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**RIGHTS AND RENTAL: IS RURAL CULTIVATED LAND POLICY AND MANAGEMENT
CONSTRAINING OR FACILITATING CHINA'S MODERNIZATION?**

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RIGHTS AND RENTAL TAKINGS: IS LAND POLICY AND MANAGEMENT CONSTRAINING OR FACILITATING CHINA'S MODERNIZATION?

Abstract

The overall goal of our paper is to begin the task of laying out the current facts and to describe systematically the organization and utilization of China's cultivated land resources. Currently, we observe enormous heterogeneity at the village level in the property rights that households enjoy. In some villages, farmers seem to enjoy relatively long-term security and most of the rights typically associated with a private property regime, short of being able to buy or sell the land. In other villages, on the other hand, tenure is insecure, and farmers' use of the land appears to be constrained in a variety of ways. From a policy perspective the critical question is how effective these alternative regimes have been in providing households the necessary incentives to ensure rational land use and investment, while simultaneously helping local communities meet distributive objectives. One of the most important messages to take away from this essay is that a solid empirical basis does not currently exist for making an assessment of the impact of the land system on efficiency, equity, and overall development of China's rural sector. On the basis of the work that has been done, the record of China's land system is mixed. Over the past two decades, reallocations by village leaders may have facilitated access to land and the food it produces for a majority of China's households and overcome some of the imperfections in land rental markets. No work has found a large effect of the land management system on agricultural production or on investment into land-specific activities. Nonetheless, in many parts of China there are significant costs of the current property right regime in terms of short and long-run productivity that are not being offset by lower income inequality. As land rental markets have emerged, these negative effects have begun to be attenuated.

RIGHTS AND RENTAL: IS LAND POLICY AND MANAGEMENT CONSTRAINING OR FACILITATING CHINA'S MODERNIZATION?

China's rural economic reform, widely regarded as one of the most successful transitions of the last two decades years (Johnson, 1996; Lin, 1992), radically altered land tenure in rural China. The initial reforms triggered an unprecedented acceleration of agricultural growth in China. Empirical studies (McMillan, Whalley, and Zhu, 1989; Lin, 1992; and Huang and Rozelle, 1996) attribute a significant part of this increase to the incentives associated with better residual income rights. Growth slackened after 1984, however, especially for grain production (ZGTJNJ, 1996).

The deceleration in the late 1980s and early 1990s generated considerable debate about the reasons for the slowdown. During this time (and since) some observers focused their attention on China's land management system, the one dimension of the farm economy that has been altered relatively little since the initial reforms. Some suggested that weaknesses in these institutional arrangements are the fundamental source of the problem. Poor incentives related to tenure insecurity, for example, has reportedly discouraged investment in agriculture and lowered growth (Prosterman, Hansted, and Li, 1996). The perceived incentive problems sparked calls for either land privatization or for extending land contracts to 30 or more years—which was institutionalized in the early 2000s (Chen, 1999).

While growth has rebounded in the mid- to late 1990s, there are other considerations about the nature of China's land rights. As China is emerging as a rapidly developing country that is industrializing, urbanizing and globalizing, it is clear that China will need to have a way to increase farm incomes during the interim period of time as hundreds of millions of households move into the cities (which will be necessary if China is to develop into a modern state). Without being able to increase protection at the border due to its WTO commitments (Huang et al., 2004), the only feasible way to increase incomes for those left in farming as others move to the city will be to increase farm size. Since land can not be bought or sold, this means that China's cultivate rental markets need to be improved. In the past (1980s and 1990s), at least, there were many restrictions against renting and the number of rental contracts was extremely small (Brandt et al., 2002). However, in recent years there are indications that rental markets have emerged in a vibrant way. Unfortunately, in China's national statistic surveys, there is little (almost no) systematic information on the scope of their emergence or on the way the local governments and village leader discourage or encourage them.

The overall goal of our paper is to lay out the current facts and to describe systematically the organization and utilization of China's cultivated land resources in order to better weigh China's policy options. We will look at cultivate land rights and cultivated land rental. From a policy perspective the critical question is how effective these alternative regimes have been in providing households the necessary incentives and flexibility to ensure rational land use and investment, while simultaneously helping local communities meet distributive objectives. We will try to assess what the literature says empirically what the effect of China's land rights and rental has had on the efficiency, equity and overall development of the rural sector. Ultimately

we want to know if the problems around land in rural areas are a festering in a way that will lead to chronic unrest or if there is gradual improvement in the way that land is being managed which will contribute to the growth and transformation of the economy.

Data

The data that we draw on in this paper come from four main sources. The first three data set looks at land rights, in general; the fourth was put together to look at land rental, in particular.

First and foremost, in 1996 we collected a community-level data set, which because of its widespread coverage provides a rough estimate of nationwide trends and heterogeneity. We also base some of our insights and findings on a household data set from Liaoning and Hebei provinces that we collected in 1995.

The community-level survey (data set 1) covers 215 villages in eight representative provinces across China. On the coast, the most developed area in China, the sample includes Liaoning, Shandong and Zhejiang Provinces. In the agricultural heartland or inland region of the upper and middle Yangtze River valley, the sample includes Hebei, Hubei and Sichuan Provinces. In the northwest and southwest, China's poorest regions, the sample includes Shaanxi and Yunnan Provinces. In all of the provinces, counties were stratified on the basis of per capita industrial output. Eight counties per province were randomly selected, two from each of the quartiles of the ranked list of counties. A similar sampling procedure was used in each county to select two sample townships and in each township to select two sample villages.

In each village, the enumerators elicited a broad array of detailed data from three village leaders: the Party secretary, the chairman of the village committee or the village leader, and the village accountant. The three leaders were chosen because they were generally most able to answer questions about current and past village institutions. The 10-section survey instrument included sections on off-farm labour, land management, local industrial management, local credit markets, periodic markets, agricultural input and output markets, and the local political environment. We asked for information about two years, 1995 and 1988, and for changes since household farming were reintroduced. They answered detailed questions about the frequency, average size, and timing of the village's land readjustment, and about each village's rental activities and related institutions, including local rules concerning renting, how many households rented land in and out, who participated, and how much land was engaged in rental transactions.

To study the impact of tenure types and land rights on production behavior, a survey of 780 households from 31 villages in six counties in Hebei and Liaoning was also conducted in the summer of 1995 (data set 2). Hebei and Liaoning provinces, located in North and Northeast China, are two of China's major agricultural provinces, and the six sample counties are located in major agricultural regions of the two provinces. Most agricultural producers in the sample counties depend on grain or cash crop production. Farmers primarily grow maize, which accounts for about 70 percent of the total sown area, but also cultivate soybeans, rice, and cotton.

For each of the surveyed households, enumerators recorded detailed information about household characteristics and agricultural production activities. Total landholdings of each household were enumerated on a plot-by-plot basis. After obtaining basic information about each plot, the supervisor of the enumeration team selected two plots from each household to investigate more carefully. An effort was made to ensure that the two plots were being farmed under different tenure forms. The enumerators systematically surveyed the two selected plots from each household, eliciting information about the plot's tenure status, specific land rights, all inputs and outputs, and land quality. After data cleaning, the sample consists of 1073 plots from 612 households.

These data (on land rights) are updated in a data set (data set 3) collected by authors in 2000. The data set covers 60 villages across nationally representative six provinces (Hebei, Liaoning, Shanxi, Zhejiang, Hubei and Sichuan). In each village, there are 20 sample households with a total of 1,200 households. Since the survey is designed to analyze land tenancy issues in China, this data set has rich information on land rights, land rental transactions as well as family labor endowments. The data set has several recall questionnaires on particular issues such as allocated land holdings in earlier years. This information is used to construct a variable to indicate tenure insecurity. The data are available by plot—for all holdings of cultivated land and orchards.

The data used for examining cultivated land rental come from China's Rural Household Income and Expenditure Survey (HIES), a nationwide survey of rural households carried out annually by China's National Statistical Bureau (NSB—data set 4). Like most household surveys, the sample uses a two-stage sampling procedure. In the first stage, sampling villages are drawn randomly from the survey. Sample villages in 2001 came from 26 provinces. In the second stage, 10 households were drawn from each administrative village in the sample using an equal distance sampling methodology.

While the main focus of the HIES is on a detailed recording of the household's consumption and production activities, each year the survey team undertakes a series of special interviews with the household that provide information on a number of other variables. In 2001, the NBS added one-time sets of questions related to the household's land rental activities. In particular, enumerators asked households about whether they rented land in or out and if they did, the size of the rental transaction. In addition, there is a block of the survey (added in the 1990s) that records information on the household's time allocation of its labor, including whether a member of the household worked off the farm and if he/she did whether they lived at or away from home. If a household member earned a wage while living outside of the home, in our survey we count this household as being one which participates in the migrant labor force. We use a mixture of panel data and cross-sectional data for our analysis in the paper. The descriptive statistics that we present in this section are derived from a set of data for 2001 that includes the *entire sample* for 19 of the NSB's 26 sample provinces. As part of our agreement with the NSB, we used only a *sub-sample* from the same 19 provinces (28 percent of the entire sample of the 19 provinces) for econometric analysis of the determinants of land rental and migration. Since the households in our subsample were chosen from those households that were interviewed in both 2000 and 2001, NSB allowed us to create a panel that included variables that could be used to estimate a production function. With these data, we are able to derive a measure

of household's productive efficiency in farming as is done in Deininger and Jin (2003). The land rental and migration activities analyses only use the subsample of data for 2001.

Heterogeneity of Tenure, Rental and Other Land Rights

In this section, we focus our attention on several rights: security of tenure, transfer or rental rights, crop selection and rights to payment when there are land takings. The rights most likely affect both short- and long run productivity. The description of security and crop selection rely mainly on data set 1 and are updated by references to data set 3. While rental rights between 1988 and 1995 are looked at with data set 1, a fuller description of land rentals in 2001 relies mainly on data set 4.

Security of Tenure

Tenure security is typically associated with long-term use rights to land and freedom from the arbitrary loss of these rights without compensation. In most villages, use rights to land are lost (or gained) in the process of village-wide reallocations. Land is taken back from some households, and redistributed to others. For example, leaders shift land from a household that had a daughter marry out to one that had a new child born. In this process, households typically are not compensated for investments they may have made in the land. Tenure security will be inversely related to the frequency of these reallocations. The effect of insecurity, however, may be attenuated if the timing and the scope of the reallocations are established ahead of time.

Our data confirm the fact that the right to reallocate land is typically vested in the village. Considerable differences existed in the 1990s among provinces in the average number of reallocations per village since HRS was introduced, with a national average of 1.7 times. Local leaders in Liaoning, Shaanxi, and Hubei Provinces make adjustments at higher-than-average frequency, while those in Yunnan and Sichuan Provinces intervene relatively infrequently. Examining a histogram for the number of reallocations per village, in 60 of the 215 villages in our survey the land had *not* been readjusted between the start of HRS and the mid-1990s; in a small number of villages, reallocation occurred almost annually (Figure 1, Panel A). In a quarter of all the villages land was reallocated once during the 1980s and early 1990s, and in a fifth of the villages reallocation was conducted two times.

In some parts of China, the decision to reallocate is made at the township level. In Yunnan, two-thirds of the villages reported that reallocation decisions were made by higher administrative levels, while in Hebei and Liaoning a third and quarter of surveyed villages, respectively, report that township leaders make these decisions. Overall, however, 85 percent report that these decisions are village-based. This number has not changed much between 1995 and 2004 (according to data from data sets 3/4).

The pattern of reallocations over time is consistent with the idea that villages and townships were making the decisions to reallocate in a decentralized way, without much regard to national policies to maintain land allocations for 15 years. Figure 1, Panel B reports the percentage of villages in our sample that reallocated land for each year between 1983 and 1995.

In any year between 1980 and 1995, slightly less than 10 percent of all villages on average reallocated land. While there is no definitive long-term trend, reallocation behavior appears to be slightly cyclical. Leaders make land adjustment more commonly in years associated with major macro-economic retrenchment policies, as in 1989/90 and 1994/95.¹ Data reported in Deininger and Jin (2007) suggests that between 1995 and 2002, the pace of reallocation also did not change. There may be a downward shift, however, after the passage and implementation of the 2003 Rural Land Contracting Law.

Reallocations have also differed in their size and scope across China's rural communities. On average, a reallocation entailed slightly more than half the village's land, and extended to two-thirds of its households. In villages experiencing more than one reallocation between 1980 and 1995, the sizes of the reallocations were highly correlated with each other (i.e., the amount of land reallocated in each of the reallocations is fairly similar). On average, slightly more than half of all cultivated land in our sample of villages (53.4 percent) had been reallocated at least once (Figure 1, Panel C). The distribution was also bi-modal; a nearly equal percentage of village leaders (about 40 percent) reported that nearly all or none of the land was reallocated since HRS. Interestingly, according to data set 3, between 1995 and 2000, the nature of reallocations continued on this same pattern and at the same level of intensity. While not as detailed, the data from data set 4 5 appear to be consistent with these patterns, too. Clearly there are lots of differences across space and the patterns are more similar over time (in other words, if a locality reallocated land in a particular way in the early 1990s, it is likely that they reallocated land in the same way in the early 2000s, despite all of the national policy / legal efforts to have a uniform national rural cultivated land system.

Insecure tenure is associated with a higher frequency of cultivated land reallocation; the more times that land has been reallocated in a village, the more likely that a farmer will have lost a particular plot of land. Tenure insecurity is also exacerbated if the dates of village-wide adjustment are not known, since it increases the uncertainty that farmers face. From the survey, we know that if leaders announced the date of the first adjustment at the time that they implemented HRS. In nearly half of all villages, a date was not announced. A similar percentage of villages also reported that households did not know the date of the next adjustment during the survey period. Therefore, all three factors—the frequency, size, and uncertainty regarding the date of the next reallocation—potentially contribute to a farmer's concerns over the security of their use rights.

While tenure security changed little between the early 1980s through the mid-1990s, security began to rise after 1998 and was strengthened even more by the passing of the Rural Land Contracting Law (RLCL) in 2002 (Deininger and Jin, 2007). By 2000, the percent of farmers that claimed to believe that they would be able to keep their land for the full 30 years of their contract rose. This happened in all provinces. However, it is also important to point out that there is still a lot of reallocation going on in most areas of China. So, while the passing of the

¹ As discussed below, quota fulfillment is a major motivation for land reallocation. During boom periods, grain prices have typically increased, as has the implicit tax associated with the quota. This makes quota fulfillment more difficult, and effectively reduces the demand for land on the part of farmers. The slight increase in the incidence of reallocations may be related to both of these factors.

RLCL strengthened the shift to stronger property rights, it has not made tenure perfectly secure and safe from reallocations.

Crop Selection and Land Conversion

During the 1980s, many leaders were involved in making decisions on planting and land use (Sicular, 1995; Rozelle; 1994); this, however, is one area that has steadily evolved from more controlled to less controlled since the 1980s. Even during the 1990s, however, leaders imposed restrictions on how farmers use the land, including their ability to convert it between alternative uses in agriculture (Table 1, column 4). Although in nearly 75 percent of villages households claimed they could freely decide on the crop-mix in 1995, there were many that had to follow the decisions of local leaders. In several sample provinces, notably, Hubei, Shandong, and Yunnan Provinces, leaders were particularly active in intervening into cropping decisions. Even as late as the late 1990s in Zhejiang farmers showed us a directive from township leaders requiring all farmers in the village to plant two-season (summer and fall crop) rice under threat of a fine, even when the trend in the area was to use one-season varieties or move into horticultural production.

During the mid-1990s, obligations, such as the mandatory grain or cotton delivery quotas, could also affect crop choice. In our surveyed villages in Liaoning Province, for example, grain quotas in 1995 averaged nearly 25 percent of gross output, and officials typically did not allow farmers to satisfy their obligations with a cash payment; instead they insisted on delivery of grain. Cotton quotas in parts of Hebei, Hubei, and Shandong Provinces also may have had a similar effect on land use. Some of the farmers in areas in which we have surveyed complained that they would rather plant cash crops instead of planting grain or cotton, as they were required to do.

Local leaders placed even more severe constraints on households with regard to the freedom they have to convert land to alternative uses (Table 1, column 5). For example, during the 1990s, rules often prohibited farmers from converting cultivated land to orchards, fishponds, greenhouses or brick kilns. Officials in Liaoning Province were especially strict, and throughout China only about half of the farming population were able to make significant permanent changes to their land use without the authorization of local leaders.

After 2000, however, these rules had changed dramatically. According to data set 3, by 2000, village leaders were intervening into crop choice decisions in only about 10 to 15 percent of villages (down from 25 percent in 1995). The reductions in the procurement quotas made village leaders much less interested in telling farmers what to do. By 2000, the average procurement quota affected only 9 percent of gross output. Rules were beginning to be relaxed on conversion of land to orchards and other uses.

By 2005 and 2006, during two surveys by the authors in the Greater Beijing area and Shandong province found that there was almost no intervention into the decision making process (Wang et al., 2007; Huang et al., 2007). Fully 97 percent of farmers in Greater Beijing and 96 percent in Shandong said that crop choice and land conversion was their own decision. The only farmers that said they did not have a choice were those that were renting the orchards that

belonged to the collective. In other words, by 2006 the right to choose a crop or convert land had totally devolved to the household.

Transfer or Rental Rights

Zhuanbao, literally “passing on a contract,” refers to the transfer of land-use rights between two households and is comparable to the notion of land rental. The transfer was (during the 1980s and 1990s) and still is (in 2000 / 2005) typically short-term and usually entails the payment of a fee and assumption of tax and quota liabilities (when there is one) by another household in return for the use of the land. In 1995, 71.6 percent of villages reported that households had complete freedom to transfer land use rights, about the same as in 1988 (Table 1, column 1). In the remaining 28.4 percent of the villages, households faced some sort of constraint, most often in the form of restrictions on renting to non-villagers, or the need for households to obtain prior authorization from village leaders. Leaders only rarely imposed a complete moratorium on rental transactions.

Despite the high percentage of villages reporting that households have unconstrained rights to allow other households to use their land, before 2000 farmers rented in and out a remarkably low percentage of their land (Table 1, columns 2 and 3). In 1988, only one-half of one-percent of cultivated land was rented in rural China; nearly three-quarters of villages reported no land rental. By 1995, although more than 75 percent of local leaders reported rental activities in their villages, farmers still rented less than 3 percent of their land, most of which occurs between relatives.

China's emerging markets for cultivated land in 2001

The descriptive statistics produced from our new national level data for 2000 and 2001 (data sets 3 / 4) generally are close to those for the overall figures generated by CNSB and are broadly supportive of our hypotheses on the productivity and equity effects of the emergence of land and labor markets in China. For example, Table 2 provides information for all of China and by region on the household's income composition, the participation of its members in different types of economic activities and its land endowments and rental market participation. Above all, the average rural income per capita levels for China (2681 —row 1 of Table 2) is almost the same as in the 2001 statistical yearbook publication (ZGTJNJ, 2002). The national shares of income from agricultural production (37%) and land holdings per capita (1.62 mu), two variables also reported regularly in published statistical sources, are nearly the same as the published figures (ZGTJNJ, 2002). Our data also show how diversified China's rural income sources are in 2001. Although agriculture makes still the largest contribution to overall rural household income (37 percent), it is followed by income from local wage employment and migration (25 + 9 percents) and local non-farm self employment (29 percent).

With information from the survey data, the emergence of land markets is confirmed. The 2001 rental market question from the CNSB shows that 9.5 percent of households nationwide rented in land in 2001 while 6.2 percent rented land out. Although there are considerable regional differences, there are still non-trivial amounts of rental in all regions. Around 10 percent of households rented in land China's central and coastal regions. About 7 percent of those in other

parts of China did so.² Clearly across China land rental activities is becoming increasingly common and approaching those in more market-oriented economies.

At a number of different levels of disaggregation our data not only show rising levels of land rental, they show that there is a positive correlation between activities in the land and labor markets. Across China's major regions, the ones that have the highest levels of migration (central region and coastal region) also have the highest levels of rental (Table 2, rows 8 versus 10). Correlations between the share of labor that is in the migrant labor force and share of cultivated land that is rented is more than 0.80. It is more than 0.90 when including migration and other types of off farm activities. Moreover the trends at the regional level are supported by province-level data. For example, rental markets tend to be more active in the provinces in which out-migration is most common (e.g., Jiangxi, Henan, Hubei, Hunan and Anhui). The relationship also is evident in the coastal region if the definition of off farm employment is expanded to include both migration and local wage earning. The correlation coefficient between migration and land rental at the province level is 0.54. Examining the differences among households (not shown for brevity reasons) supports the findings from Table 2 on the relationship between migration and land rental as well as shows that the emergence of land markets helping those with less land endowment. T-test results show that households who rent out land spend significantly more time in migration and have significantly less land holdings than those who rent in land. Both tests are at 1% significant level.

Our data also indicate that land markets are pro-poor. Households renting out, when compared to those that rent in) have the highest level of non-farm assets (557 versus 237). Even more strongly, per capita income of those renting out (3024) is higher than those that rent in (2636).

The empirical evidence also is suggestive of a link between non-agricultural activity and land rental market participation. It can be seen that once households allocate more of their available labor time to work off the farm, the propensity to rent out land increases. To see this we note that households who rent out spend on average 4.7 and 12.2 months in migration and non-agricultural self employment as compared to 3.7 and 9.9 months for autarkic households. This illustrates the importance and potential linkages between land and labor markets.

Land Rights Formation: Identifying the Determinants

A popular view expressed in some of the earlier work on land is that rights and land policy are uniformly determined by the central government. Policy pronouncements by the State Council on issues such as tenure security convey this impression. The observed heterogeneity in property rights discussed in the previous section essentially undermines this view. Land security and transfer rights not only differ among provinces, but also from township to township within a county and among villages within a township. In terms of land reallocations, in 39 out of 44 sample counties (87 percent), townships within a county reported different frequencies of land

² Not surprisingly, the spatial variations widen when we disaggregate regions. For example, 20 percent of households in Zhejiang rented in land. During the same year, only 2.9 percent of households in Gansu did so.

readjustment at the village level. In 52 out of 92 townships (57 percent), villages within a township reported different frequencies in readjustment. Similar patterns appear with respect to land rental rights. In 30 out of 44 counties (68 percent), townships within a single county reported different land rental rights at the village level. In 33 out of 92 townships (36 percent), villages within a township reported different rental rights. In our sample of 31 villages drawn from 6 counties in Northeast China, land resources were organized in almost 20 different ways. Qiao (1997) discovered that leaders in 40 Yunnan and Fujian villages managed their forestry land in nearly 30 different ways. Throughout China, heterogeneity is observed at every administrative level, suggesting that central or regional policy makers are not the final arbiters in land management issues.

Instead, the pattern of land rights suggests that the real source of this widely observed heterogeneity is differences at the village level. This interpretation is consistent with several recent studies that find central policy makers to be less effective in implementing local development programs due to the increased independence of village leaders (Kelliher, 1997). Some argue that decision-making powers have already shifted from central to local and village authority to such a degree that China is now one of Asia's most decentralized countries (Carter, Liu and Yao, 1995).

Empirical Work on Rights Impacts and Determinants of Rental

Empirical work by others and ourselves helps illuminate a number of the issues that we raised. This work has focused on several key areas and can be divided into 3 empirical exercises: a) measuring the extent of inefficiency resulting from the current land allocation system; b) identifying the effects of the current property rights regime on dynamic incentives; c) explaining the determinants of land rental. The first two subsections of this section of the paper examine the impact of land security on efficiency and output (empirical exercises a and b). The final section empirically examines the determinants of market rental transactions (empirical exercise c).

Land Rights and Inefficiency (empirical exercise a)

Inefficiency arises because of a misallocation of resources across households, and in the case of China, may arise for a relatively straight forward reason. At the outset of decollectivization, the land was allocated in a fairly egalitarian way to reflect household size and composition, and in some cases, off-farm labor supply. Over time, however, demographic changes, because of births, deaths, marriages, family division and labor supply shifts, affect the household's demographic structure.³ If there are no changes to the initial allocation of land to households, the demographic changes and differential access to off-farm opportunities would lead to growing inefficiencies, and a less than perfect fit between a households' land-holdings and its endowment of labor.

³ Deaths of the elderly and births do not affect the number of individuals of working age in the household, but can affect how much other members of the family decide to work through a variety of channels, e.g. the number of individuals that need to be fed.

The key questions are do these inefficiencies exist and what mitigates or exacerbates them. It is possible that households rent land out or in (or hire farm labor out or in) to offset these differences, but recall that these markets are thin in most of our survey areas. Village reallocations could do the same thing. If land is *not* allocated so that all households have the same land-labor ratio, land scarce households might be induced to supply more labor per unit of land, a symptom of static inefficiency. In principle, this can give rise to an “inverse relationship” between farm size and land productivity, with output per unit of land higher on smaller farms. In fact, the presence of the inverse relationship is evidence of static inefficiency.

Using our data, we examined the “inverse relationship” as an indicator of inefficiency.⁴ And, in fact, we do find that as farm size rises, labor use per unit of land falls and output per unit of labor rises. These findings can only be reconciled by a view there is inefficiency in the use of labor. Constrained farmers apply more labor per unit of land and earn relatively little in return for their extra time. Inefficiencies indeed do exist. We also examined if the severity of the relationship is correlated with key institutional factors, such as the nature of village land reallocation. We find that villages that undertook larger and more comprehensive village land reallocations eliminated some of the labor inefficiency. One interpretation of this result is that reallocations are partially mimicking the outcome of a functioning land rental market. However, even after the reallocations, we still find that some inefficiency remains.

Importantly, we also find that well-functioning local labor markets and other sources of off-farm employment help to reduce significantly the inefficiency in farm labor use. Since low productivity is essentially a product of underutilized labor, it appears that less labor is wasted where its opportunity cost is greatest. Together, our findings suggest that there are some efficiency gains to be realized from reallocating land from land-rich households to land-poor ones, a move that equalizes the marginal product of labor across households and enables the same level of output to be produced with less labor.

Are these inefficiencies serious? While the findings also suggest that there is a cost of the current property right regime, a recent paper by Carter and Yao (1998), drawing on data for 200 rice-farming households in Zhejiang, suggests the cost of allocative inefficiency arising from restrictions on transfer rights is around two percent of output. Because of the relatively well developed off-farm opportunities in these areas, the costs are probably lower than they are in other areas where income from farming is much more important.

Perhaps the most important result arising from the work on the impact of reallocation on household welfare is that inefficiency does not have to come at the cost of rising inequality. On the basis of our work (and that of Carter and Yao, 1998), it is not unfair to say that there is room for reallocations that improve both efficiency and equity. However, this conclusion and any policy implications that might follow is based on the assumption that land rental markets do not operate well. The presumption here is that better-defined rights to rent might alleviate the

⁴ Benjamin and Brandt (2002). Burgess (1997) in a related paper also utilizes the inverse relationship, but only looks output and not also labor input and labor productivity because of data limitations. He finds support for a fairly severe inverse relationship in Sichuan but only a small one in Zhejiang, which he attributes to differences in off-farm opportunities in the two provinces. Failure to control for land quality differences, as well as missing information on labor input, leave these results open to several interpretations.

problem. As noted earlier, it might be that high transaction costs are the source of the problem, and that it is not village-level policy per se that effectively discourages rental. The reason for the limited amount of land transacted through the rental markets needs to be more carefully examined (which we do below).

Investment Incentives and the Costs of China's Rights Regime (empirical exercise b)

The major rationale for recent calls to extend tenure to thirty years is the anticipated effect of enhanced tenure security on household investment decisions. To date, however, in addition to our own work, only several studies have examined the effects of tenure security and related rights on household investment behavior. While the results of our studies are useful, we need to admit up front that they are done with imperfect data, only address some of the issues, and are based on a small sample in only one region of China.

There are several kinds of investment in which we are interested, all of which can affect land productivity and output growth. On the one hand, there are land quality-augmenting investments, such as expenditures on irrigation, drainage, and wells. There are also investments in long-term soil fertility through the use of organic fertilizers and green manure. Empirically, the key is to link levels of investment to the land rights that households enjoy, notably security of tenure and freedom of rental, while simultaneously controlling for household characteristics and inherent differences in land types and quality that may influence household investment decisions. We used plot-by-plot data collected in Hebei and Liaoning data to analyze the incentive effects of property rights on household input use and investment. Because of the nature of our data, we are limited to analyzing only one household investment decision, the use of organic fertilizer. Other kinds of land quality-improving investments are excluded from the analysis. In fact, with the exception of our (unpublished) analysis using data set 3 in the next section, there is no empirical study of the effect of land tenure on any type of land-specific investment except organic manure.

In a sub-sample of our data drawn from one county in Hebei Province, we find that farmers had significantly higher yields on their private maize plots than on their responsibility maize fields. On average, private plots yielded 25 percent more than responsibility plots. Also, the difference in output appears to be linked to differences in input use. When cultivating their private plots, farmers applied more labor (11 percent), draft animal input (3 percent), nitrogen fertilizer (5 percent), organic fertilizer (35 percent), and phosphates (22 percent). Note that the greatest differences (which are also significant in a statistical sense) are observed in organic fertilizer and phosphate use, the two inputs with greatest long-term impact on the land.

The key question is how much of these differences in input use can be attributed to property rights? A key difference between private plots and responsibility plots in the sample (both of which are planted to maize) is the length of tenure. For private plots, the average length of tenure was over twice that for responsibility land (21 years versus 9 years). Also, for nearly forty percent of the responsibility plots, the household's contract was expected to expire the following year. Security of tenure as captured by these two variables appears to be much better on private plots. However, several other factors, such as the size of the plot, the quality of the land, and the distance of the plot from the homestead, may also be important. In fact, differences

in yield and input intensity may be a product of differences in inherent plot characteristics and be unrelated to property rights.

Inter-plot comparisons are made using regression analysis. Controlling for differences in land quality and other key variables, we find that weaker property rights, either in the form of poorer tenure security or constraints on rental rights, adversely affect incentives of farmers to invest in medium term inputs such as soil-building organic manure. In fact, these two variables explain much of the difference in organic manure use between the two kinds of plots. The effect of these same variables on other current inputs was (somewhat expectantly) insignificant. The relatively low effect of organic fertilizers on output suggests that only a relatively small percentage of the differences in output between the two kinds of plots is related to property rights per se.

One problem with the above results is that the length of time that a household has held a plot may not be a perfect measure of tenure; it could be that the longer one has held a plot, the more likely the land will be taken away. To overcome some of the simplifying assumptions, we used the same data and undertook a new empirical exercise (see Jacoby, Li and Rozelle, 2002). More specifically, we performed a hazard analysis of individual plot tenures that relates the predicted probability of having a plot expropriated to land-specific investment, specifically organic fertilizer use. We can do this analysis since our plot-by-plot tenure data collected in Hebei and Liaoning provide a mirror that reflects the recent history of land expropriation. Using our analytical framework, we can create an objective measure of tenure insecurity and assess the social benefits of policies designed to reduce tenure insecurity.

Our empirical results support the view that heightened expropriation risk dampens investment in rural China, although the impacts may not be large. Farmers living in villages with more frequent land reallocations--or those who are at higher risk of losing a plot, e.g., by virtue of the fact that they have greater landholdings than the average farm household in the village--use organic fertilizer less intensively. The opposite is true of chemical fertilizers, which are known to have no long-lasting effects on soil quality. Despite having a negative impact on investment in soil quality, periodic land reallocations do not appear to entail a substantial cost—only about 5 percent of production, a figure that is above that of Carter and Yao (1998), but still relatively low.

Determinants of Land Market Rental Transactions (empirical evidence c)

In this last section we study another crucial dimension of land rights—the right to rent and whether improvement in transfer rights has affected the amount of land rental. In a country like China land rental is essential for the long term health of agriculture since trade policy restrictions do not allow China's leaders to raise domestic prices through border protections. We also seek to identify who benefits from new opportunities for rental—the poor or those that are better off.

Econometric evidence

The econometric results reported in Tables 3 and 4 perform fairly well and are robust to the choice of dependent variables, the estimation techniques and specification of the equation.

Many of the estimated parameters are consistent with our apriori expectation as well as with other analyses of rural China households and elsewhere in the world. For example, the coefficient on the education variable is positive and significant in the equation explaining the participation in migration of both the household head (Table 3, row 5) and children of the household head, suggesting that education helps has a strong and significant effect on ability of members of the households to gain access to a job in the migrant labor force. Similar results are found for other studies of migration in China in deBrauw et al. (2002) and for Mexico in Taylor and Yunez-Naude (2000).

Participation in off-farm migration. The regressions—both probits and tobits for the household head—confirm that labor markets are both efficiency- and equity- enhancing (Table 3, columns 1 and 3). On the one hand, migrant labor markets are providing a way for farm households that have invested more in education to get access to the off farm labor market (Table 3, row 5). On the other hand, emerging migrant labor markets are also places for households that have less of an inherent ability to engage in agriculture. In all of the labor market regressions, the sign on the agricultural ability variable is negative and highly significant (row 1). In fact, the least able households in the sample is 5% more likely to migrate out than the most able one. These two findings are consistent with efficiency improvements at both the macro- and micro-dimensions. From society's point of view, when labor markets are able to shift those with higher human capital and less efficient farming abilities into the more productive industrial and service sectors, welfare will improve. From the household's point of view, when the household can send its members into the off farm labor market, their investments in education will generally earn a higher return.

Migration labor markets, however, also provide opportunities for the poor. In our results, we show that in all of our equations that those households with less land and lower levels of wealth (as measured by the value of their non-agricultural assets) are more likely to migrate (Table 3, rows 2 and 4). Our results also show that villages that are poorer (as measured by the average level of expenditures) have more migration (row 9). Although such findings are not new (Parish et al., 1995; Rozelle et al., 1999; deBrauw et al, 2002 also show the linkage between poverty and migration), they still have important policy implications and should play a role in resolving the debate on the desirability of reforms that seek to facilitate greater migration and breakdown barriers.

Participation in non-farm employment

The regression examining the determinants of non-farm employment generally supports the findings of the migration equations for both the household head and children of household head, especially in the ways that markets are enhancing efficiency (Table 3, columns 2 and 4). Specifically, the non-farm employment markets appear to be efficiency-enhancing in that they are attracting those with relatively poor ability to engage in agriculture but those with relatively large families (rows 1 and 10). Moreover, while for moderate levels of education there is a tendency for households to move away from non-farm employment, this may be because for these intermediate levels of education, the best opportunities in the migrant market (rows 5 and 5). However, when levels of education reach relative high levels (e.g., above 3 years for household head and 9 years for children), there is a tendency for households to begin their own businesses.

The local non-farm employment markets, however, are less equity-enhancing. Although those with less land are more likely to enter the self employment market (row 2), perhaps due to poorly functioning capital markets, unlike the case of the emergence of migration markets, it appears that it is those individuals with greater levels of non-agricultural assets (or wealth) that are able to finance the start up of their own businesses (row 4). Moreover, whether it is poor liquidity or the demand pull of local wealth, richer villages are those that are most likely to have higher participation rates in the self employed sector (row 9). Hence, while the non-farm employment market is efficiency-enhancing, employment opportunities in the sector are more reserved for those with higher levels of wealth and those that live in wealthier areas.

Land market participation. Perhaps more than any other single result, our analysis shows the effectiveness of cultivated land rental markets in increasing the efficiency of production in China's rural economies. Although the information problems that affect land rental are well known, our results show how land rental markets allow those with higher agricultural abilities to systematically rent in more land (Table 4, row 1). In contrast, those households with inferior abilities in agricultural systematically rent out their land (Table 4, row 1). The results are robust regardless of whether we examine the probit (columns 1 and 2) or tobit regressions (columns 3 and 4) and no matter what the composition of the explanatory variables are (the partial model—columns 1 and 3—versus the full model—column 2 and 4). Such findings are consistent with other findings inside China (e.g., Deininger and Jin, 2002; Benjamin and Brandt, 2002) and outside of the China (e.g., Deininger and Jin 2003, Deininger et al., 2003). In Deininger and Jin (2002), the effectiveness of rental markets in raising efficiency (as we have defined it) is shown to be far greater than administrative moves by village leaders to reallocate land among households.

Our results also show that rental markets shift land towards those with the means to improve the productivity of farming. In the rent-in equations, farm households with draft animals and other assets that can be used in agricultural production are more likely to rent land in. In contrast, households with fewer draft animals (with coefficients significantly different from zero) and those with fewer other agricultural assets (non significant) are more likely to rent out (results not shown for brevity reasons).

While it is possible that emergence of efficiency-enhancing markets could hurt the poorer households in our sample, in fact, we find evidence that land rental markets are doing little to limit the access of land by the poor and in some ways are also equity-improving. According to our findings, the wealth of household does not play a significant role in gaining access to land (Table 4, row 4). Essentially, there is no detectable relationship between the value of the non-agricultural assets of households and their propensity to rent in land. In other words, the poor and the rich appear to have equal levels of participation. Moreover, the findings in both the rent-in and rent-out equations support the hypothesis that rental markets in China also are providing a means for farm households that are endowed with less cultivated land to expand their holdings. *Ceteris paribus*, families that have less land given to them by the village are more likely to rent in land (Table 4, row 5). In short, the findings of our study show that, in fact, household with small holdings are at least able to begin to increase their access to cultivated land.

Conclusions and Policy Implications

The allocation of property rights is widely recognized to have important implications for resource use and the distribution of household welfare. The introduction of HRS in the early 1980s extended to households on a fairly egalitarian basis use rights to cultivated land. Over the last two decades, control over the allocation of that land to households has remained in the hands of local leaders. In evaluating China's land tenure system from a policy perspective, the critical question is how effective has the system been in providing households the necessary incentives to ensure rational land use and investment, while simultaneously helping local communities meet distributive objectives. Moreover, looking past 2000, how well does the system fit the needs of China's rapidly evolving economy?

Survey work that we have done suggests enormous heterogeneity at the village level in the rights that household have been extended. In some villages, farmers seem to hold relatively long-term tenure and most of the rights, e.g. right to crop selection, right to convert to alternative agricultural uses, right to rent, typically associated with a private property regime, short of being able to buy or sell the land. In other villages, on the other hand, tenure is more short-term, and farmers' use of the land appears to be constrained in a variety of ways.

We have examined a number of alternative explanations for this heterogeneity. Underlying the reallocation behavior appears to be a number of factors including: quota fulfillment, the desire to maintain equal access to land among villagers, missing rental markets, and rent-seeking behavior on the part of local leaders. The role of reallocations in assuring equal access can only explain a small portion of the reallocation behavior; the other explanations, all of which are linked to the incentives of local leaders, appear to be far more important in explaining decisions with respect to the timing and size of reallocations. These incentives, in turn, are directly tied to their responsibilities for fulfilling state policy, as well as rent-seeking behavior on their part.

So how has China's land management system done in its effort to increase efficiency and equity? Our work (and that of others) on the impact of the land tenure system on growth, efficiency and distribution is limited, but a number of observations can be made. First, the impact on growth, through tenure security's effect on investment, appears relatively modest. One possibility is that leaders are "internalizing" these costs in making decisions; in other words, in areas in which the potential costs of tenure insecurity are high, reallocation is less likely. Some villages have also invested heavily in agriculture. Since we do not have the basis for estimating investment, crop choice and output under a counterfactual in which households enjoy all of the rights associated with private property, we hesitate to push this conclusion too far.

There may be a much larger effect of the current system on efficiency, however. Although village-wide reallocations help move land to households that have a higher marginal product of land, and thus, are efficiency enhancing, there remains inefficiency in the allocation of land across households. This can be linked to the thinness of rental markets, and more generally, to the difficulty of administrative methods to efficiently allocate resources. The latter difficulty

almost certainly is tied to informational problems and transactions costs of carrying out the reallocations.

Land allocation also has important distributive implications. In the 1980s, equal access to land played an important role in enabling households to meet basic nutritional needs at minimum cost in an environment in which food markets were highly imperfect and off-farm opportunity were limited. This feature of the system, however, has probably become less important as grain markets have developed, as off-farm opportunities have expanded, and as rural incomes have risen. All of these developments in some sense have taken pressure off the land. Ironically, in the changing economic environment in China, the current land tenure system may actually be adversely affecting income distribution. Households differ considerably in terms of their ability to access rapidly emerging off-farm opportunity. This ability is linked to the age of individuals and human capital. Hence, it is likely that poorly developed rental markets have prevented households limited in terms of their ability to access off-farm opportunity from more fully utilizing their labor and earning more income through expanding the size of the farm operations. More generally, the land system may have discouraged households from specializing in agriculture. This issue will become more important over the next decade as the farm labor force continues to shrink both in absolute and percentage terms, and as a reorganization in farm structure is required, and as competitive pressures in food markets grow.

In the long run, most economists believe that China needs a land tenure system that provides long-term security of tenure and promotes the efficient use of land. The current move to provide households with security for 30 years and only allow small adjustments to accommodate population changes is a step in that direction. In the meantime, however, keeping the door open for small adjustments (whether sanctioned by the new contracting law or not) may be enough to meet distributional concerns. As we noted above, only a small percentage of the land that is reallocated appears related to the desire to maintain equal access, and so small adjustments can likely meet this need. Secure use rights and the expansion of rental markets is one way to help facilitate the reorganization that is required in the farm sector.

If the past is any clue, however, this policy will only be effective if the incentives of local leaders are aligned in this direction, (i.e., when there is less incentive for leaders to undertake major reallocations). Interestingly, the decline in farm prices over the late 1990s and early 2000s and the conversion of the quota-tax into a subsidy worked in that direction by reducing the “rents” and other benefits that local leaders originally had from maintaining control over land. Rental activity appears to have increased as a consequence, with potentially important benefits for both efficiency and distribution. Without secure land rights, however, the propensity of leaders to have increasingly less interest in land reallocations could be short-lived. A rise in farm prices and a reintroduction of the quotas would once again put a premium on the control over land, and likely reverse the recent trend. As long as land is not privatized--and that raises a separate set of issues--additional reforms, including an elimination of the quota, and additional checks on leader behavior such as that provided through genuinely contested elections, are likely needed to sustain the current trends. This highlights once again how embedded the property rights households enjoy are in the local political economy, and how reform of the local political economy is required to provide farmers the kinds of property rights a rapidly growing economy requires.

Summary and Conclusions—Land Rentals

Our exploration into the question whether increasing reliance on market forces provides, in a context of rapid globalization, an avenue for China to increase rural productivity as well as the welfare of the poorest households suggests that markets do move things in the right direction. At its more fundamental level, we have three main results that show that the emergence of land rights and the appearance labor and land markets have been mostly both efficiency- and equity-enhancing. Efficiency is enhanced since the markets tend to allow households with limited farming skills and poor capital endowments for farming to out migrate. In the meantime, those with great agricultural abilities are able to rent land in from those with poorer agricultural abilities. In all of our regressions, we see those households and individuals with higher levels of education able to more easily break into the migrant labor and self employed labor markets. In this way we see a movement of resources—both land and labor—towards those with the ability best able to use them.

There are also a number of equity-enhancing elements in China's labor and land markets. Those with little land are getting access to land. Those with little wealth are those going into the migrant labor force. Those in poorer villages are finding their ways into the migrant labor force. But while the poor are tending to benefit, the efficiency side of the market mainly means that we might be able to conclude that it is really the *productive poor* that are benefiting. Those with education in poor areas are finding migrant jobs. Those with high levels of agricultural skills and high levels of agricultural capital are the ones that are able to rent in land. From a policy point of view, this means that markets can help alleviate poverty, but only if policy makers can provide access to the human and physical capital that are needed to take advantage of the opportunities provided by China's growth.

Finally, we see the interlinkages of labor and land markets. In some sense, higher levels of non-farm activity, either migration or self employment, appears to have a direct role in activating land rental markets. Taken together, these imply that the interaction of land and labor markets in rural areas goes in the right direction. And, it also gives hope that as China begins to implement its promises for entering the WTO that it will not only enjoy the rising efficiency that comes from such agreements but that it might be able to avoid some of the negative consequences by giving some of those who are not able to take advantage of greater levels of employment a chance to access land through land rental markets.

While the evidence therefore provides promising signals, it also points towards two topics which can not be resolved within the more narrow context of this study but which could provide valuable insights for both research and policy. In international comparison it is noteworthy that this may be linked to greater initial equality in the distribution of endowments which may be a causal factor.

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Table 1: Non-Residual Property Rights in China's Villages, 1988 and 1995.

	Unencumbered Right to Rent (% of Villages)	Percentage of Land Rented in 1988	Percentage of Land Rented in 1995	Right to Decide Crop Mix (% of Villages)	Right to Convert Land to Alternative Uses (% of Villages)
Province					
Zhejiang	93.8	1.6 (3.3)	6.9 (10.3)	74.1	40.7
Sichuan	93.8	0.2 (0.5)	2.1 (2.6)	93.1	68.9
Hubei	59.4	0.3 (1.1)	3.6 (8.3)	66.7	41.4
Shaanxi	65.6	0.8 (2.1)	2.2 (2.9)	93.3	84.4
Shandong	46.5	NA	1.1 (1.8)	60.0	60.7
Yunnan	66.7	1.3 (0.5)	0.9 (2.2)	66.7	45.8
Hebei	80.0	0.3 (0.6)	2.1 (2.2)	84.6	53.8
Liaoning	62.3	0.1 (0.3)	3.6 (5.0)	93.8	6.3
Total	71.6	0.6 (1.8)	2.9 (5.8)	73.4	53.6

Source: Authors' field survey.

Notes: Standard errors are reported in parenthesis.

Table 2. Key indicators of labor and land market activity in China's main regions, 2001

	All	North &	Coast	Central	South
	China	Northwest			West
Income level (Yuan) and composition (%)					
Mean per capita income	2681	2646	3894	2392	1794
Agric. Production	37	38	28	41	41
Wage employment	25	28	31	21	19
Remittance	9	6	10	13	8
Non-farm self employment	29	28	31	25	32
Participation in activities (%)					
Households with non-farm enterprise	10.7	7.3	14.4	11.1	9.2
Households who migrate	37.0	25.0	35.0	47.0	37.0
Months in non-farm activity	10.0	8.3	13.7	9.2	7.6
Months spent in migration	4.1	2.3	4.5	5.4	3.6
Agricultural endowments					
Land endowment	1.62	2.14	1.00	1.31	1.37
Share of households renting-in	9.50	7.10	9.40	10.40	7.50
Share of households renting-out	6.20	4.90	8.80	5.10	5.70
Rented to own land ratio ¹	0.51	0.48	0.59	0.50	0.44
No of households in sample	54590	12390	14680	14860	12660

Source: Own computation from the NBS national 2001 household survey.

The *North and Northwest* Region includes the provinces of Hebei, Shanxi, Liaoning, Henan, the *Coastal Region* includes Jiangsu, Zhejiang, Fujian, Shandong, and Guangdong, the *Central Region* includes Anhui, Jiangxi, Hubei, Hunan, and Guangxi, and the *Southwest* includes Sichuan, Guizhou, Yunnan, Shaanxi, and Gansu.

¹ only for households who are renting in.

Table 3. Determinants of household Head's participation in migration/local non-farm employment

	Probit Models		Tobit Models	
	Participation in Migration	Participation in local non-farm employment	Months of Migration	Months of local non-farm employment
Agricultural Ability	-0.057*** (7.70)	-0.205*** (12.30)	-3.668*** (7.73)	-2.883*** (18.22)
Owned land per capita	-0.001 (1.46)	-0.005** (2.11)	-0.098*** (3.05)	-0.099*** (9.47)
Value of Agri. assets (log)	-0.003** (2.36)	-0.013*** (7.21)	-0.198*** (3.25)	-0.160*** (7.71)
Value of Non-ag assets (log)	-0.004*** (3.94)	0.018*** (4.75)	-0.242*** (4.93)	0.230*** (14.77)
Years of Educ. Obtained by head	0.007** (2.48)	-0.006 (0.91)	0.394** (1.98)	-0.123** (2.01)
Head's education squared	-0.001*** (2.96)	0.001*** (3.16)	-0.027** (2.26)	0.021*** (5.66)
Head's age	0.009*** (3.89)	0.019*** (5.27)	0.530*** (4.44)	0.193*** (5.51)
Head's age squared	-0.000*** (6.75)	-0.000*** (8.48)	-0.010*** (7.36)	-0.003*** (9.19)
Household expenditure at village mean	-0.001 (1.24)	0.001 (0.59)	-0.031 (1.14)	0.038*** (4.58)
Number of kids at working age	-0.010** (2.20)	-0.010 (1.52)	-0.499*** (3.13)	-0.030 (0.60)
Constant			-15.477*** (5.59)	0.282 (0.33)
Observations	13598	13598	13598	13598
Pseudo R-squared	0.12	0.09	0.07	0.04
Log likelihood	-4296.65	-8538.31	-8494.70	-26805.94

Robust z statistics in parentheses

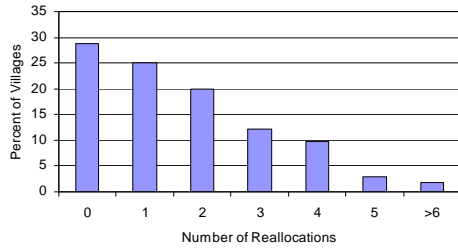
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Determinants of participation in rent-in and area rented in.

	Probit (Participation)		Tobit (Area rented in)	
	Base Model	Expanded Model	Base Model	Extended Model
Agricultural ability	0.160*** (11.41)	0.157*** (9.55)	3.294*** (13.73)	3.225*** (13.43)
Owned land per capita	-0.011*** (9.28)	-0.011*** (5.10)	-0.085*** (5.38)	-0.085*** (5.41)
Own draft animal	0.057*** (6.41)	0.058*** (3.77)	1.028*** (6.41)	1.048*** (6.54)
Value of agri. assets (log)	0.007*** (3.54)	0.006 (1.62)	0.098*** (2.92)	0.095*** (2.83)
Value of non-agri assets (log)	0.000 (0.27)	0.001 (0.32)	0.012 (0.51)	0.018 (0.75)
Education attained by head	-0.000 (0.05)	-0.000 (0.04)	-0.005 (0.06)	-0.005 (0.05)
Education attained by head squared	-0.000 (0.39)	-0.000 (0.34)	-0.001 (0.10)	-0.001 (0.12)
Head's age	0.012*** (4.12)	0.013*** (4.50)	0.141*** (2.88)	0.167*** (3.37)
Head's age squared	-0.000*** (4.83)	-0.000*** (5.07)	-0.002*** (3.74)	-0.002*** (4.11)
Share of households migrating in the village except the current one	0.039*** (2.66)	0.060*** (3.04)	0.389 (1.40)	0.823*** (2.78)
Share of households working off-farm in the village except the current one	-0.003 (0.26)	0.006 (0.23)	-0.259 (1.23)	-0.089 (0.39)
Household expenditure at village mean	-0.001** (2.04)	-0.001 (1.31)	-0.021* (1.67)	-0.018 (1.43)
Months migrating out in the previous year		-0.003*** (3.67)		-0.056*** (4.65)
Months working non-farm in the previous year (separate from above)		-0.001 (1.22)		-0.027** (2.35)
Constant			-4.965*** (4.07)	-5.655*** (4.58)
Observations	13598	13598	13598	13598
Pseudo R-squared	0.05	0.05	0.02	0.02
Log likelihood	-7211.71	-7201.00	-14558.61	-14545.85

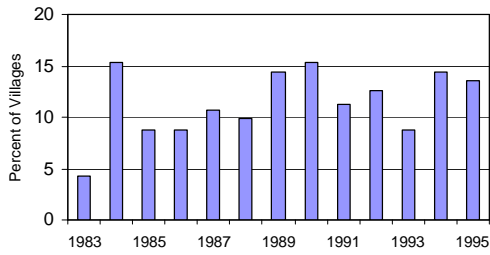
Robust z statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%



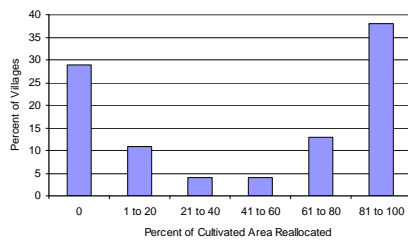
Source: Authors' Data

Figure 1. Percent of Villages Undertaking Land Reallocations Since Reform Began in 1983.



Source: Authors' Data

Figure 2. Villages Carrying Out Major Land Reallocations by Year in China



Source: Authors' Survey

Figure 3. Percent of Village's Cultivated Area that Has Been Reallocated Since Reform Began in 1983.