

The Impact of Property Rights on Households' Investment, Risk Coping, and Policy Preferences: Evidence from China*

Klaus Deininger
World Bank

Songqing Jin
University of California, Davis

I. Introduction and Motivation

The way in which property rights to land are defined and documented, the rights and obligations they convey, and the extent to which they facilitate exchange of land through rental or sales markets have far-reaching implications not only for the productivity of land use but also for the social organization of communities and households' ability to cope with shocks. Land policies implemented by governments the world over aim to strike a balance between these multiple and often conflicting objectives. Failure to appreciate the multifaceted nature of land rights may lead to recommendations that either are politically unacceptable from the outset or, even if passed into law, prove difficult or impossible to implement.

Few countries illustrate better than China the interaction between these equity and efficiency goals of land policies and the need for such policies to respond to a constantly changing dynamic environment. The desire to change the social relations of production and at the same time to boost production was the driving force underlying China's collectivization of the late 1950s. While this policy achieved equality in terms of land access, it was associated with a disastrous decline in productive performance and the starvation of millions.¹ The desire to increase production through higher levels of individual responsibility and secure individual land-use rights culminated in the adoption of the household responsibility system (HRS) in 1978. This measure, which gave 15-year land-use rights to households, proved hugely successful in terms of production and did not undermine the basic equality of land access that is credited with helping China attain levels of nutritional security and human

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development much superior to those achieved by other countries at similar levels of development.²

As the rural economy evolves toward placing greater importance on investment, migration, and nonagricultural income sources, there is discussion as to whether the mechanisms put in place in 1978 are still needed or appropriate. It is often argued that the restrictions put on land rights, in terms of their duration as well as the scope for redistribution, are no longer adequate to facilitate productivity-improving land transfers and bring about an adequate level of investment, both of which would provide the framework for a dynamic evolution of China's rural economy. In response to fears fueled by reports that existing land-rights arrangements led to reduced investments, the government has adopted a policy that would give longer and better-documented land rights to the rural population. Whether or not the government should proceed more vigorously with the implementation of these measures is an issue of considerable interest and policy relevance. Obtaining a satisfactory answer to this question requires looking not only at the economic aspects of the new land-rights arrangement but also at social issues and the impact of such a policy measure on asset accumulation and factors that determine its acceptability to the population. This article uses information generated by a land policy experiment conducted by the Chinese government with the express purpose of providing insights that would result in a better understanding of these issues.

The policy experiment consisted of the adoption of directives that, by eliminating the scope for periodic redistribution and increasing the duration for which land-use rights were awarded, provided cultivators in Guizhou Province with more secure land rights than those available in neighboring provinces. This allows a "real world" assessment of the impact of land policy changes that is likely to be superior to what can be obtained from the hypothetical studies that have, until now, largely formed the basis for policy recommendations in this area. The ability to assess the impact of an actual policy change in a number of dimensions allows us to address the complexity of the issue, and it is also more likely to meet the needs of policy makers who, in addition to being interested in the economic impact of such a measure, are concerned about its longer-term equity impacts and social acceptability. That Guizhou is also one of China's poorest provinces adds relevance since other safety nets are accordingly more scarce; therefore access to land should perform a particularly important role in making rural households less vulnerable. Showing that more secure land rights have had no negative impact in this environment on households' ability to cope with shocks and that they are socially acceptable would lead one to expect similar results in other, more advanced provinces, thus allowing a broader applicability of the results.

Section II provides a background on Chinese land tenure, the literature, and the characteristics of the land-tenure experiment conducted in Guizhou. Section III describes the sample and, as a first approximation to measurement of the impact of different land policies, compares descriptive statistics across

the three provinces included in the survey. Section IV provides more rigorous econometric evidence with respect to each of the questions under concern. Section V draws out implications for further research as well as policy conclusions for China by relating the results to recent changes in Chinese land policy.

II. The Chinese Land-Tenure System

Ever since the collectivization of the late 1950s, the dual goals of increasing output while maintaining broad equality in access to resources have been at the core of policy initiatives by the Chinese government. This section reviews the recent history of land relations in China with the goal of summarizing discussion regarding the advantages and disadvantages of more secure individual property rights. By basing our findings on a description of the policy experiment conducted in Guizhou Province, we identify the underlying implications of this discussion and outline the three main research questions to be addressed. These questions relate to agricultural investment, equity and human capital investment, and households' land-rights preferences, and they motivate the subsequent analysis.

A. Key Events and Policy Issues

Collectivization of production in China during the 1950s had disastrous consequences on output and on the welfare of the rural population and led to widespread starvation and death.³ Adoption of individual-use rights to land under the household responsibility system (HRS) in the late 1970s and early 1980s contributed to increased productivity and output in rural areas.⁴ However, output growth flattened in the late 1980s. Even though low grain prices, together with high taxes and quotas and the associated reduction in the profitability of agricultural production, generally are seen as the main variables underlying this phenomenon, it is widely held that more secure individual land-tenure arrangements could improve the performance of the agricultural sector and thus rural welfare in China.⁵

Proponents of measures to increase tenure security point to three ways in which China's land-tenure system has limited cultivators' tenure security. One has been the relatively short duration of land-use rights. Immediately following introduction of the HRS, producers received land rights for a period of only 15 years. Also, little legal foundation has been given to villagers' land-use "contracts," which were often only verbal agreements. The lack of clear documentation, together with absence of independent mechanisms for appeal, is assumed to have contributed to great tenure insecurity. This is particularly important since, even during the 15-year period for which they were granted, such land-use rights were in many cases quite insecure. Changes in population or the community's need to obtain land for nonagricultural purposes, such as infrastructure or local enterprises, have often led to administrative reallocations of land within the village. A nationally representative survey suggests that about 80% of communities experienced at least one

reallocation of land between 1983 and 1990.⁶ In 1996, the number of reallocations experienced by an average village since the inception of the HRS in the early 1980s was estimated at 1.7. Decisions on reallocations were made in a decentralized manner, and arrangements for governance at the local level seem to have had a significant impact on the final outcome.⁷ Reports suggest that, in some cases, local cadres may have used power over the land as a means of extracting rent from farmers.⁸

In 1999, the Chinese government revised the 1986 Land Management Law in order to improve tenure security. This revision requires that all farmers receive written 30-year land-use contracts and that the scope for readjustments be circumscribed or completely eliminated. Evidence of initial implementation shows, however, that much remains to be done to translate these legal provisions into effective tenure security. A recent survey in 17 provinces found that, although 60% of households are estimated to have held written land-tenure contracts, only 13% of these contracts rule out further land readjustments, 25% explicitly allow for readjustments, and the remainder contain unclear or contradictory provisions.⁹ Consequently, only 12% of farmers felt confident that there would be no further adjustments, which implies that the impact of the legal provisions on farmers' subjective tenure security has been limited. Was such a revision justified? Should it be implemented more quickly? These questions are not only relevant in terms of policy but have also been subject to considerable academic debate.

B. The Guizhou Experiment

To provide evidence that could help clarify these issues and to guide the policy discussion in the area, the Chinese government encouraged provinces and counties to implement a number of land-rights "experiments."¹⁰ Meitan County in Guizhou Province was designated by the State Council in 1987 as one of the initial 18 national experiment zones for rural reforms. The "experiment" undertaken there consisted of the introduction of long-term land-use rights, prohibition of redistribution (initially for 20 years for paddy land), and the policy of no land readjustment in response to changes in household size. In 1994, when the 15-year contract (starting in 1979) ended, the Guizhou Communist Party Committee issued a document requiring that, in the whole province, "the term of the contract be extended for another 30 years for arable land, and 60 years for nonarable land. The policy of 'no land increase for new population, no land decrease for reduced population' [the 'two noes' policy] should be continued" (my translation). At the end of 1997, the party committee issued another document stipulating that "the contract term of arable land be extended for another 50 years (compared to 30 years nationally), and the term for nonarable land for another 60 years, both starting with 1994" (our translation). This policy has been widely implemented by giving farmers certificates to the land they cultivate.

Guizhou's early implementation of a policy that exogenously provides significantly longer and more secure land rights than were available to farmers

in other areas of China provides an ideal case to assess the impact of such policies in comparison with the circumstances of other provinces. To explore this impact, we rely on a household survey that covered 1,001 households from 110 villages in Guizhou, western Hunan, and Yunnan Provinces. The latter two provinces were chosen on the basis of their proximity and climatic and geographical similarity to Guizhou. The expectation was that farmers outside Guizhou would enjoy lower levels of tenure security than those within Guizhou. Comparing the impact of property-rights arrangements in Guizhou, either directly through a variable indicating whether village leaders were aware of the adoption of the “two noes” policy or indirectly through a provincial dummy, to those in other provinces allows us to ascertain the impact of the policy on the variables of interest. In addition to the “two noes” policy, we add information on two other interventions in the sphere of property rights. One refers to villager perception of the transferability of land rights within the village, an indicator that is justified in view of recent evidence suggesting the importance of transferable land rights.¹¹ A second indicator is whether villagers have received written land-use certificates. Before describing the data in more detail, we discuss the research questions to be addressed.

C. Research Questions

We intend to use these data to address three main questions, namely, (1) whether changed land-tenure arrangements had an appreciable effect on agricultural investment; (2) whether land policy had a negative impact on equity or affected households’ ability to cope with shocks, thereby causing a reduction in their ability to invest in physical and human capital or to access land; and (3) what determines households’ preferences for specific land rights. The justification for each of these questions and their relation to the existing literature is discussed below.

Agricultural investment. A number of studies from China suggest that tenure insecurity may have affected economic outcomes in three ways. First, insecure tenure was found to prevent much needed investment in land improvement,¹² something that may have had particularly negative consequences on former “wasteland.”¹³ Although in a less direct and systematic way, lack of tenure security appears also to have contributed to environmentally unsustainable methods of cultivation and overexploitation of natural resources.¹⁴ Second, the literature points to the fact that insecure tenure reduces the possibility of productivity-enhancing land transfers in the rental market and may result in underutilization of land, especially in areas where rural nonfarm employment is economically important.¹⁵ This is often believed to have led to economic inefficiencies because an absence of land markets permitted a fragmented land-holding structure.¹⁶ Finally, to the extent that land rental is seen as a signal that a household does not need its allocation of land, it would tend to reduce out-migration of households that would benefit both the migrants and those who stay behind.¹⁷ Taken together, these factors have led to calls for policy makers to consolidate and streamline reforms,¹⁸ especially to

strengthen households' property rights over land.¹⁹ Identifying the differences in land rights through either a provincial dummy or a direct indicator of whether or not the village had adopted the "two noes" policy allows us to assess the impact of the change in land-tenure regime. As the household survey asked specifically for agricultural investments undertaken during different time periods, we should be able to capture a wider range of investments than has been available to other studies, which often considered only very short-term investments.

Equity, investment, and land access. It is undisputed that, in rural areas of China, as in many other transition economies, access to land is a critical determinant of household welfare that, by contributing directly to home production and consumption, helps to reduce vulnerability. This is of particular importance when, for cost and administrative reasons, a social welfare system is impossible to implement. The remarkable equality of opportunity that is established by the possibility of having periodic reallocations of land is often seen as a key reason for China's ability to attain higher levels of nutritional security and human development than other countries at similar levels of development.²⁰ Although, with an egalitarian distribution of endowments in place, markets could, in principle, help to reallocate land in response to changes in family structure caused by births, out-migration, and deaths, it is often maintained that continued provision of administrative reallocation will be needed for equity reasons.²¹ If this were the case, that is, if the inability to redistribute land in response to population change that is associated with the award of a more secure tenure would reduce the ability of the poor to cope with shocks, the equity gains might outweigh the efficiency losses and, on balance, it might not be worth moving toward more secure tenure even if securer land rights increased households' propensity to make investments.

To determine whether, once an equitable initial allocation of land has been achieved, providing more secure long-term rights to land will negatively affect equity, we explore to what extent there are systematic differences across provinces in changes of households' asset endowments over time.²² One possibility is that population change by itself has led to a worsening of the ownership and operational distribution of land. A second, and more likely, hypothesis is that households that experienced shocks during the period have had, possibly owing to a lack of access to land, lower levels of investment. Both possibilities can be tested in a regression framework.

Households' land-rights preferences. Farmers' preferences concerning land rights are of interest over and above the observed differences in outcomes because in a decentralized system it is unlikely that any policy can be successfully implemented unless it is supported by a majority of the local population. To explore this issue, we assess the extent to which households' preferences regarding different types of land rights are affected by differences in relative endowments; the ability to access other markets, especially those for insurance and credit; and the fact that they actually experienced the "two noes" policy regime. Identification of the extent to which endowments and

access to markets for credit and insurance affect land-rights preferences allows us to assess the extent to which market imperfections not only persist but also reduce the benefits from better-defined land rights for individual households. This assessment could be used to identify complementary policy measures that could contribute to a higher acceptance rate or to a better distribution of the gains from well-defined property rights. Identifying factors that affect farmers' preferences will allow us to better appreciate the complexity of such rights and, by making possible the assessment of the likely future evolution of exogenous variables, also help to predict the likely change in preferences resulting from broader economic development. In addition, finding a significant positive impact of past adoption of a specific land policy measure would point toward a learning effect, the magnitude of which can be compared with the impact of other factors. An emergent and significant literature building on relevant hypothetical questions largely finds households' opinion to be strongly against a policy of "no redistribution."²³ Even though our sample is not nationally representative, it is based on actual experience rather than on such hypothetical questions and allows detailed assessment of the interaction of various factors and market imperfections in shaping such preferences. This allows us to avoid situations in which interviewees fail to comprehend the implications of a situation that they have not actually experienced and that leads them, as a consequence, to exhibit a strong bias toward the status quo.²⁴

III. Data Sources and Descriptive Evidence

This section describes the sample and the nature of the data used in our subsequent analysis by presenting descriptive statistics on household characteristics; changes in the inequality of endowments, investment, shocks, and coping strategies; and preferences regarding land rights. We find that—despite differences in sources of income, especially regarding the extent of migration—most household characteristics, such as income levels, are quite similar across provinces in the sample. Investment in enterprise assets and consumer goods was the most prevalent, and even though a large number of households reported exposure to shocks, these did not contribute to an appreciable increase in the inequality of land endowments. Also, we find that support for the policy of no redistribution is high, especially in the provinces where this policy had been implemented before.

A. Characteristics of the Sample

The data used in the study are from a combined village and household survey conducted by the Rural Survey Team from China's State Statistical Bureau (SSB) in May and June of 2001. The survey covered 1,001 households from 110 villages in three of China's poorest provinces having significant differences in land-tenure arrangements, namely, Guizhou, western Hunan, and Yunnan provinces. Guizhou Province was chosen because it had implemented the "two noes" policy early on, while, as stated above, western Hunan and Yunnan were chosen because of their proximity and their climatic and geo-

TABLE 1

BASIC CHARACTERISTICS OF HOUSEHOLDS INCLUDED IN THE SAMPLE

VARIABLE	PROVINCE			
	Total	Guizhou	Hunan	Yunnan
Head's age (years)	45.27	45.96	46.50	42.40
Head's education (years completed)	6.09	6.20	6.10	5.80
Number of persons aged 14–60 years	3.04	3.14	2.92	2.90
Number of persons aged < 14 years	.93	.96	.74	1.07
Number of persons aged > 60 years	.35	.35	.50	.25
Total earned income (Y)	5,156.52	4,832.53	5,911.00	5,267.33
Per capita earned income (Y):	1,235.89	1,116.38	1,468.07	1,319.82
Agricultural income (%)	70	69	71	74
Nonagricultural income (%)	30	31	29	26
Share receiving remittances from family members (%)	44	42	60	33
Mean amount of remittances received (Y)	1,179.92	1,189.76	1,220.56	1,080.20
Share of households paying for offspring (%)	64	63	68	61
Mean amount of support given (Y)	674.56	593.46	884.00	668.56

SOURCE.—Own computation from SSB/CCER/WB 2001 Household Survey data (China's State Statistical Bureau, China Center for Economic Research, World Bank).

graphical similarity to Guizhou. Thus, the provinces have similar geographical and other characteristics but differ significantly in their land-tenure arrangements, which were changed by provincial decree in Guizhou. We thus expected to find that farmers outside this province would not enjoy the same level of tenure security as did those within Guizhou.

In addition to most of the variables included in standard multipurpose surveys, such as household characteristics, expenditure, assets, different income sources, and agricultural production, this survey contained a number of modules that aimed to reconstruct movements in population and key assets. To achieve this reconstruction, information on individuals' employment history; their investment in productive agricultural assets, nonfarm enterprises, and consumer durables (including housing); and changes in land endowments were obtained retrospectively for the time period starting in 1980. Similar information was obtained on the occurrence of shocks, households' responses to these shocks, and their coping strategies.²⁵ To gain insight on key village characteristics, a village-level questionnaire was administered to village leaders, with a significant part of the information being obtained from village books.

B. Household and Village Characteristics

Income size and composition. The households included in the sample are very similar with regard to total or per capita earned income, defined as the sum of wage income and profits (excluding family labor) from agriculture and nonagricultural enterprises. As illustrated in table 1, this figure amounts

TABLE 2
KEY VILLAGE CHARACTERISTICS

VARIABLE	PROVINCE			
	Total	Guizhou	Hunan	Yunnan
Total village population	2,225.53	1,801.92	1,021.01	4,405.45
Number of households	543.47	417.13	272.85	1,109.00
Share of population with main income from agriculture (%)	84	84	70	95
Share of households > double average land (%)	7	7	4	11
Share of households < half average land (%)	14	14	13	17
Households with children who migrated outside province (%)	24	24	42	8
Share of households with electricity (%)	98	99	99	97
Mean area of total land per household (mu)	1.30	1.12	2.09	1.00
Mean area of paddy land (mu)	.43	.38	.74	.29
Mean area of upland (mu)	.54	.60	.31	.61
Share of households cultivating wasteland (%)	36	28	79	20
Mean area of wasteland cultivated (mu)	.32	.14	1.04	.10
Forest land per capita (mu)	1.27	.37	3.13	1.77
Share of forest privately held (%)	44	56	71	25
Gini coefficient of per capita total land	.44	.40	.46	.39
Gini coefficient of per capita paddy land	.52	.50	.40	.66
Gini of the income distribution	.48	.48	.50	.49

SOURCE.—Own computation from SSB/CCER/WB 2001 Household Survey data (China's State Statistical Bureau, China Center for Economic Research, World Bank).

to between Y 1,116 in Guizhou and Y 1,468 in Hunan, clearly identifying all of the households in the sample as very poor.²⁶ Despite some diversification of income sources, agricultural income, that is, profits from crop and livestock production, still accounts for more than two-thirds of earned income, varying from less than 69% in Guizhou to more than 74% in Yunnan. Other characteristics for households in the sample are fairly similar. For example, Guizhou has the largest family size, with 4.5 members per family, as compared with 4.16 in Hunan and 4.22 in Yunnan. Village characteristics, as reported in table 2, point not only toward differences in overall size but also to differences in population growth. The mean annual rate of population growth (from 1985 to 2000) was 1.1% in Guizhou and Yunnan, but only 0.4% in Hunan. At the same time, the villages in the sample have, by now, virtually universal access to electricity.

Intergenerational links. Although overall levels of earned income and household characteristics are similar across provinces, the composition of such income and the extent to which households are able to complement it with remittances differs. The survey indicates that, for the majority of households, remittances from family members who had migrated out and intergenerational transfers are of high importance. For those who receive them, remittances increase nonearned income by more than 50%. With 44% of households receiving remittances in the aggregate, regional differences are considerable; the share of households receiving remittances ranges from almost two-thirds

TABLE 3
LAND RIGHTS, LAND DISTRIBUTION, AND LAND RENTAL IN THE SAMPLE (%)

VARIABLE	PROVINCE			
	Total	Guizhou	Hunan	Yunnan
Village level:				
No action taken on population increase	73	93	43	48
No action taken on population decrease	68	86	43	43
Land rental allowed (village leaders)	64	68	79	39
Share with certificate	92	98	69	98
Land rental allowed (individual level)	90	87	95	91
Households' preferred land policy:				
"Two noes" policy	41	45	28	43
Large adjustment and then "two noes"	21	23	14	21
Continuing small adjustments	29	24	44	28
Continuing large-scale adjustments	10	7	14	13

SOURCE.—Own computation from SSB/CCER/WB 2001 Household Survey data (China's State Statistical Bureau, China Center for Economic Research, World Bank).

in Hunan to one-third in Yunnan. On the other hand, providing resources for household members who have left the household, mainly for education, constitutes a significant burden—almost two-thirds of households provide support for offspring, and for those who do so, the mean amount of support given amounts to 25% of earned income.

C. Land-Rights Arrangements and Preferences

We are interested in three interrelated though distinct types of land-rights interventions, namely, the extent to which the "two noes" policy has been adopted, whether households have been awarded certificates that document their landholdings, and whether or not land rental is allowed. Concerning the adoption of the "two noes" policy, we observe clear differences between Guizhou and the other two provinces (table 3). In Guizhou, 93% of all villages report that they do not take any action following an increase in population, as compared to less than half of all villages (43% and 48%, respectively), in Hunan and Yunnan. Coverage with certificates (at the household level) is almost complete in Guizhou and Yunnan, as compared with about two-thirds in Hunan, suggesting that certificates can be and are awarded even in cases where tenure is for a shorter term and redistribution remains a possibility.²⁷

Village leaders' as well as individual households' responses to the question whether land rental is allowed or not point toward considerable divergence between official policy and household perception but at the same time suggest that the "two noes" policy is not a precondition for—or even highly correlated to—availability of transfer rights. Surprisingly, the share of villages where land rental is officially allowed is highest in Hunan, even though this is the province with the least amount of certification or implementation of the "two noes" policy. According to village leaders' responses, the percentage of villages allowing land rental ranges between almost 80% for Hunan and 39%

for Yunnan. Villagers' views are quite different, suggesting that households may be less aware of existing restrictions on land rental than village leaders assume or that these rules are either difficult to enforce or not recognized. While villagers' relative ranking of provinces is consistent with the information given by village leaders, the total share of households that believe that rental is allowed, 90%, is much higher than what has been indicated by leaders.

To obtain information on preferences for land rights, the survey also asked households to rank four types of land policies in descending order. The first is the "two noes" policy, that is, no readjustment in response to either population increase or decrease, together with an enhanced duration of land rights of at least 30 years. The second option is a policy of continuing "small adjustments," that is, administrative reallocation of land from households that experienced population decrease to those whose population increased, while leaving others' land endowments unchanged. The third option is a "large adjustment" policy, whereby land is completely redistributed among all households in the village based on population size every 3–5 years. The final policy option is one of a "big adjustment followed by a 'two noes' policy," where land is redistributed to establish an egalitarian landholding structure, before imposing the "two noes" policy and longer-term tenure security.²⁸

Descriptive evidence on farmers' first preferences indicates that there is indeed considerable support for the policy of "two noes." Either immediate imposition of the "two noes" policy or implementation of a large adjustment that is then followed by the "two noes" policy is supported by about two-thirds of households in Guizhou (68%) and Yunnan (64%) but by only 42% of the households in Hunan. Most of the households (45% in Guizhou and 43% in Yunnan) prefer to have the "two noes" directly, without going through a redistribution beforehand. Continuing large adjustments, arguably the policy that undermines property rights the most, are preferred only by a very small minority of households (7% in Guizhou and 14% and 13% in Hunan and Yunnan, respectively), while small adjustments are the first preference of between one-fourth (24% in Guizhou and 28% in Yunnan) to almost one-half (44% in Hunan) of the households. To assess the policy relevance of these figures, it is important to assess the extent to which they might be nationally representative. The nationwide study by Brian Schwarzwald and his colleagues broadly supports our findings for the provinces where there is an overlap (72%, 63%, and 67%, respectively, of households in Guizhou, Yunnan, and Hunan who do not oppose a policy of "two noes"). In addition, this study finds a high level of support for a stable land distribution nationwide, though this support is slightly higher in poor provinces.²⁹ Interestingly, even though the survey employed here finds that support for the "two noes" policy was slightly higher in Guizhou than in other provinces, the study by Schwarzwald et al. finds that support for such a policy in Guizhou is only about 10% higher than the average for the eight poorest provinces (Guizhou, Yunnan, Hunan, Jiangxi, Jilin, Heilongjiang, Guangxi, and Shaanxi), clearly too little to argue that this policy might have been imposed endogenously in Guizhou. While

TABLE 4
INVESTMENT IN PHYSICAL AND HUMAN CAPITAL; COPING STRATEGIES

VARIABLE	PROVINCE			
	Total	Guizhou	Hunan	Yunnan
Investment in physical and human capital:				
Share of households investing in agricultural enterprise assets (%)	32	33	36	24
Share of households investing in nonagricultural enterprise assets (%)	9	10	9	8
Share of households investing in housing and consumer goods (%)	65	65	62	68
Mean value of agricultural investment, land and draft animal: cash (yuan)	340.82	483.19	487.89	716.54
Mean value of consumer goods/housing investment: cash (yuan)	3,695.26	3,066.62	2,645.09	5,901.21
Mean value of nonagricultural enterprise investment: cash (yuan)	732.36	739.94	416.07	954.39
Share of villages investing in agricultural infrastructure (%)	40	31	54	52
Mean education level of cohort born 1980–85	5.13	5.5	5.8	4.1
Head migrated outside of own county (%)	7	7	10	3
Children migrated outside of own county	24	24	42	8
Shocks and coping strategies:				
Number of people from whom to borrow				
Y 1,000–Y 5,000	2.09	2.36	1.75	1.72
Share of households experiencing a small shock (Y 1,000–Y 5,000) (%):	33	29	39	32
Cope through borrowing or help by friends (%)	61	62	56	63
Cope through migration (%)	35	36	39	30
Cope through reduced consumption/disinvest (%)	4	2	6	7
Share of households experiencing a big shock (> Y 5,000) (%):	10	7	19	8
Cope through borrowing or help by friends (%)	63	63	57	72
Cope through migration (%)	33	37	34	22
Cope through reduced consumption/disinvest (%)	5	0	9	6

SOURCE.—Own computation from SSB/CCER/WB 2001 Household Survey data (China's State Statistical Bureau, China Center for Economic Research, World Bank).

definitions are slightly different, this is at variance with an earlier study, which, based on a smaller and geographically more concentrated sample, found 62% of households to be in favor of periodic redistribution.³⁰ Exploring the methodological and substantive reasons underlying such differences in more detail would be an important area for future research.³¹

D. Investment, Shocks, and Coping Strategies

To gain insight into how exogenous land-rights arrangements affect households' choice of asset portfolio, we distinguish between investments in agriculture, education, and nonagricultural enterprises. Table 4 illustrates that the most frequent type of investment is in consumer durables, especially housing, followed by investment in agricultural enterprises (including land) and nonagricultural enterprise assets. About one-third of the households in-

cluded in the sample (36% in Hunan, 33% in Guizhou, and 24% in Yunnan) undertook agricultural investment during the 5 years before the survey (i.e., from 1996 to 2001), as compared with about two-thirds in all provinces who invested in consumer goods and housing. Two other strategies to increase income in the future are investment in children's education and out-migration. The data show slight differences in education of the most recent cohort of children graduating from primary school (i.e., those between 15 and 20 years of age in 2000), with the highest values attained in Hunan, followed by Guizhou and Yunnan (5.8, 5.5, and 4.1 years, respectively). Regarding current migration, one observes significant differences between household heads and children; migration is highest in Hunan.

One of the most important reasons for households to disinvest or to reduce their equilibrium holding of durable assets is either in response to or in anticipation of shocks, given the type of safety nets available. To the extent that differences in land-rights arrangements imply a systematic change in the possibilities to smooth consumption in response to population-related shocks, one would expect households' optimum portfolio to adjust both *ex ante* (i.e., irrespective of whether a shock was actually experienced, depending only on the specific land-rights arrangements) and *ex post* for those households that experienced a shock. To provide a first indication of the extent to which we would expect changes in land rights to have an impact on the ability to deal with risk, we need to hold constant for other factors, in particular the strength of the borrowing network and whether or not respondents experienced an actual shock. To approximate the former in an environment where access to formal credit is restricted,³² interviewees were asked about the number of people from whom they could borrow amounts ranging from Y 1,000 to Y 10,000.³³ For the latter, information was gathered on whether, during the last 5 years, households had experienced any of a number of shocks,³⁴ the approximate magnitude of the shock in monetary terms, and the coping strategy adopted to deal with the situation.

Table 4 contains descriptive statistics for both variables. The average household had 2.1 friends who could be approached for borrowing of amounts of Y 1,000–Y 5,000, with significant differences between Guizhou, where this figure was highest (2.4), and Hunan (1.7) and Yunnan (1.7). Responses to small shocks, involving a loss of Y 1,000–Y 5,000, and large shocks, defined as those with a value of more than Y 5,000, point toward informal borrowing and migration as the most common coping strategies—applied by about 60% and 35%, respectively. As compared with this, the share of households that chose to reduce consumption or to sell assets was, with less than 9%, modest. Also, descriptive evidence fails to substantiate fears that the implementation of the “two noes” policy in Guizhou would have undermined households' ability to draw on existing safety nets as a way of coping with shocks. In fact, of all the households included in the sample, disinvestment or reduction of consumption was, with 2% and 0% (as compared with 6% and 9% in Hunan and 7% and 6% in Yunnan), least observed in Guizhou.

Inequality. To approximate the distribution of land in the villages, we asked village leaders for the share of households with more than double or less than half of the average village land endowment. Responses indicate that land distribution is most unequal in Yunnan, followed by Guizhou and Hunan, but that there have been only limited changes over time. This evidence is supported by data on individual land endowments for households included in the sample. The data point to differences in the mean per capita endowments and the structure of landholdings across provinces.³⁵ Comparing the distribution of income and landholdings highlights that, in all provinces, the distribution of land is more equal than the distribution of income; income Gini coefficients are 0.50 in Hunan, 0.48 in Guizhou, and 0.49 in Yunnan, while the Gini coefficient for total land area is 0.33 in Yunnan, 0.38 in Guizhou, and 0.42 in Hunan. Since households were asked about the evolution of their landholding over time, we can test for systematic differences in the evolution of land inequality across the three provinces. Doing so does not reveal any significant differences, thus allowing us to reject the hypothesis that the “two noes” policy led to a systematic worsening of landholdings.

IV. Econometric Evidence

This section contains econometric evidence concerning the three main policy questions of interest. We first explore the extent to which land rights affect investment in agriculture and, through the impact on households’ ability to cope with shocks, could possibly affect human capital accumulation and non-agricultural enterprise investment. Evidence indicates that more secure land rights and higher levels of transferability increase producers’ propensity to invest in agriculture. Households that experience shocks reduce nonagricultural investments as well as the level of schooling of children who make their educational decisions during the time period of the shock. At the same time, there is no evidence that differences in land-rights arrangements had any impact on the ability to cope with these shocks. Although many of the factors affecting households’ land-rights preferences are as predicted, what is most surprising is the evidence of “learning,” that is, that households experiencing more stable land rights are likely to favor them.

A. Agricultural Investment

The effect of land-tenure arrangements on households’ propensity to invest is widely seen in the literature as a test of the investment-enhancing impact of higher levels of tenure security.³⁶ With respect to China, most applications focus on short-term investment. Without data on long-term investment, many studies have resorted to short-term measures, such as the use of specific inputs—for example, fertilizer or organic manure.³⁷ Also, to the extent that the variation in tenure security is endogenous, that is, adopted in response to higher payoffs from land-improving investments, observations on the phenomenon may suffer from biased estimates. Both of these shortcomings can be addressed with our data. First, we have data on long-term investment.

Second, the fact that laws affecting tenure security in Guizhou were made at the provincial level provides exogenous variation in tenure security. To the extent that more secure property rights (such as the policy of the “two noes”) have been adopted in other villages outside Guizhou, where the benefits from such a policy would be particularly high, the econometric estimates of the impact of this arrangement as obtained by our study would provide a lower bound of the true effect.

To make inferences on determinants of household investment, we use a specification that follows the literature in that overall levels of agricultural investment are treated as a function of household characteristics, in particular, endowments and access to credit markets and other mechanisms for smoothing consumption along with policy variables.³⁸ In addition, as farmers’ investment decisions are likely to depend on the aggregate level of investment undertaken by the village, we include village-level investment as one of the right-hand-side variables and adopt a two-stage approach. Formally, we estimate

$$I_i^t = \alpha + \chi I_i^* + \beta X_i + \gamma Z_i + \delta P_i + \varepsilon_i, \quad (1)$$

where I_i^t is either (in the probit specification) a dummy equaling one if household i made investments in agriculture during the period, and zero otherwise, or (in the tobit specification) the actual amount of investment made; X_i are vectors of household characteristics; Z_i are endowments of labor and land; and P_i are land policy variables. The measure of agricultural investment includes households’ efforts to make land improvements—such as establishment of wells, digging of ditches, planting of orchards and trees, and forms of soil improvement—as well as livestock-related investments.

Others have argued that individual households make their investment decisions based on the aggregate level of investment in the village, implying that failure to include village-level investments may introduce significant biases.³⁹ To address this issue, we use instrumental variable techniques. Village-level investment, I^* , is the endogenous variable, and identifying instruments are the lagged value of village investment in the previous 5-year period, the share of upland in the village’s total land endowment, average per capita income, and the population growth rate from 1985 to 1995. The first instrument is a proxy for the overall propensity to invest in the village, the second identifies the scope for productivity-enhancing investment by converting upland, the third indicates the scope for cross-subsidization of agricultural investment from nonagricultural sources, and the rate of population growth highlights the need for more investment at the village level to maintain a given living standard.

Results, presented in table 5, support the conjecture that secure land-use rights increase agricultural investment by individual households. Irrespective of whether the impact of more secure land rights is proxied by the provincial dummy for Guizhou or whether we include an explicit variable indicating whether or not the village had adopted a policy of “two noes,” probit and tobit regressions suggest a significant and positive impact of more secure land

TABLE 5
DETERMINANTS OF HOUSEHOLD-LEVEL AGRICULTURAL INVESTMENT

VARIABLE	PROBIT AGRICULTURAL INVESTMENT DUMMY		TOBIT AMOUNT OF AGRICULTURAL INVESTMENT (Log)	
	(1)	(2)	(3)	(4)
Village investment dummy	.939* (1.87)	.963 ⁺ (1.91)	4.676 (1.35)	5.237 (1.49)
Lagged agricultural investment (dummy/amount)	-.217** (-2.37)	-.238** (-2.58)	-.607** (-4.24)	-.609** (-4.28)
Village adopted "two noes" policy		.349* (2.26)		1.979 ⁺ (1.80)
Households with land certificate	.302 (1.41)	.238 (1.160)	1.549 (1.03)	1.304 (.91)
Household with land-transfer right	.884** (-2.75)	.746* (-2.33)	-5.212* (-2.30)	-4.473* (-1.99)
Head's maximum education	.014 (.90)	.013 (.79)	.199 (1.76)*	.191 ⁺ (1.69)
Past migration by head	-.193 (-1.28)	-.196 (-1.29)	-1.196 (-1.13)	-1.216 (-1.15)
Migration by children	-.246* (-2.19)	-.246* (-2.19)	-1.461 ⁺ (-1.86)	-1.481 ⁺ (-1.88)
Age of household head	.004 (.73)	.003 (.56)	.034 (.89)	.029 (.75)
Number of household members aged > 60 years	.199* (2.17)	.194* (2.14)	1.492* (2.37)	1.490* (2.38)
Number of household members aged < 14 years	.087 (1.38)	.081 (1.28)	.703 (1.57)	.683 (1.54)
Number of household members aged 14-60 years	.149** (3.34)	.147** (3.31)	1.189** (3.79)	1.180** (3.77)
Per capita paddy land	.220* (2.06)	.249* (2.29)	1.705* (2.40)	1.877** (2.60)
Per capita upland	-.095 (-1.10)	-.105 (-1.21)	-.388 (-.63)	-.451 (-.73)
Per capita other land	.101** (3.53)	.121** (3.61)	.695** (3.49)	.830** (3.50)
Guizhou dummy	.433* (2.08)	.380 ⁺ (1.91)	2.812 ⁺ (1.92)	2.657 ⁺ (1.88)
Yunnan dummy	-.076 (-.48)	-.023 (-.14)	-.783 (-.69)	-.443 (-.38)
Constant	-2.238** (-3.57)	-2.388** (-3.60)	-15.837** (-3.52)	-17.129** (-3.58)
Observations	944	922	944	922
Log-likelihood	-558.20	-557.22	-1,280.93	-1,280.11

NOTE.—Absolute values of z-statistics are in parentheses.

⁺ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

rights. The Guizhou dummy is consistently significant at least at the 10% level and is very positive; in the equation with the policy dummy, both are significant. This suggests that households in Guizhou or in villages that adopted the “two noes” invested more in agriculture than those in the other provinces or in villages where this policy was not in effect. While no such effect is visible on paddy land only,⁴⁰ the increased tenure security on upland that was afforded by the “two noes” policy appears to have induced a significant response in terms of agricultural investments.

At the same time, the regressions suggest that secure land-ownership rights are not the only policy variable of relevance; to the contrary, whether or not a household is able to transfer land is found to have a bigger impact on investment than the adoption of the “two noes” policy. The importance of transfer rights is intuitive because high levels of tenure security will not be very useful if such security is contingent on self-cultivation by the household. Transfer rights will be of particular importance if there is a reasonable chance that the household (or its children) will be able to obtain an off-farm job, which is similar to the findings by Michael Carter and Yang Yao.⁴¹ This suggests that, if it is impossible to transfer land, higher levels of tenure security will have only a modest impact on increased investment.

Coefficients for other variables are for the most part as expected. The instrumented village-level investment variable is weakly positive, suggesting that village and individual-level investment tend to complement each other. By comparison, past (individual) agricultural investment is clearly negative both in the probit and the tobit specification, highlighting that households that undertook such investment recently are less likely to make further investment in agriculture. Also, other household characteristics and endowments have the expected signs: households' labor endowment is associated with higher levels of relatively labor-intensive agricultural investments. While paddy-land endowments are marginally significant, the high significance of “other” land, that is, orchards and wasteland, illustrates that, everything else being constant, availability of such lands greatly increases the scope to make agricultural investments, especially in planting trees. Households that have children migrating to off-farm jobs are less likely to invest in their land, suggesting that investment in nonagricultural pursuits such as education and out-migration can substitute for investment in agriculture, possibly owing to higher returns to migration as compared with on-farm investment.⁴² Thus, while we find a significant and positive impact of the Guizhou dummy or the decision to implement a policy of “two noes,” the regression suggests that a number of other variables, especially transfer rights, have a quantitatively more important impact on investment.

B. Coping with Shocks

Even though descriptive statistics suggest that the change in land policy had only limited or no effect on the coping strategies employed by households, econometric exploration that controls for other factors is needed to provide

more rigorous evidence. To explore whether the change in land policy affected households' levels of investment, we focus on human capital investment as well as net investment in enterprise equipment and consumer durables. The reduced form equation to be estimated is of the form

$$Y_i^j = \alpha + \beta X_i + \gamma \Theta_i + \varepsilon_i. \quad (2)$$

For the case of educational investment, Y_i^j , the outcome variable of interest, indicates the number of years of education completed by child j in household i ; X_i is a vector of household and individual-specific characteristics that may affect child j 's education decision, including provincial dummies; Θ_i is a dummy indicating whether or not the household experienced a small or large shock during 1995–2000 and the interaction of this variable with provincial dummies to indicate different land-tenure regimes; and ε_i is an error term. Investment in education or nonagricultural equipment could be affected by land-rights arrangements in two ways. While there is an ex post scope, the ability to gain access to additional land may increase the likelihood that households that have experienced shocks will be compensated. On the other hand, households that have experienced a shock may be more likely to obtain land.

We consider “small shocks” to be those involving a monetary loss of between Y 1,000 and Y 5,000 and “large shocks” to be those of a loss of more than Y 5,000. As we are interested in the impact of shocks that affected households' ability to invest in education during the 1995–2000 period, we restrict ourselves to educational decisions by children who were between 10 and 15 years of age during that time.⁴³ Variables relating to household and individual characteristics include the mean level of education achieved by the child's parents, his or her gender, the household's land endowment, and a dummy for whether or not the household head or any siblings had migrated out during the period of interest. Age dummies are included throughout.

Replacing Y_i^j with C_i , the amount of net investment in nonagricultural enterprise assets and consumer durables during the 1995–2000 period, leads to a similar equation for net investment in physical capital. In this case, the dependent variable is net investment by the household, that is, total investment minus any assets lost through an exogenous shock during the 1995–2000 period. Implementing this is relatively easy since households reported the approximate monetary loss (e.g., in spending on hospital fees and medicine) due to a shock. We do not make any provision for depreciation.

Results of the education equation for 258 children in the applicable age group are reported in table 6.⁴⁴ In general, large shocks are indeed estimated to have had a significant and quantitatively large negative impact on children's education. Having experienced a large shock is estimated to have reduced a child's level of educational attainment by two-thirds of a year (see col. 1), a value that is large if compared with the average attainment of 4.5 years within the sample. To explore whether the ability to cope with shocks differs across provinces, for instance, because the introduction of the “two noes” policy

TABLE 6
DETERMINANTS OF HUMAN CAPITAL INVESTMENT IN CHILDREN'S EDUCATION

VARIABLE	LARGE SHOCK (>Y 5,000)		SMALL SHOCK (Y 1,000–Y 5,000)	
	(1)	(2)	(3)	(4)
Male dummy	.435** (2.72)	.431** (2.71)	.413* (2.57)	.432** (2.73)
Head migration dummy	–.311 ⁺ (1.73)	–.359* (2.00)	–.331 ⁺ (1.82)	–.371* (2.07)
Children migration dummy	–.069 (.36)	–.059 (.31)	–.110 (.58)	–.047 (.25)
Per capita paddy land	.364 (1.31)	.387 (1.40)	.412 (1.43)	.680* (2.22)
Per capita upland	.188 (.74)	.203 (.81)	.274 (1.09)	.258 (1.03)
Per capita other land	–.081 (.97)	–.070 (.84)	–.094 (1.11)	–.109 (1.32)
Parents' years of education	.124** (3.65)	.122** (3.62)	.127** (3.73)	.120** (3.55)
Experienced shock (γ_1)	–.677* (1.98)	–1.449** (2.63)	–.116 (.65)	–1.034** (2.68)
Guizhou dummy $\times$ shock (γ_2)		.934* (2.44)		.887 ⁺ (1.89)
Yunnan dummy $\times$ shock (γ_3)		.429 (.50)		1.473** (3.11)
Guizhou dummy	–.165 (.78)	–.281 (1.30)	–.155 (.72)	–.343 (1.45)
Yunnan dummy	–.713** (2.78)	–.761** (2.94)	–.718** (2.77)	–1.095** (3.84)
Constant	3.634** (10.83)	3.680** (10.99)	3.565** (10.60)	3.700** (11.05)
Number of observations	258	258	258	258
R^2	.43	.45	.42	.45
Test for net effect of shock by province: ^a				
$\gamma_1 + \gamma_2 = 0$		(2.25)*		(.86)
$\gamma_1 + \gamma_3 = 0$		(.15)		(1.29)

NOTE.—Dependent variable = years of schooling completed by 11–15-year-old children. Absolute values of robust t -statistics are in parentheses. Age dummies are included but are not reported.

^a Test statistic reported is the t value.

⁺ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

deprives households of access to land that they have traditionally used as a safety net, we interact the shock variable with regional dummies. Doing so points indeed toward differences in the ability to smooth consumption across provinces (table 2). However, contrary to what one might have expected, households in Guizhou are apparently able to deal with shocks better than those in the other two provinces. The t -tests presented at the bottom of table 6 indicate that, while in all cases shocks had a significantly negative impact

on household provision of education for the children in Hunan, it is not possible to reject the hypothesis that shocks had no effect in the case of Guizhou and Yunnan. In fact, households in Guizhou that were subjected to large shocks responded by increasing rather than cutting back on the educational investment in their children's future. This allows us to reject the hypothesis that limitations in households' ability to deal with shocks (which, in turn, might be associated with the adoption of the "two noes" policy) had an impact on human capital investments. Results thus support the notion that, consistent with what emerged from the descriptive analysis, there is little reason to expect land rights to have a significant impact on households' coping strategies.⁴⁵

Other variables in the human capital investment model are for the most part as expected. The positive and significant coefficient of the male dummy in all four models indicates a continuing strong bias against girls in providing education, something that is markedly different from other countries, such as the Philippines,⁴⁶ but not too uncommon for China.⁴⁷ Parents' educational attainment, defined as the mean years of schooling completed by both parents, has a significant and positive impact on children's education; one additional year of schooling increases the level of children's education by 0.12 years. The importance of parental education on children's education in China is also supported in the relevant literature.⁴⁸ Out-migration of the household head is shown to have a significant and negative impact on children's attainment, suggesting that parental presence is an important input into the education production function. While households' land endowment is positive, it is not significant, suggesting that neither land policy nor land endowment have a systematic impact on the level of education obtained by households' offspring.

Tobit regressions for investment in physical capital and consumer durables, as reported in table 7, point in the same direction. We find that, after controlling for other factors such as age (negative), the number of household members (highly positive), and the household's level of education (highly positive), shocks reduced both the probability of a household's making positive net investments (probit models) and the magnitude of net positive investment (tobit models). This is true for both large and small shocks. At the same time, and similar to what was found for human capital accumulation, the results suggest that, if anything, households in Guizhou are better able to cope with shocks than their compatriots in other provinces. It thus appears very unlikely that the land policies adopted in this province had a negative effect on households' ability to smooth consumption.

C. Land-Rights Preferences

If, as is suggested by the evidence presented above, more secure and transferable land rights increase households' propensity to invest but are associated with neither a more unequal distribution of land nor a significant decrease in their ability to cope with shocks, one would expect that the average household would be in favor of more secure land rights and that rejection of the "two noes"

TABLE 7
TOBIT REGRESSION OF INVESTMENT IN NONAGRICULTURAL BUSINESS ASSETS
AND CONSUMER DURABLES (Log)

VARIABLE	SMALL SHOCK		BIG SHOCK	
	Tobit (1)	Tobit (2)	Tobit (3)	Tobit (4)
Education (years)	.362** (3.76)	.354** (3.67)	.325** (3.32)	.318** (3.24)
Head migration dummy	.918 (1.12)	.954 (1.17)	1.320 (1.59)	1.303 (1.56)
Child migration dummy	.790 (1.26)	.689 (1.09)	.632 (.99)	.615 (.96)
Age of household head	-.115** (3.86)	-.116** (3.90)	-.115** (3.81)	-.117** (3.85)
Number of household members aged > 60 years	1.445** (2.97)	1.395** (2.87)	1.110* (2.25)	1.113* (2.25)
Number of household members aged < 14 years	.849** (2.65)	.801* (2.50)	.886** (2.71)	.885** (2.71)
Number of household members aged 14–60 years	.754** (3.01)	.751** (3.00)	.690** (2.70)	.694** (2.72)
Per capita paddy land	.631 (1.05)	.712 (1.19)	.593 (.97)	.609 (1.00)
Per capita upland	-.286 (.59)	-.402 (.82)	-.506 (1.01)	-.513 (1.03)
Per capita other land	.145 (.59)	.156 (.64)	.126 (.49)	.125 (.48)
Household experienced shock (γ_1)	-4.792** (8.53)	-7.787** (6.41)	-6.168** (5.88)	-7.673** (4.17)
Yunnan dummy $\times$ shock (γ_2)		4.078* (2.52)		2.581 (.92)
Guizhou dummy $\times$ shock (γ_3)		3.702** (2.64)		2.106 (.88)
Yunnan dummy	2.627** (3.07)	1.196 (1.17)	2.392** (2.74)	2.139* (2.35)
Guizhou dummy	1.354* (1.84)	.074 (.09)	1.239+ (1.66)	1.032 (1.33)
Constant	-1.162 (.66)	.175 (.10)	-1.565 (.86)	-1.270 (.69)
Observations	1,001	1,001	1,001	1,001
Log-likelihood	-1,907.61	-1,903.43	-1,926.91	-1,926.36
Test for net effect of shock by province: ^a				
$\gamma_1 + \gamma_2 = 0$		.88		.90
$\gamma_1 + \gamma_3 = 0$		6.18**		.00
$\gamma_2 - \gamma_3 = 0$		.40		.02

^a The test statistic reported is the t value.

+ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

policy would be related to differences in the ability to smooth consumption, the endowments owned, or past experience of this policy. To explore determinants of preferred tenure arrangements, we define vectors of household characteristics ($\mathbf{X}$) that affect the ability to smooth consumption and ensure against risk, endowments of labor and land ($\mathbf{Z}$) that will have an impact on the ability to make land-related investment and the expected household-specific benefits or losses from a specific land tenure system, as well as policy variables ($\mathbf{P}$) to run a probit regression of the form

$$T_i^j = \alpha + \beta \mathbf{X}_i + \gamma \mathbf{Z}_i + \delta \mathbf{P}_i + \varepsilon_i, \quad (3)$$

where T_i^j is a dummy equaling one if household i prefers tenure regime T^j ($j = 1 \dots 4$), and zero otherwise; α , β , γ , and δ are coefficients to be estimated; and ε_i is an independently and identically distributed (i.i.d.) error term.

The rationale for specific variables, together with the results from the preference regressions thus specified in table 8, are discussed below. We focus on results for households that chose the “two noes” policy (with and without village-level adoption of this policy as a right-hand-side variable), to be complemented by those in favor of other policy options. The coefficients reported are marginal effects at the mean of all other variables, and standard errors have been adjusted using the Huber-White heteroskedasticity consistent estimator throughout.

Households’ endowments. Preferences for or against redistribution are likely to be affected by the way in which such action will change households’ land endowments, in particular, whether a household’s current endowment is above or below the endowment expected after redistribution.⁴⁹ Thus, endowment variables will be of obvious importance. Under the assumption that only paddy land is subject to redistribution, we would expect households with higher levels of per capita endowments of paddy land (relative to the village mean) to be less in favor of policies that allow for redistribution in the future. At the same time, greater dependence on agriculture is likely to increase the payoffs from long-term investment in land, thus leading households to favor the “two noes” policy. Preferences for or against administrative land allocation are also likely to be affected by household structure. In particular, children who were born “without land” after the initial land assignment during the HRS would allow a household to stake a claim for obtaining more land in any future redistribution and are thus expected to predispose households against the “two noes” policy.

Contrary to the expected importance of per capita land endowments, we find that these variables are only weakly significant at the 10% level. Total per capita land has the expected positive sign but the endowment of upland relative to the village mean is negative. The share of income from agriculture is highly significant and positive, suggesting that it is particularly households that depend on agriculture and that thus benefit most from higher investment incentives that appreciate the increased stability and investment incentives conveyed by this policy. In line with expectations, households with a large

number of children who were born after the initial land reallocation are against the “no reallocation” policy since an adjustment would provide them with additional land. By the same logic, higher numbers of elderly members lead households to favor the “two noes” policy because the land that belonged to these people would have to be given up in the reallocation following their death. One more adult member increases the propensity by 3.5%, while another old member is estimated to result in a 6.6% increase in the probability of having stable land rights under the “two noes” policy as the most preferred policy option. By contrast, one additional member in the 10–14 age group who was likely to be “born without land” after the finalization of allocations under the HRS around 1983–84 and who is now coming into productive age decreases the propensity toward the “two noes” by 4.8%.

Credit access and insurance. A second set of variables relates to a household’s ability to self-insure and smooth consumption. These include the level of per capita income, the number of children who migrated out, whether remittances were received from other family members, and the strength of the informal borrowing network available to the household defined as the number of people from whom an amount of Y 1,000–Y 5,000 could be borrowed. Variables related to credit market access and consumption smoothing are of importance if periodic administrative reallocation of land functions as a safety net. We expect that households that have access to other, and possibly less costly, mechanisms to provide insurance would be more in favor of an efficiency-enhancing redefinition of land rights. The main mechanisms for doing so are the ability to self-insure, owing to high levels of asset ownership or income, and the presence of social networks. To measure the latter, we include indicators relating to the size of a household’s informal borrowing network, the number of children who have married out and can thus provide a source of remittances, as well as the actual amount of remittances received during the past year.

Indeed, we find that the opportunities for consumption smoothing provided by higher levels of income significantly affect households’ preferences in favor of more stable land-use rights. Intergenerational links in the form of children who have migrated out to establish their independent households, are also of great significance, while the scope for informal borrowing, that is, the number of people from which the household could informally borrow Y 1,000–Y 5,000, is significant only at the 10% level.⁵⁰ Comparing the number of children who have migrated out with the (insignificant) actual receipt of remittances suggests that the option of drawing on social support in the future, rather than the actual receipt of income, is the relevant criterion. All of this supports the hypothesis that, as overall levels of income and the scope for non-land-related mechanisms of insurance increase, a policy of stable land-use rights will be favored by an increasing share of households in China.

Policy variables. Finally, we include three sets of policy variables in *P* relating to the receipt of a land-use certificate, whether land rental is allowed in the village, and whether or not the village had adopted the “two noes”

TABLE 8
PROBIT REGRESSIONS FOR FARMER'S PREFERENCES OVER ALTERNATIVE LAND POLICIES

VARIABLE	PREFERRED LAND POLICY				
	"Two Noes" (1)	"Two Noes" (2)	Small Adjustment (3)	One Big Adjustment, then "Two Noes" (4)	Big Adjustment Continuing (5)
Village adopted "two noes" policy	.119* (2.57)		-.112** (2.60)	.028 (.76)	.011 (.45)
Households with land certificate	-.062 (1.22)	-.020 (.43)	.079 ⁺ (1.79)	-.000 (.01)	.019 (.70)
Village has right to rent	.169* (2.40)	.191** (2.78)	.028 (.48)	-.199** (3.13)	-.025 (.69)
Share of income from agriculture	.154* (2.43)	.159* (2.53)	-.028 (.48)	-.071 (1.48)	.005 (.16)
Per capita income (log)	.068** (2.69)	.069** (2.75)	-.012 (.51)	-.016 (.86)	-.008 (.56)
Number of children migrated out	.030* (2.16)	.029* (2.11)	.011 (.84)	-.042** (3.18)	-.005 (.58)
Remittance from family member	.028 (.69)	.027 (.67)	-.029 (.78)	-.012 (.37)	-.011 (.50)
Number of members aged 10–14 years	-.045 ⁺ (1.85)	-.042 ⁺ (1.75)	.003 (.16)	.007 (.43)	.033** (2.77)
Number of members aged 14–60 years	.031* (2.17)	.031* (2.15)	.002 (.14)	-.020 ⁺ (1.74)	-.011 (1.23)

Number of members aged > 60 years	.062* (2.12)	.060* (2.06)	-.032 (1.23)	-.014 (.59)	-.027 (1.50)
Per capita total land used	.023+ (1.79)	.020 (1.59)	-.032* (2.24)	.015 (1.54)	-.013 (1.51)
Per capita paddy land relative to village mean	.003 (.51)	.003 (.47)	.004 (.70)	-.007 (.69)	-.002 (.47)
Per capita upland relative to village mean	-.019+ (1.84)	-.016 (1.60)	.004 (.45)	.006 (.76)	.007 (1.60)
Household able to borrow money between Y 1,000 and Y 5,000	.006+ (1.89)	.006+ (1.94)	-.003 (1.06)	-.001 (.35)	.001 (1.30)
Dummy of rent-in	-.122* (2.35)	-.120* (2.28)	.051 (1.08)	.067 (1.58)	.020 (.73)
Number of plots	.005 (1.01)	.007 (1.43)	.003 (.67)	-.013** (3.01)	.000 (.15)
Guizhou dummy	.068 (1.28)	.123* (2.51)	-.148** (3.07)	.158** (3.30)	-.074* (2.47)
Yunnan dummy	.100 (1.56)	.121+ (1.91)	-.115* (2.20)	.131* (2.18)	-.007 (.23)
Log-likelihood	-604.99	-608.36	-556.59	-454.79	-293.70

NOTE.—Robust z-statistics are in parentheses. $N = 956$.

+ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

policy in 1995.⁵¹ One justification for this is that, if households “learn” in the sense of adjusting their expectations about different policies in light of earlier experience, one would expect to find systematic differences in preferences between households that experienced the “two noes” policy of (or those who received land-tenure certificates) and those who did not. A second possibility would be that the adoption of the “two noes” policy affects the outcome achieved in land rental markets—for example, by systematically reducing the transaction costs associated with such rentals or by allowing for longer-term contracts, which are likely to be more efficient. In line with such importance of land-transfer rights to achieve efficient allocation of land among households, we would also expect that with better land-transfer rights, households would be more in favor of the “two noes” policy because, with such rights, market mechanisms can substitute for administrative reallocation.

The policy variables included in the preference regression support the hypothesis of a strong learning effect. Adoption of the “two noes” policy in Guizhou is a clear example; as illustrated in column 1 of table 8, a simple regression suggests that adoption of the “two noes” policy at the village level increases a household’s propensity to have this policy choice as its first preference by almost 12%. Having provided land-use certificates at the village level further increases this probability by 17%. As can be verified easily in the second column of table 6, this large learning effect does not depend on the specification chosen; even if the “two noes” variable, which may be endogenous, is dropped, the Guizhou dummy emerges as highly significant, suggesting that, after controlling for all other factors, households’ preference for the policy of “two noes” is 14% higher in Guizhou than in the other two provinces, while the coefficient on the adoption of land certificates remains highly significant. It is particularly illuminating to note that the combined learning effect of the adoption of land-use certificates and the “two noes” policy easily outweighs any impact of the other variables discussed earlier. This provides clear and strong support for the policy of quickly implementing the legal changes that have been made already. The statistically highly significant and quantitatively large coefficients on policy variables support the hypothesis that households learn about the advantages of more stable property rights as these are being implemented but also suggest that the magnitude of such learning is large enough to offset those of other characteristics discussed earlier.

Although results regarding other policy options are not as clear-cut as those for the “two noes” with respect to some of the policy-relevant variables discussed above, they coincide with them insofar as the main factor leading households to favor redistributive policies is related to household size. Having a higher number of children clearly leads households to favor a big adjustment. Adoption of the “two noes” policy, as well as the overall size of land held, and the Guizhou and Yunnan dummies are all strongly negative in the case of small adjustment. Finally, households that have a land-use certificate and

that have more adult members are strongly against a policy of first having a big adjustment then followed by the “two noes” policy.

Taken together, results from households’ preferences regarding the “two noes” policy lead to three conclusions. First, as overall income levels and access to mechanisms to smooth consumption increase, support for the “two noes” policy is likely to grow. Second, most of the resistance to the policy comes from households that experienced a population change and apparently expect that administrative intervention would help them to reach a new equilibrium. This suggests that mechanisms for land redistribution based on decentralized market mechanisms do not work well yet, possibly owing to high transaction costs. Comparing advantages and disadvantages of administrative to market-based land reallocation, in theory, as well as in practice, could be of considerable interest and appears to be a promising area for future research. A third finding relates to the significant and quantitatively large impact of learning about the impact of property-rights arrangements. This learning effect not only casts doubt on the validity and relevance of studies that are based merely on hypothetical changes in land-rights arrangements but also suggests that, once introduced, households’ support for more secure land-tenure arrangements will actually increase.

V. Conclusions and Outlook

Use of data from an actual land-policy experiment leads to insights on the equity and productivity effects of land-rights arrangements that are of interest in terms of policy and point toward a number of areas for future research. Even though the results obtained here suggest that the adoption of the “two noes” policy was, *ex post*, not associated with a negative impact on households’ investment in response to exogenous shocks, there are three areas where further research would be of great interest. First, uncovering the short-term fluctuations in asset positions caused by exogenous shocks could provide a great deal of information on the mechanisms underlying this phenomenon that might be of broader policy relevance. Even though aggregate investment in the long term may remain stable in response to a shock, whether or not consumption has to be cut back, the duration of such cutbacks, and the extent to which they are related to household characteristics, will be relevant for policies aiming to reduce households’ vulnerability in more general terms. Second, the literature is very clear that, even if there is no change in investment *ex post*, policy changes may lead to *ex ante* adjustments of asset portfolios that will have a systematic impact on the returns households will be able to receive from such assets. Information on short-term changes in households’ asset portfolios can provide insights into this issue. Finally, the importance of transfer rights for investment suggests that it would be of great interest to explore the relationship between the adoption of the “two noes” policy and the extent to which, by transferring land to its most productive use, land markets can improve equity and efficiency at the same time.

A key concern of policy makers in the past has been that, even though it may be associated with economic benefits, a modified property-rights regime would be opposed by the majority of the rural population. This notion was based largely on studies that asked hypothetical questions rather than on exploration of households' actual reaction to a policy change and did not account for the complexity of the situation. Our results suggest that such concerns are unfounded, for two reasons. First, we find a strong learning effect whereby households in Guizhou, when more secure land rights were introduced exogenously, became much more in favor of the "two noes" policy than those in the remainder of the provinces. Second, we find that, with overall economic development, household support for this policy increases considerably. Better access to other mechanisms to insure and smooth consumption, as well as increased levels of nonland wealth, are both associated with higher levels of support for the "two noes" policy. Exploring how this would translate into other provinces is an important task for future research. Concerning agricultural investment, our findings indicate that the "two noes" policy has a positive impact but, at the same time, they highlight the fact that, in quantitative terms, allowing transferability of land rights is likely to have a bigger investment-increasing impact. This suggests that, to reap the full benefits from more secure land rights, such rights need to be transferable and that, even where the "two noes" have not yet been implemented, making land rights transferable will allow households to capture some investment benefits.⁵² While this does not obviate the scope for more in-depth research to explore in greater detail some of the mechanisms underlying these results, it suggests that implementation of a policy that gradually increases tenure security as well as the transferability of land will yield economic benefits without obvious negative social consequence. Such a policy would appear to be a logical extension of the initiatives started with the adoption of the HRS and could help advance economic development in China's rural areas.

Notes

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1. D. Gale Johnson, "China's Great Famine: Introductory Remarks," *China Economic Review* 9, no. 1 (1998): 103–9; Justin Yifu Lin and Dennis Tao Yang, "Food Availability, Entitlements, and the Chinese Famine of 1959–61," *Economic Journal* 110 (January 2000): 136–58; Louis Putterman and Gilbert L. Skillman, "Collectivization and China's Agricultural Crisis," *Journal of Comparative Economics* 17 (June 1993): 530–39; Shujie Yao, "A Note of the Causal Factors of China's Famine in 1959–1961," *Journal of Political Economy* 106 (December 1999): 1365–69.

2. Robin Burgess, "Land and Welfare: Theory and Evidence from China" (unpublished manuscript, London School of Economics, London, 2002).
3. Johnson, "China's Great Famine"; Lin and Yang; Putterman and Skillman; Yao.
4. Justin Yifu Lin, "Rural Reforms and Agricultural Growth in China," *American Economic Review* 82 (1992): 34–51; John McMillan, John Whalley, and Lijing Zhu, "The Impact of China's Economic Reforms on Agricultural Productivity Growth," *Journal of Political Economy* 97 (1989): 781–807.
5. Jean C. Qi, "Two Decades of Rural Reform in China: An Overview and Assessment," *China Quarterly* 159 (1999): 616–28.
6. Albert Nyberg and Scott Rozelle, *Accelerating China's Rural Transformation* (Washington, D.C.: World Bank, 2000).
7. Matthew A. Turner, Loren Brandt, and Scott Rozelle, "Property Rights Formation and the Organization of Exchange and Production in Rural China," working paper (University of Toronto, Department of Economics, 1998).
8. Xiyi Huang, "Ground Level Bureaucrats as a Source of Intensification of Rural Poverty in China," *Journal of International Development* 11 (1999): 637–48; D. Gale Johnson, "Property Rights in Rural China," working paper (University of Chicago, Department of Economics, 1995).
9. Brian Schwarzwald, Roy Prosterman, Ye Jianping, Jeff Riedinger, and Li Ping, "An Update on China's Rural Land Tenure Reforms: Analysis and Recommendations Based on a Seventeen-Province Survey," *Columbia Journal of Asian Law* 16, no. 1 (2002): 141–226.
10. Note that these were not randomized experiments and that no systematic evaluation of the impact was undertaken.
11. Michael Carter and Yang Yao, "Local versus Global Separability in Agricultural Household Models: The Factor Price Equalization Effect of Land Transfer Rights," *American Journal of Agricultural Economics* 84 (August 2002): 702–15.
12. Hanan G. Jacoby, Guo Li, and Scott Rozelle, "Hazards of Expropriation: Tenure Insecurity and Investment in Rural China," *American Economic Review* 92, no. 5 (2003): 1420–47.
13. Roy Prosterman and Tim Hanstad, "Legal Impediments to Effective Rural Land Relations in Eastern Europe and Central Asia: A Comparative Perspective," Technical Paper no. 436, Europe and Central Asia Environmentally and Socially Sustainable Rural Development Series (World Bank, Washington, D.C., 1999).
14. Rigorous assessment of the impact of shocks on changes of household consumption in the short term will require data on consumption that are collected with greater frequency. In the absence of such data, we can use changes in asset endowments and explore the extent to which there are significant differences across provinces in households' strategies to cope with shocks, something that could point toward a detrimental impact of land tenure in this respect.
15. Shuoying Liu, Michael Carter, and Yang Yao, "Dimension and Diversity of Property Rights in Rural China: Dilemmas on the Road to Further Reform," *World Development* 26 (October 1998): 1789–1806.
16. F. Chen and John D. Davis, "Land Reform in Rural China since the Mid 1980s," *Land Reform* 2 (1998): 123–37.
17. Yang Yao, "Rural Industry and Labor Market Integration in Eastern China," *Journal of Development Economics* 59 (1999): 463–96.
18. Qi (n. 5 above).
19. Prosterman and Hanstad.
20. Burgess (n. 2 above).
21. Xiao Yuan Dong, "Two-Tier Land Tenure System and Sustained Economic Growth in Post-1978 Rural China," *World Development* 24 (May 1996): 915–28.
22. If long-term tenure turned out to negatively affect equity, one would have

to ask whether the efficiency gains of such a move would be large enough to potentially compensate those who lose out and whether, at the local level, mechanisms exist to actually implement such compensation.

23. James K. Kung, "Equal Entitlement versus Tenure Security under a Regime of Collective Property Rights: Peasants' Preference for Institutions in Post-reform Chinese Agriculture," *Journal of Comparative Economics* 21 (1995): 82–111; James K. Kung and Shouying Liu, "Farmers' Preferences Regarding Ownership and Land Tenure in Post-Mao China: Unexpected Evidence from Eight Counties," *China Journal* 38 (1997): 33–63; Loren Brant, Jikun Huang, Guo Li, and Scott Rozelle, "Land Rights in China: Facts, Fictions, and Issues," *China Journal* 47 (2002): 67–97.

24. In many situations, households opted for administrative redistribution of land as a means to shift land that had been left uncultivated because of outmigration to other users (Kung and Liu). The fact that administrative redistribution, rather than a decentralized market mechanism, was quoted as the mechanism of choice could be a reflection of respondents' lack of familiarity with the scope for operation of markets and the way they work.

25. Obtaining this retrospective information proved fairly easy in practice.

26. Even though Hunan is much richer than the other two provinces, limiting the sample to the mountainous part in the west of the province means that per capita incomes are very similar.

27. Following provincial policy, certificates held by villagers in Guizhou specify a contract term that extends from 1994 to 2043, that is, exactly 50 years. The reason for backdating contracts to 1994 is that this was the year in which the first round of 15-year contracts following the adoption of the HRS in 1979 was supposed to have ended, despite the fact that, as is evident from our survey, most villages completed the initial round of land allocations only in the early to mid-1980s.

28. Roy Prosterman, Brian Schwarzwald, and Ye Jianping claim that such a policy has significant support in many rural areas of China ("Implementation of 30-Year Land Use Rights for Farmers under China's 1998 Land Management Law: An Analysis and Recommendations Based on a 17-Province Survey," *Pacific Rim Law and Policy Journal* 9, no. 3 [2000]: 507–68).

29. Schwarzwald et al. (n. 9 above).

30. Kung and Liu.

31. A study of Meitan, the county where the original policy experiment had been conducted (James Kai-sing Kung, "Choice of Land Tenure in China: The Case of a County with Quasi-Private Property Rights," *Economic Development and Cultural Change* 50, no. 4 [July 2002]: 793–817), finds evidence for a significant decline in support for a policy of no reallocation and a level of support for a policy of no readjustment that, with about 32%, at present is less than half of what emerges from our survey. This draws attention to the fact that changes in the property-rights regime will have distributional implications in addition to their impact on efficiency. Differences in sampling are a prime candidate for such variation in results. To the extent that our sample is a true random sample of the population in the provinces to be covered (as compared with only one county in the case of Kung), we are reasonably confident with respect to the accuracy of the numbers obtained.

32. Our data suggest that the amounts received from formal sources of credit were tiny (consistently below Y 500) and that access was quite limited, with only 33% of households having had a formal loan any time during the 1995–2000 period.

33. Interviewees were able to provide quite precise answers to this question. For higher amounts there was, however, a misunderstanding (some understood enumerators to ask for the number of people they would have to ask to borrow a total of Y 10,000 rather than those who could provide them with this amount in one go). We therefore focus on lower amounts where the information appears to be better.

34. These shocks include crop failure, loss of livestock through death, disease,

or theft, illness or death of a family member, damage to the house or other assets, loss of wage-earning opportunities, and significant expenses for marriages and funerals.

35. The natural endowment is most favorable in Hunan. In this province, relatively large areas of paddy land (0.75 mu per capita, as compared with 0.31 mu in Yunnan and 0.4 mu in Guizhou) are available; virtually all households (80% as compared with 31% in Guizhou and 24% in Hunan) are able to access wasteland and the area available is much larger (1.1 mu, as compared with only slightly more than 0.1 mu in the other two provinces) and forest is more plentiful (3.22 mu, as compared with 2.5 mu in Yunnan and 0.48 mu in Guizhou).

36. Geshon Feder and Tongroj Onchan, "Land Ownership Security and Farm Investment in Thailand," *American Journal of Agricultural Economics* 69 (March 1987): 311–20; Timothy Besley, "Property Rights and Investment Incentives: Theory and Evidence from Ghana," *Journal of Political Economy* 103 (October 1995): 903–37; Guo Li, Scott Rozelle, and Loren Brandt, "Tenure, Land Rights, and Farmer Investment Incentives in China," *Agricultural Economics* 19 (1998): 63–71.

37. To the extent that these "investments" may just compensate for failure to make investments in the past (possibly due to low tenure security) or are correlated with soil quality, a factor that is generally unobserved, doing so can give rise to erroneous conclusions.

38. This specification follows Feder and Onchan.

39. See Xiao Yuan Dong, "Public Investment, Social Services and Productivity of Chinese Household Farms," *Journal of Development Studies* 36, no. 3 (2000): 100–122.

40. Regressions in which only investment on paddy land is considered yield consistently insignificant results.

41. Michael R. Carter and Yang Yao, "Local versus Global Separability in Agricultural Household Models: The Factor Price Equalization Effect of Land Transfer Rights," *American Journal of Agricultural Economics* 84, no. 3 (2002): 702–15.

42. This also implies that credit constraints are unlikely to be a major impediment preventing agricultural investment—if they were, we would expect households to subsidize agriculture through earnings from off-farm employment.

43. Another reason for focusing on this age group is that educational progress beyond primary school, that is, beyond 9 years of age, depends on intellectual ability more than on household characteristics. Thus, only decisions up to the completion of primary education are strictly a household decision.

44. Use of household fixed effects was impractical owing to the fact that the vast majority of households had only one child who completed schooling during this time period.

45. Tests for the presence of a systematic difference in households' patterns of land accumulation or a systematically different impact of exogenous shocks on the land-accumulation pattern across provinces (not reported) yield similar conclusions. In all cases, the Guizhou dummy or its interaction with the shock variable remains insignificant.

46. Jonna P. Estudillo, Agnes Quisumbing, and Keijiro Otsuka, "Gender Differences in Land Inheritance and Schooling Investment in the Rural Philippines," *Land Economics* 77 (February 2001): 130–43.

47. Jean Dreze and M. Saran, "Primary Education and Economic Development in China and India: Overview and Two Case Studies," Working Paper no. DEP/47 (London School of Economics, Suntory-Toyota International Centre for Economics and Related Disciplines, 1994).

48. John Knight and Li Shi, "Educational Attainment and the Rural-Urban Divide," *Oxford Bulletin of Economics and Statistics* 58 (February 1996): 83–117.

49. In regard to taking away from those with high levels of per capita land and

giving to those with low levels, the current level of land access is likely to affect preferences for or against redistribution.

50. Note the possible measurement error in this variable.

51. Even though we use earlier adoption of the “two noes” policy, the fact that there is very little time variation in this variable implies that adoption may be correlated with unobservable village characteristics that would, for example, have a systematic impact on the payoff from this policy, prompting us to estimate the equation both with and without this variable.

52. Further evidence on how these policies might be made compatible with each other would be very useful.