unclear how the increase in the value of land would affect landownership.

Table 9 summarizes the estimation results using wheat price as the instrumental variable. Robust standard errors are clustered at the tenant level. The probit estimates from Table 8 are replicated for comparison.

Table 9 about here.

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<sup>39</sup>I do not choose soybean price as the instrument, because soybean was much cheaper than wheat. Soybean was an ideal complementary crop for wheat, because soybean, like most legumes, perform nitrogen fixation that can raise the fertility of land.

The likelihood ratio test suggests that the Null hypothesis is rejected at the 1 percent level of significance. This implies that double cropping is correlated with  $\epsilon_i$  and therefore endogenous. The bivariate probit regression shows that double cropping has a statistically positive effect on choosing dual ownership after accounting for the endogenous choice of cropping system. The effects of tax reduction and other controls remain similar.

## 5.6 Robustness Check

In this section, I perform a robustness check. I compute results from a more restricted sample: Since paddy fields were more likely to be divided into topsoil and subsoil (see Proposition 1), I am not fully sure if including paddy fields would bias the estimation of the effect of wheat-soybean double cropping. Thus, I exclude paddy fields from the sample. Table 10 summarizes the estimation results from the restricted sample. Again, the probit estimates from Table 8 are replicated for comparison. Table 10 shows that after excluding paddy fields from the sample, the estimation results remain similar.

Table 10 about here.

## 6 Conclusion

A conventional theme of the literature on customary land tenure is that multiple ownership and complex tenure systems are obstacles to agricultural development. By studying the persistence of dual landownership in preindustrial China, I hypothesize that complex property norms could be the endogenous outcome of collective choice under institutional constraints, thus may not be inefficient. Dual ownership acted as a tax shelter for heavily taxed peasants who colluded with lightly taxed gentry to maximize the value of land.

This study has an implication about landholding patterns in Chinese history. Historians have painted two conflicting pictures about landholding patterns in the Ming and the Qing Dynasty. One school of historians claim that in the most advanced areas of China, land was largely concentrated in the hands of the rich and powerful<sup>40</sup>. The majority of peasants were landless and impoverished

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<sup>40</sup>The often cited Confucian scholar Gu Yanwu (1613-1682) described land concentration in the area near Suzhou



by rent extraction. The other school of historians reverse this statement. They argue that the majority of independent peasant households owned small fragmented parcels. My study reconciles the conflicting views by showing that subsoil properties were largely possessed by gentry families; small topsoil properties were held by the majority of peasants. These two ownership patterns should not be mixed together.

The second implication of the theory challenges the conventional view that China had few managerial landlords in the Ming and the Qing Dynasties. Some scholars consider the lack of managerial farming an important cause of "agricultural stagnation". Their evidence is that most landlords in the advanced areas were rental landlords who extracted surpluses from the agricultural sector but had little incentive to invest in production. This paper shows that secondary landlords (topsoil owners) were in fact managerial landlords. The concept of managerial landlord should include not only landlords who hired wage labor on the farm, but also secondary landlords who sublet their topsoil properties. These secondary landlords provided finance to production, supplied farming tools, supervised subtenants, and made agricultural investment. Some of them consolidated large quantities of topsoil properties to grow cash crops. Some of them rented vast uncultivated areas, divided the properties into small parcels and sublet the parcels to individual peasants. Therefore, secondary landlords played an important role in expanding production and adopting new technologies.

The third implication is that subsoil owners were in fact tax farmers. Tax farming is the principle of assigning the responsibility for tax revenue collection to private citizens or groups. Subsoil owners owed a fixed land tax quota to the state and paid tax out of the rent revenue they collected from peasants. The tax rate differentials enabled subsoil owners to earn commissions from the tax farming practice. However, the risk of rent default was also borne by the tax farmers. The risk of tax farming increased as rent-resistance movements became more rampant in the mid-late Qing Dynasty.

Last but not least, the tax shelter hypothesis also sheds light to current property right issues in

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in the seventeenth century: "Only one out of ten people is a landowner. The other nine people are tenants." In 1704 Emperor Kangxi (1661-1772) made a similar estimation on landownership in his country: "Lands are owned by the rich and powerful... Only thirty or forty percent of people own land. The rest of them are renters."

China. Nowadays some firms in the private sector are called “red hat enterprises”. The term “red hat” means that the firm can obtain a collective or state license for production and operations by paying administrative fees to the collective unit of local government organization (especially TVEs). After paying these fees, private owners are able to evade government prohibitions, surcharges and ideological harassment on their firms. The operational efficiency of these red hat firms is often higher than their counterpart in the public sector. Just as the peasants who colluded with the gentry to obtain a tax shelter, these red hat firms collude with the TVEs to obtain a shelter to evade surcharges and fees.

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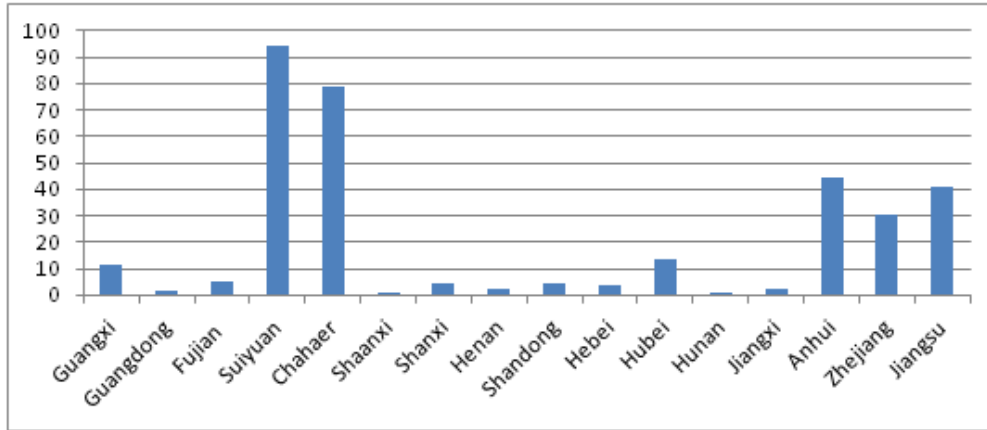


Figure 1: The ratio of plots under dual ownership in the 1930s, by province

Source: National Land Survey Report by the land committee, 1937, page 45.

Table 1: Inequality of Effective Tax Rate between Social Classes

Province and District	Commoner's Effective Tax Rate/Gentry's Effective Tax rate
Shui-an County (Zhejiang Province)	1.56- 1.65
Chenghou County (Fujian Province)	1.3-1.86
Anchi County (Fujian Province)	1.31
Longchi County(Fujian Province)	1.20
Shanghang County(Fujian Province)	1.20
Kushi County(Honan Province)	1.18-1.69
Kaiyuan Country (Fengtian Province)	1.63
Tianling County (Fengtian Province)	1.75

Source: The figures are calculated from Table 2.2. in page 40 of Wang Yejian's Land Taxation in Imperial China, 1750-1911.

Table 2: Inequality of Land Tax Rate between Urban and Rural Areas in Fujian Province

District	Rural Tax Rate/Urban Tax Rate
Yongfu County	1.01
Nanping County	1.07
Shunzhang County	1.37
Zhangding County	1.03
Yongan County	1.01
Guihua County	1.05

Source: The index was calculated from Table 2.3, Wang, 1973, p. 41

Table 3: Transaction of Manorial Land of Confucius's Lineage in the Qianlong period

Year	Manor	Type of Manor	Size of land(mu)	Fees (tales)
1743	Meihua	Private	50	5,000
1767	Meihua	Private	50	-
1770	Yangjialou	Private	908	-
1787	Yangjialou	Private	15.6	112.32
1788	Yangjialou	Private	196.73	1120.73
1789	Yangjialou	Private	90	612
1792	Yangjialou	Private	1275.57	2178.94

Source: Lai Huimin, *Imperial Power and Nobilities in the Qing Dynasty*, p. 148.

Table 4: Land Donated to Confucius's Lineage in the Jiaqing Period

Year	Identity of Donor	Size of Land (mu)	Type of Land
1810	Commoner	-	Riverbank Land
1811	Commoner	300	Waste Land
1812	Lower-ranked Gentry	500	Riverbank Land
1812	Lower-ranked Gentry	700	Waste Land
1812	Lower-ranked Gentry	600	Sandy Land
1812	Lower-ranked Gentry	500	Sandy Land
1812	Lower-ranked Gentry	-	Sandy Land
1817	Lower-ranked Gentry	-	Unregistered Meadow

Source: Selected Historical Archives of Kong Fu, Qufu, vol. 6.

Table 5: Sample Size

Manor		Observations
1759-1788	Junchengchang, Qiwang, Da	207
1789-1818	Qiwang, Da, Xiaoqiwang	277
1819-1848	Nanchi, Shijing, Quantou	121
1849-1878	Nanchi, Zhangyang	158
1879-1901	Anji, Chunting, Qiwang, Hetao, Da, Nanchi, Zhangyang	475
		Total N = 1,238

Table 6: Cropping System Statistics

	Millet	Sorghum	Paddy	Wheat	Soybean	Wheat-Soybean
Size (acre)	0.66	1.00	0.076	1.54	2.34	0.85
s.d.	(0.68)	(0.79)	(0.090)	(1.43)	(0.19)	(0.95)
Number of plots under sole ownership	90	127	0	147	20	102
Number of plots under dual ownership	199	45	182	45	0	245
Number of Observations	289	172	182	287	21	148

Table 7: Summary Statistics

Variable	Description	Mean	Standard Deviation
Dual Ownership	=1 if land operated under dual ownership	0.578	0.014
Double Cropping	=1 if land was double cropped	0.280	0.449
Tax Reduction	=1 if under the reign of Qianlong	.379	0.014
Size	Size of a holding (in mu)	2.250	0.077
Kin Tenant	=1 if kin tenant	0.117	0.321
Natural Diaster	=1 if there was a natural disaster in that year	0.402	0.491
Wheat Price	Wheat price in tale/cang shi	206.87	61.239
Tax Reduction	=1 if under the reign of Qianlong	.379	0.014
N = 1,238			

The minimum and maximum values for all variables except plot size and wheat price are zero and one, respectively. The minimum value of plot size is 0.011, and the maximum value is 24.948. The minimum value of wheat price is 127.25, and the maximum value is 579.17.

Table 8: The Probability of Dual Ownership on a Plot

Independent Variable	(1)	(2)
Double Cropping	0.385 (0.097)***	0.642 (0.132)***
Tax Reduction	-3.083 (0.130)***	- 2.958 (0.168)***
Size		-0.674 (0.063)***
$Size^2$		0.030 (0.003)***
Kong		-0.051 (0.214)
Natural Disaster		0.333 (0.208)
Manor Dummy	Y	Y
County Dummy	Y	Y
Constant	Y	Y
Number of obs	1,238	1,217

\*\*\*significantly different from zero at 1 percent level;\*\* significant at 5 percent level; \*significantly different from zero at 10 percent level. Robust standard errors are clustered at the tenant level.



Table 9: The Probability of Dual Ownership on a Plot: Bivariate Probit

Independent Variables	single probit		bivariate probit	
	(1)	(2)	(3)	(4)
Dependent Variable: Was a plot operated under dual ownership or sole ownership?				
Double Cropping	0.385 (0.097)***	0.642 (0.132)***	1.810 (0.208)***	1.804 (0.216)***
Tax Reduction	-3.083 (0.130)***	- 2.958 (0.168)***	-2.339 (0.181)***	-2.374 (0.260)***
Size		-0.674 (0.063)***		-0.534 (0.071)***
$Size^2$		0.030 (0.003)***		0.024 (0.003)***
Kong		-0.051 (0.214)		1.177 (0.194)
Natural Disaster		0.333 (0.208)		0.214 (0.293)
Determinants of Double Cropping				
Wheat Price	0.002 (0.0007)***	0.002 (0.0007)***	0.003 (0.0006)***	0.003 (0.0006)***
Size		0.075 (0.032)**		0.080 (0.031)**
$Size^2$		-0.004 (0.003)		-0.004 (0.002)
Kong		-0.056 (0.147)		-0.065 (0.144)
Natural Disaster		-0.036 (0.059)		-0.042 (0.061)
Manor Dummy	Y	Y	Y	Y
County Dummy	Y	Y	Y	Y
Constant				
Disturbance Correlation				
$\rho$			-0.892 (0.070)	-0.804 (0.130)
Number of obs.	1225	1204	1225	1204
LR test for $\rho = 0$	$\chi^2(1) = 17.901, p = 0.0000$		$\chi^2(1) = 9.123, p = 0.0025$	

\*\*\* significantly different from zero at 1 percent level; \*\* significantly different from zero at 5 percent level; \*significantly different from zero at 10 percent level. Robust standard errors are clustered at tenant level.

Table 10: Robustness Check

Independent Variable	Full Sample	Full Sample	Excluding Paddy	Excluding Paddy
Double Cropping	0.385 (0.097)***	0.642 (0.132)***	0.819 (0.131)***	0.963 (0.160)***
Tax Reduction	-3.083 (0.130)***	- 2.958 (0.168)***	-3.627 (0.228)***	-3.467 (0.326)***
Size		-0.674 (0.063)***		-0.525 (0.671)***
$Size^2$		0.030 (0.003)***		0.025 (0.003)***
Kong		-0.051 (0.214)		-0.336 (0.229)
Natural Disaster		0.333 (0.208)		0.504 (0.096)***
Manor Dummy	Y	Y	Y	Y
County Dummy	Y	Y	Y	Y
Constant	Y	Y	Y	Y
Number of obs	1,238	1,217	1,056	1,035

\*\*\*significantly different from zero at 1 percent level;\*\* significant at 5 percent level; \*significantly different from zero at 10 percent level. Robust standard errors are clustered at tenant level.