

# **The impact of property rights on households' investment, risk coping, and policy preferences:**

## **Evidence from China**

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World Bank Policy Research Working Paper 2931, November 2002

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*We thank China's State Statistical Bureau, in particular Zude Xie, Pingping Wang, Xinhua Yu, and CCER, especially Yang Yao, Justin Lin and Jing Li for making available the data and assisting in the survey underlying this analysis. We are also grateful for the helpful comments from Keijiro Otsuka, Scott Rozelle and Michael Carter. Support from the Norwegian ESSD Trust Fund (Environment Window) is gratefully acknowledged.*

# **The impact of property rights on investment, risk coping, and policy preferences: Evidence from China**

**Abstract:** Even though it is widely recognized that giving farmers more secure land rights may increase agricultural investment, scholars contend that, in the case of China, such a policy might undermine the function of land as a social safety net and, as a consequence, not be sustainable or command broad support. Data from three provinces, one of which had adopted a policy to increase security of tenure in advance of the others, suggests that greater tenure security, especially if combined with transferability of land, had a positive impact on agricultural investment and, within the time frame considered, led neither to an increase in inequality of land distribution nor a reduction in households' ability to cope with exogenous shocks. Household support for more secure property rights is increased by their access to other insurance mechanisms, suggesting some role of land as a safety net. At the same time, past exposure to this type of land right has a much larger impact quantitatively, suggesting that a large part of the resistance to changed property rights arrangements disappears as household familiarity with such rights increases.

## **1. 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 all over the world aim to strike a balance between these multiple and often conflicting objectives. Failure to appreciate the multi-faceted nature of land rights may lead to recommendations that are either not acceptable politically from the outset or, even if passed into law, may prove difficult or impossible to implement.

Few countries illustrate 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, better than China. The desire to change the social relations of production and at the same time to boost production, was the driving force underlying the 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 (Johnson, 1998; Lin and Yang, 2000; Putterman and Skillman, 1993; Yao S.J. 1999). 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 which is credited with helping China to attain levels of nutritional security and human development that are much superior to those achieved by other countries at similar levels of development (Burgess, 2000).

With the evolution of the rural economy towards placing greater importance on investment, migration, and non-agricultural income sources, there is a discussion as to whether the mechanisms that were put in place in 1978 are still needed and/or the most 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 to 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 of an investment-reducing impact of existing land rights arrangements, the Government has adopted a policy that would give longer and better documented land rights to the rural population. Whether or not to proceed more vigorously with the implementation of these measures is an issue of considerable interest and policy relevance. To provide a satisfactory answer, it will be necessary to look 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. In this paper, we use information generated by a land policy experiment, conducted by the Chinese Government with the express purpose of providing insight into these issues, to gain a better understanding of these issues.

The policy experiment in question consisted of the adoption of directives which, by eliminating the scope for periodic redistribution and increasing the duration for which land use rights were awarded, provided land cultivators in Guizhou province with more secure land rights than were 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 hypothetical studies that have, up to now, largely formed the basis for policy recommendations in this area. The ability to assess the impact of the policy change in a number of dimensions allows us to address the complexity of the issue and is also more likely to respond to the need of policy makers who, in addition to the economic impact of such a measure, are concerned about the longer-term equity impacts and social acceptability of such a policy. The fact that Guizhou is also one of China's poorest provinces adds relevance as, in this environment, other safety nets will be more scarce, implying that access to land would perform a particularly important role in insuring rural households against vulnerability. Ability to show that more secure land rights have no negative impact on households' ability to cope with shocks and are acceptable from a social point of view in this environment would lead one to expect similar results in other more advanced provinces, allowing broader applicability of the results.

The paper is structured as follows. Section two provides a background on Chinese land tenure, the literature, and the characteristics of the land tenure experiment conducted in Guizhou. Section three 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 four provides more rigorous econometric evidence with respect to each of the questions under concern. Section five draws out implications for further research as well as policy conclusions for China by relating the results to recent changes in Chinese land policy.

## **2. 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 the discussion in terms of the advantages and disadvantages of more secure individual property rights. Based on a description of the nature of the policy experiment conducted in Guizhou province, we identify the nature of the issue underlying the discussion, and outline the three main research questions. These questions relate to agricultural investment, equity and human capital investment, and households' land right preferences that motivate the subsequent analysis.

### **2.1 Key events and policy issues**

Collectivization of production in China during the 1950s had disastrous consequences on output and the welfare of the rural population and led to widespread starvation and death (Johnson, 1998; Lin and Yang, 2000; Putterman and Skillman, 1993; Yao S.J. 1999). Adoption of individual use rights to land under the Household Responsibility System (HRS) in the late 1970s and early 1980s has contributed to increased productivity and output in rural areas (Lin 1992, Lin et al. 1994, McMillan et al 1989). 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 are generally seen as the main variables underlying this phenomenon (Oi, 1999), it is widely held that more secure individual land tenure arrangements could improve performance of the agricultural sector and thus rural welfare in China.

Proponents of measures to increase tenure security point to three ways in which China's land tenure system has limited tenure security on the part of farmers. One is that the duration of land use rights was limited. Immediately following introduction of the HRS, producers received land rights for a period of only 15 years. Also, there was little legal foundation to villagers' land use "contracts", which were often only a verbal agreement. 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 non-agricultural 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 (Nyberg and Rozelle, 2000). 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 (Turner et al., 1998). Reports suggest that in some cases local cadres may have used their power over the land as a means of extraction rent from farmers (Huang 1999; Johnson 1995).

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 is either 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 re-adjustments, and the remainder contain unclear or contradictory provisions (Schwarzwalder et al., 2001). As a consequence, only 12% of farmers were confident that there will be no more adjustments, implying 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.

## **2.2 The Guizhou experiment**

To provide evidence that could help clarify these issues, and to guide the policy discussion in this area, the Chinese Government has encouraged provinces and counties to implement a number of land rights "experiments".<sup>1</sup> In 1987, Meitan county in Guizhou province was designated by the State Council as one of the initial 18 national experiment zones for rural reform. 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 non-arable land. The policy of 'no land increase for

new population, no land decrease for reduced population' should be continued." 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 non-arable land for another 60 years, both starting with 1994." 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 was available to farmers in other areas of China provides an ideal case to assess the impact of such policies in comparison to other provinces. To explore this issue, we rely on a household survey that covered 1001 households from 110 villages in Guizhou, western Hunan, and Yunnan provinces. These provinces were chosen on the basis of their proximity and climatic and geographic 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 nos" policy, or indirectly through a provincial dummy, to those in other provinces, provides a mechanism to ascertain the impact of the policy on the variables of interest. In addition to the "two nos" 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 (Carter and Yao, 1999). 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.

### **2.3 Research questions**

We intend to use these data to address three main questions, namely: (i) whether changed land tenure arrangements had an appreciable effect on agricultural investment; (ii) whether land policy had a negative impact on equity and/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; (iii) 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 (Jacoby, Li, and Rozelle, 2001), something that may have had

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<sup>11</sup> Note that these were not randomized experiments and that no systematic evaluation of the impact was undertaken.

particularly negative consequences on former “wasteland” (Hanstad et al. 1998). Although less direct and systematic, there are indications that lack of tenure security contributed to environmentally unsustainable methods of cultivation and overexploitation of natural resources (Simil 1999; Nyberg and Rozelle, 2000).<sup>2</sup> 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 under-utilization of land, especially in areas where rural non-farm employment is economically important (Liu, Carter and Yao, 1998). This is often believed to have led to economic inefficiencies because absence of land markets permitted a fragmented land holding structure (Chen and Davis, 1998). Finally, to the extent that land rental is seen as a signal for a household not needing its allocation of land, it would tend to reduce out-migration of households which would benefit both the migrants and the those who stay behind (Yang, 1999). Taken together, these factors have led to calls for policy-makers to consolidate and streamline reforms (Oi, 1999), and especially to strengthen households’ property rights over land (Prosterman and Hanstad, 1998). Identifying the differences in land rights either through a provincial dummy or a direct indicator of whether or not the village had adopted the “two no” policy allows us to assess the impact of the change in land tenure regime. As the 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 transitional economies, access to land is a critical determinant of household welfare which, by contributing directly to home production and consumption, also 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 (Burgess, 2000). Although, with an egalitarian distribution of endowments in place, markets could, in principle, help to re-allocate land in response to changes in family structure caused by births, out-migration, and deaths, it is often maintained that continued provision of administrative re-allocation will be needed for equity reasons (Dong, 1996). If this were the case, i.e. if the inability to redistribute land in response to population change that is associated with the award of more secure tenure would reduce the ability of the poor to cope with shocks, the equity gains might outweigh the

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<sup>2</sup> 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 towards a detrimental impact of land tenure in this respect.

efficiency losses and on balance it may not be worth moving towards more secure tenure even if more secure land rights increase households' propensity to make investments.

To explore, 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 household asset endowments over time.<sup>3</sup> 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, possibly due to a lack of access to land, had lower levels of investment. Both possibilities can be tested in a regression framework.

*Household land right preferences:* Farmers' preferences in terms of 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 over 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 nos" policy regime. Identification of the extent to which endowments and access to markets for credit and insurance affect land right 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 could be used to identify complementary policy measures that could contribute to a higher acceptability or better distribution of the gains from well-defined property rights. Identifying factors that affect farmers' preferences will allow one to better appreciate the complexity of such rights and, by assessing 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 towards a learning effect, the magnitude of which can be compared to the impact of other factors. A significant literature building on hypothetical questions has emerged and largely finds household opinion to be strongly against a policy of "no redistribution" (Kung 1995; Kung and Liu 1997; Brandt et al. 2001). Even though our sample is not nationally representative, it is based on real life experience rather than 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 where interviewees fail

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<sup>3</sup> If this were the case, 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.

to comprehend the implications of a hypothetical situation which they have not actually experienced themselves and,<sup>4</sup> as a consequence, exhibit a strong bias towards the status quo.

### **3. Data sources and descriptive evidence**

This section describes the sample and nature of the data used in subsequent analysis by presenting descriptive statistics on household characteristics and 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, and especially the extent of migration, means of 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 endowment. Also, we find that support for the policy of no redistribution is high, especially in the provinces where this policy had been implemented before.

#### **3.1 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 1001 households from 110 villages in three of China's poorest provinces with significant differences in land tenure arrangements, namely Guizhou, western Hunan, and Yunnan provinces. Guizhou province was chosen because it had implemented the "two nos" policy early on while western Hunan and Yunnan were chosen because of their proximity and their climatic and geographic similarity to Guizhou. Thus, the provinces have similar geographic 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 than those within Guizhou.

In addition to most of the variables included in standard multi-purpose surveys such as household characteristics, expenditure, assets, different income sources, and agricultural production, the survey contained a number of modules that aimed to re-construct movements in population and key assets. To do so, information on individuals' employment history, their investment in productive agricultural assets, non-farm enterprises, consumer durables (including housing), and changes in land endowments

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<sup>4</sup> In many situations, households opted for administrative redistribution of land as a means to shift land that had been left uncultivated because of out-migration to other users (Kung and Liu 1997). 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.

was 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.<sup>5</sup> To obtain information 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.

### **3.2 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 non-agricultural enterprises. As illustrated in table 1, this figure amounts to between Y 1116 in Guizhou and Y 1468 in Hunan, clearly identifying all of the households in the sample as very poor (table 1).<sup>6</sup> Despite some diversification of income sources, agricultural income, i.e. 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, compared to 4.13 in Hunan and 4.22 in Yunnan. Village characteristics, as reported in table 2, point not only towards 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.

*Inter-generational 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 across provinces. The survey indicates that, for the majority of households, remittances from family members who had migrated out and inter-generational transfers are of great importance. For those who receive them, remittances increase non-earned income by more than 50%. With 44% percent of households receiving remittances in the aggregate, regional differences are considerable; the share of households receiving remittances ranges from almost two thirds 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 off-spring and for those who do so, the mean amount of support given is equal to 25% of earned income.

### **3.3 Land rights arrangements and preferences**

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<sup>5</sup> Obtaining this retrospective information proved fairly easy in practice.

<sup>6</sup> Even though Hunan is much richer than the other two provinces, limiting the sample to the mountainous part in the west of the province implies that per capita incomes are very similar.

We are interested in three interrelated though distinct types of land right interventions, namely the extent to which the “two nos” policy has been adopted, whether households have been awarded certificates that document their land holdings, and whether or not land rental is allowed. Concerning the adoption of the “two no” policy, we observe clear differences between Guizhou and the other two provinces. In Guizhou, 93% of all villages report not having taken 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<sup>7</sup> and Yunnan, compared to about two thirds in Hunan, suggesting that certificates can be and are awarded even in cases where tenure is of a shorter term nature and redistribution remains a possibility.

Village leader as well as individual household responses to the question of whether land rental is allowed or not points towards considerable divergence between official policy and household perception but at the same time also suggest that the “two nos” policy is neither a precondition for -nor 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 penetration of certification and the “two nos” policy. According to village leader responses, the percentage of villages allowing land rental ranges from between almost 80% for Hunan to 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 share of households who believe that rental is allowed is, with 90%, much higher than what has been indicated by leaders.

To obtain information on preferences for land rights, the survey also asked households to rank 4 types of land policies in descending order. The first is the “two nos” policy, i.e. 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”, i.e. administrative reallocation of land from households who 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 to 5 years. The final policy option is one of a “big adjustment followed by a

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<sup>7</sup> Following provincial policy, certificates held by villagers in Guizhou specify a contract term that extends from 1994 to 2043, i.e. exactly 50 years. The reason for back-dating 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.

two no policy” where land is redistributed to establish an egalitarian landholding structure before imposing the “two nos” policy and longer-term tenure security.<sup>8</sup>

Descriptive evidence on farmers’ first preferences indicates that there is indeed considerable support for the policy of “two nos”. Either immediate imposition of the “two nos” policy or implementation of a large adjustment that is then followed by the “two nos” policy is supported by about two thirds of households in Guizhou (68%) and Yunnan (64%) but only 42% in Hunan. Most of the households (45% in Guizhou and 43% in Yunnan) prefer to have the “two nos” directly, without going through a redistribution beforehand. Continuing large adjustments, arguably the policy that undermines property rights the most, is preferred only by a very small minority of households (7% in Guizhou, 14% and 13% in Hunan and Yunnan) while small adjustments are the first preference of between one fourth (24% in Guizhou; 28% in Yunnan) to almost one half (44% in Hunan). To assess the policy relevance of these figures it is important to assess the extent to which they might be nationally representative. The nation-wide study by Schwarzwald et al. (2001) broadly supports our findings for the provinces where there is an overlap (72%, 63% and 67% of households in Guizhou, Yunnan, and Hunan who do not oppose a policy of “two nos”) and, in addition, points towards a high level of support for stable land distribution nation-wide, though this support is slightly higher in poor provinces. Interestingly, even though this survey finds that support for the “two no” policy was slightly higher in Guizhou than in other provinces, this study 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 definitions are slightly different, this is at variance with an earlier study by Kung and Liu (1997) who, based on a smaller and geographically more concentrated sample, found 62% of households to be in favor of periodic redistribution. Exploring the methodological and substantive reasons underlying such differences in more detail would be an important area for future research.<sup>9</sup>

### **3.4 Investment, shocks, and coping strategies**

To gain insight into how exogenous land right arrangements affect households’ choice of asset portfolio, we distinguish between investments in agriculture, education, and non-agricultural enterprises. Table 4 illustrates that the most frequent type of investment is in consumer durables,

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<sup>8</sup> Prosterman et al. (2000) claim that such a policy has significant support in many rural areas of China.

<sup>9</sup> A study of Meitan, the county where the original policy experiment had been conducted (Kung forthcoming), 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 which, 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 to only one county in the case of Kung), we are reasonably confident with respect to the accuracy of the numbers obtained.

especially housing, followed by investment in agricultural enterprises (including land) and non-agricultural enterprise assets. About one third of the households included 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 1996-2001), compared to 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 group 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 (5.5, 5.8 and 4.9 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. irrespectively of whether a shock was actually experienced, depending only on the specific land right arrangements) as well as *ex post* for those households who 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 respondees experienced an *actual* shock. To approximate the former in an environment where access to formal credit is restricted,<sup>10</sup> interviewees were asked about the number of people from whom they could borrow amounts ranging from Y 1,000 to Y 10,000.<sup>11</sup> For the latter, information was gathered on whether, during the last 5 years, households had experienced any of a number of shocks,<sup>12</sup> 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 in order to borrow amounts between Y 1,000 and Y 5,000, with significant differences between Guizhou where this figure was highest (2.4) and Hunan and Yunna (1.7). Responses to small shocks involving a loss of between Y 1,000 and 5,000 and large shocks, defined as

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<sup>10</sup> 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 household having had a formal loan any time during the last 1995-2000 period.

<sup>11</sup> 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.

<sup>12</sup> 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.

those with a value of more than Y 5,000, point towards informal borrowing and migration as the most common coping strategies - applied by about 60% and 35% respectively. Compared to this, the share of households who chose to reduce consumption or to sell assets was, with less than 9%, modest. Also, descriptives fail to substantiate fears that the implementation of the “two nos” policy in Guizhou would have undermined households’ ability to draw on existing safety nets as a way to cope with shocks. In fact, of all the households included in the sample, dis-investment or reduction of consumption was, with 2% and 0% (compared to 5% and 9% and 7% and 6% in Hunan and Yunnan) least observed in Guizhou.

*Inequality:* To obtain an indication of 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 were 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.<sup>13</sup> Comparing the distribution of income and land holdings 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. As households were asked about the evolution of their land holding 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 of the “two nos” policy having led to a systematic worsening of land holdings.

#### **4. 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, would 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 who experience shocks reduce non-agricultural 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

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<sup>13</sup> The natural endowment is most favorable in Hunan. In this province, relatively large areas of paddy land (0.75 mu per capita as compared to 0.31 mu in Yunnan and 0.4 mu in Guizhou) are available; virtually all households (80% as compared to 31% in Guizhou and 24% in Hunan) are able to access waste land and the area available is much larger (1.1 mu as compared to only slightly more than 0.1 mu in the other two provinces; and forest is more plentiful (3.22 mu as compared to 2.5 mu in Yunnan and 0.48 mu in Guizhou).

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 right preferences are as predicted, what is most surprising is the evidence of "learning" whereby households who experienced more stable land rights are likely to favor them.

#### 4.1 Agricultural investment

The impact 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 (Feder et al., 1988; Besley 1995, Li et al., 1998). 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 such as fertilizer or organic manure.<sup>14</sup> Also, to the extent that the observed variation in tenure security is endogenous, i.e. adopted in response to higher payoffs from land-improving investments, it 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 nos") 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 arrangements 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 Feder et al. (1987) where overall levels of agricultural investment are a function of household characteristics, in particular endowments and access to credit markets and other mechanisms for smoothing consumption, and policy variables. 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

$$(I) \quad I_i^t = a + \mathbf{c}I_i^* + \beta\mathbf{X}_i + \mathbf{g}\mathbf{Z}_i + d\mathbf{P}_i + e_i$$

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.  $\mathbf{X}_i$  are vectors of household characteristics,  $\mathbf{Z}_i$  are endowments of labor and land and  $\mathbf{P}_i$  are land policy variables. Agricultural investment used for this study include households investment

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<sup>14</sup> To the extent that these "investments" may just compensate for failure to invest 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.

in land improvement, such as establishment of wells, digging of ditches, planting of orchards and trees, and other forms of soil improvement as well as livestock-related investments.

Dong (2000) and 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 bias. 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 1985-95. The first 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 non-agricultural 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. Irrespectively 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 nos”, probit and tobit regressions suggest a significant and positive impact of more secure land rights. The Guizhou dummy is consistently significant at least at 10% and very positive; in the equation with the policy dummy, both are significant. This suggests that households in Guizhou or in villages which adopted the “two nos” 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,<sup>15</sup> the increased tenure security on upland which was afforded by the “two no” 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 nos 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, similar to the findings by Yao (2001). This suggests that, without being able to transfer land, higher levels of tenure security will only have a modest impact on increased investment.

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<sup>15</sup> Regressions where only investment on paddy land is considered yield consistently insignificant results.

Coefficients for other variables are largely 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 household who 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, i.e. orchards and wasteland, illustrates that, everything else constant, availability of such lands greatly increases the scope to make agricultural investments, especially in planting trees. Households who have children migrating to off-farm job are less likely to invest in their land, suggesting that investment in non-agricultural pursuits such as education and out-migration can substitute for investment in agriculture, possibly due to higher returns to migration as compared to on-farm investment.<sup>16</sup> Thus, while we find a significant and positive impact of the Guizhou dummy or the decision to implement a policy of "two nos", the regression suggests that a number of other variables, especially transfer rights, have a quantitatively more important impact on investment.

#### 4.2 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. Following Feder et al. (1997). The reduced form equation to be estimated is of the form

$$(2) \quad Y_i^j = \mathbf{a} + \mathbf{b}X_i + \mathbf{g}q_i + \mathbf{e}_i$$

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,  $q_i$  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  $\mathbf{e}_i$  is an error term. Investment in education or non-agricultural equipment could be affected by land right arrangements in two ways. While there is scope for *Ex post*, the ability to gain

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<sup>16</sup> This also implies that credit constraints are unlikely to be a major impediment preventing agricultural investment – if they were we would

access to additional land may increase the likelihood of households who experienced shocks to be compensated. On the one hand, households who have experienced a shock may be more likely to obtain land.

We consider “small shocks”, those involving a monetary loss of between Y 1,000 and Y 5,000, and “large shocks”, those implying 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 that were between 10 and 15 years of age during that time.<sup>17</sup> 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 non-agricultural enterprise assets and consumer durables during the last period (i.e. 1995-2000), leads to a similar equation for net investment in physical capital. In this case, the dependent variable comprises net investment by the household, i.e. total investment minus any assets lost through an exogenous shock during the 1995-2000 period. Implementing this is relatively easy as households reported the approximate monetary loss (e.g. in spending on hospital fees and medicine) due to a shock. We do not make any provisions for depreciation.

Results of the education equation for 258 children in the applicable age group are reported in Table 6.<sup>18</sup> 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 (column 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, e.g. because the introduction of the two nos policy deprives households of access to land which they have traditionally used as a safety net, we interact the shock variable with regional dummies. Doing so indeed points towards 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

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expect households to subsidize agriculture through earnings from off-farm employment.

<sup>17</sup> Another reason for focusing on this age group is that educational progress beyond primary school, i.e. over 9 years, depends on intellectual ability more than on household characteristics. Thus, only decisions up to the completion of primary education are strictly a household decision.

<sup>18</sup> Use of household fixed effects was impractical due to the fact that the vast majority of households had only one child that completed schooling during this time period.

significantly negative impact on household provision of education for their 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 who 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 clearly reject the hypothesis that limitations in households' ability to deal with shocks (which, in turn, might be associated with the adoption of the two nos 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.<sup>19</sup>

Other variables in the human capital investment model are largely as expected. The positive and significant coefficient of the male dummy in all four models points towards a continuing strong bias against girls in providing education, something that is markedly different from other countries such as the Philippines (Quisumbing et al. 2000) but not too uncommon for China (Dreze and Saran 1994). 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 (Knight and Li, 1996). Outmigration 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, and the household's level of education (both highly positive), shocks reduced both the probability of a household 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.

### **4.3 Land right preferences**

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<sup>19</sup> 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.

If, as suggested by the evidence presented above, more secure and transferable land rights increase households' propensity to invest but neither are associated with 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 nos" 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 ensur 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

$$(3) \quad T_i^j = a + \beta X_i + \mathbf{g}Z_i + dP_i + e_i$$

where  $T_i^j$  is a dummy equaling 1 if household  $i$  prefers tenure regime  $T^j$  ( $j = 1..4$ ) and zero otherwise,  $a$ ,  $\beta$ ,  $\mathbf{g}$ , and  $d$  are coefficients to be estimated, and  $e_i$  is an iid 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 who chose the two nos 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 households current endowment is above or below the endowment expected after redistribution.<sup>20</sup> 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 nos 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 nos policy.

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<sup>20</sup> taking away from those with high levels of per capita land and giving to those with little, the current level of land access is likely to affect preferences for or against redistribution.

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 who depend on agriculture and who thus benefit most from higher investment incentives who 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 as an adjustment would provide them with additional land. By the same logic, higher numbers of elderly members lead households to favor the “two nos”, 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 nos policy as the most preferred policy option. By contrast, one additional member in the 10-14 age group that was likely to be “born without land” after the finalization of allocations under the HRS around 1983/84 and that is now coming into productive age, decreases the propensity towards the two nos 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 1,000-5,000 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 who 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 due 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 last 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. Social networks, mainly in the form of children who have migrated out to establish their independent household, are also of great significance while the scope for informal borrowing, i.e. the number of people from

which the household could informally borrow Y 1,000-Y 5,000, is significant only at 10%.<sup>21</sup> Comparing the number of children who have migrated out to 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 no policy in 1995.<sup>22</sup> 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 who experienced the policy of “two nos” (or those who received land tenure certificates) and those who did not. A second possibility would be that the adoption of the “two nos” policy affects the outcome achieved in land rental markets, e.g. by systematically reducing the transaction costs associated with such rentals or by allowing for longer-term contracts which are likely to be more beneficial in terms of efficiency. 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 nos” 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 nos policy in Guizhou is a clear example; as illustrated in column (1), a simple regression suggests that adoption of the two nos policy at the village level increases a household’s propensity to have this policy choice as its first preference by almost 12%. Having land use certificates at the village-level further increases this probability by 17%. As can easily be verified in column (2) of table 1, this large learning effect does not depend on the specification chosen; even if the “two nos” variable which may be endogenous is dropped, the Guizhou dummy emerges as highly significant, suggesting that, after controlling for all other factors, household preference for the policy of two nos 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 adoption land use certificates and a policy of two nos easily outweighs any impact of the other variables discussed earlier. There is clear and strong support for the policy of

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<sup>21</sup> Note the possible measurement error in this variable.

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 they 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 nos” with respect to some of the policy-relevant variables discussed above, they coincide with them in so far 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 nos” 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 who have a land use certificate and who have more adult members are strongly against a policy of first having a big adjustment and then following the “two nos” policy.

Taken together, results from households’ preferences regarding the two nos policy lead to three conclusions. First, as overall income levels and access to mechanisms to smooth consumption increase, support for the two nos policy is likely to grow. Second, most of the resistance to the policy of the “two nos” comes from households who experienced a population change and apparently expect that such 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 due 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 right arrangements but also suggests that, once introduced, household support for more secure land tenure arrangements will actually increase.

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<sup>22</sup> Even though we use earlier adoption of the two no policy, the fact that there is very little time variation in this variable implies that adoption may be correlated with unobservable village characteristics which 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.

## 5. Conclusion 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 towards a number of areas for future research.

Even though the results obtained here suggest that the adoption of the “to no” 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 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 cut-backs, and the extent to which they are related to household characteristics, will be relevant for policies aiming to reduce household 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 which 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 nos” 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, where more secure such rights were introduced exogenously, are much more in favor of a policy of “two nos” 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 non-land wealth, are all associated with higher levels of support for the policy of “two nos”. Exploring how this would translate into other provinces is an important task for future research. Concerning agricultural investment, our findings point towards a positive impact of the policy of “two nos” but at the same time highlight 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 nos” have not yet been implemented, making land rights transferable will allow households to capture some investment benefits.<sup>23</sup> 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 thus appear to be a logical extension of the initiatives started with the adoption of the HRS and geared towards advancing economic development in China’s rural areas.

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<sup>23</sup> Further evidence on how these policies might be made compatible with each other would be very useful.

**Table 1: Basic characteristics of household included in the sample**

	Total	Guizhou	Province	
			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
No. of persons age 14-60	3.04	3.14	2.92	2.90
No. of persons age < 14	0.93	0.96	0.74	1.07
No. of persons age > 60	0.35	0.35	0.50	0.25
Total earned income (Y)	5156.52	4832.53	5911.00	5267.33
Per capita earned income (Y)	1235.89	1116.38	1468.07	1319.82
of which agricultural income (%)	70%	69%	71%	74%
of which non-agricultural income	30%	31%	29%	26%
Share receiving remittances from fam. Members	44%	42%	60%	33%
Mean amount of remittances received (Y)	1179.92	1189.76	1220.56	1080.20
Share of households paying for off-spring	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

**Table 2: Key village characteristics**

	Province			
	Total	Guizhou	Hunan	Yunnan
Total village population	2225.53	1801.92	1021.01	4405.45
Number of households	543.47	417.13	272.85	1109.00
Share of pop. with main income from agriculture	84%	84%	70%	95%
Share of households > double avg. land	7%	7%	4%	11%
Share of households < half avg. 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 pre household (mu)	1.30	1.12	2.09	1.00
Mean area of paddy land (mu)	0.43	0.38	0.74	0.29
Mean area of upland (mu)	0.54	0.60	0.31	0.61
Share of households cultivating wasteland	36%	28%	79%	20%
Mean area of wasteland cultivated (mu)	0.32	0.14	1.04	0.10
Forest land per capita (mu)	1.27	0.37	3.13	1.77
Share of forest privately held	44%	56%	71%	25%
Gini coefficient of per capita total land	0.44	0.40	0.46	0.39
Gini coefficient of per capita paddy land	0.52	0.50	0.40	0.66
Gini of the income distribution	0.48	0.48	0.50	0.49

Source: Own computation from SSB/CCER/WB 2001 Household Survey

**Table 3: Land rights, land distribution, and land rental in the sample**

	<b>Province</b>			
	Total	Guizhou	Hunan	Yunnan
<b>Village level</b>				
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%
<b>Households' preferred land policy</b>				
"Two nos" policy	41%	45%	28%	43%
Large adjustment and then "two nos"	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

**Table 4: Investment in physical and human capital; coping strategies**

	Province			
	Total	Guizhou	Hunan	Yunnan
<b>Investment in physical and human capital</b>				
Share of households investing in agricultural enterprise assets	32%	33%	36%	24%
Share of hhs investing in non-ag. enterprise assets	9%	10%	9%	8%
Share of hhs investing in housing and consumer goods	65%	65%	62%	68%
Mean value of ag. Investment: Cash (land and draft animal)	340.82	483.19	487.89	716.54
Mean value of consumer goods/housing investment: Cash	3695.26	3066.62	2645.09	5901.21
Mean value of non-ag. enterprise investment: Cash	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 in 80 – 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%
<b>Shocks and coping strategies</b>				
Number of people to borrow 1000-5000 Y	2.09	2.36	1.75	1.72
Share of households experiencing a small shock (> 1000 Y)	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 (> 5000 Y)	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

**Table 5. Determinants of Household Level Agricultural Investment**

	Probit		Tobit	
	Agric. Investment dummy		Amount of Agric. Investment (log)	
Village investment dummy	0.939 (1.87)*	0.963* (1.91)	4.676 (1.35)	5.237 (1.49)
Lagged agric. invest. (dummy/amount)	-0.237 (-2.37)	-0.258*** (-2.58)	-0.607*** (-4.24)	-0.609*** (-4.28)
Village adopted Two Nos		0.349** (2.26)		1.979* (1.80)
Households with land certificate	0.302 (1.41)	0.238 1.160	1.549 (1.03)	1.304 (0.91)
Household with land transfer right	0.884*** (-2.75)	0.746** (-2.33)	-5.212** (-2.30)	-4.473** (-1.99)
Head's max education	0.014 (0.90)	0.013 (0.79)	0.199 (1.76)*	0.191* (1.69)
Past migration by head	-0.193 (-1.28)	-0.196 (-1.29)	-1.196 (-1.13)	-1.216 (-1.15)
Migration by children	-0.246** (-2.19)	-0.246** (-2.19)	-1.461* (-1.86)	-1.481* (-1.88)
Age of household head	0.004 0.73	0.003 (0.56)	0.034 (0.89)	0.029 (0.75)
No. of household members >60	0.199** (2.17)	0.194** (2.14)	1.492** (2.37)	1.490** (2.38)
No. of household members <14	0.087 (1.38)	0.081 (1.28)	0.703 (1.57)	0.683 (1.54)
No. of household members 14 -60	0.149*** (3.34)	0.147*** (3.31)	1.189*** (3.79)	1.180*** (3.77)
Per capita paddy land	0.220** (2.06)	0.249** (2.29)	1.705** (2.40)	1.877*** (2.60)
Per capita upland	-0.095 (-1.10)	-0.105 (-1.21)	-0.388 (-0.63)	-0.451 (-0.73)
Per capita other land	0.101*** (3.53)	0.121*** (3.61)	0.695*** (3.49)	0.830*** (3.50)
Guizhou dummy	0.433** (2.08)	0.380* (1.91)	2.812* (1.92)	2.657* (1.88)
Yunnan dummy	-0.076 (-0.48)	-0.023 (-0.14)	-0.783 (-0.69)	-0.443 (-0.38)
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	-1280.93	-1280.11

Absolute value of z-statistics in parentheses

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

**Table 6. Determinants of Human Capital Investment in Children's Education**

	Dependent variable: Years of Schooling Completed by 11-15 year old children			
	Large shock (>Y 5,000)		Small shock (Y 1,000 – 5,000)	
Male dummy	0.435*** (2.72)	0.431*** (2.71)	0.413** (2.57)	0.432*** (2.73)
Head migration dummy	-0.311* (1.73)	-0.359** (2.00)	-0.331* (1.82)	-0.371** (2.07)
Children Migration dummy	-0.069 (0.36)	-0.059 (0.31)	-0.110 (0.58)	-0.047 (0.25)
Per capita paddy land	0.364 (1.31)	0.387 (1.40)	0.412 (1.43)	0.680** (2.22)
Per capita upland	0.188 (0.74)	0.203 (0.81)	0.274 (1.09)	0.258 (1.03)
Per capita other land	-0.081 (0.97)	-0.070 (0.84)	-0.094 (1.11)	-0.109 (1.32)
Parents' years of education	0.124*** (3.65)	0.122*** (3.62)	0.127*** (3.73)	0.120*** (3.55)
Experienced shock ( $g_t$ )	-0.677** (1.98)	-1.449*** (2.63)	-0.116 (0.65)	-1.034*** (2.68)
Guizhou dummy*shock ( $g_s$ )		1.934** (2.44)		0.887* (1.89)
Yunnan dummy*shock ( $g_s$ )		0.429 (0.50)		1.473*** (3.11)
Guizhou dummy	-0.165 (0.78)	-0.281 (1.30)	-0.155 (0.72)	-0.343 (1.45)
Yunnan dummy	-0.713*** (2.78)	-0.761*** (2.94)	-0.718*** (2.77)	-1.095*** (3.84)
Constant	3.634*** (10.83)	3.680*** (10.99)	3.565*** (10.60)	3.700*** (11.05)
No. of observations	258	258	258	258
R-squared	0.43	0.45	0.42	0.45
<b>Test for net effect of shock by province:<sup>a</sup></b>				
$g_t + g_s = 0$		(2.25)**		(0.86)
$g_t + g_s = 0$		(0.15)		(1.29)

Absolute value of robust t statistics in parentheses

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

<sup>a</sup> Test statistic reported is the t-value.

Note: Age dummies included but not reported

**Table 7. Tobit regression of investment in non-agricultural business assets and Consumer Durables (log)**

	Small shock		Big shock	
	Tobit	Tobit	Tobit	Tobit
Education (years)	0.362*** (3.76)	0.354*** (3.67)	0.325*** (3.32)	0.318*** (3.24)
Head migration dummy	0.918 (1.12)	0.954 (1.17)	1.320 (1.59)	1.303 (1.56)
Child migration dummy	0.790 (1.26)	0.689 (1.09)	0.632 (0.99)	0.615 (0.96)
Age of household head	-0.115*** (3.86)	-0.116*** (3.90)	-0.115*** (3.81)	-0.117*** (3.85)
No. of hh members >60	1.445*** (2.97)	1.395*** (2.87)	1.110** (2.25)	1.113** (2.25)
No. of hh members <14	0.849*** (2.65)	0.801** (2.50)	0.886*** (2.71)	0.885*** (2.71)
No. of hh members b/w 14 & 60	0.754*** (3.01)	0.751*** (3.00)	0.690*** (2.70)	0.694*** (2.72)
Per capita paddy land	0.631 (1.05)	0.712 (1.19)	0.593 (0.97)	0.609 (1.00)
Per capita upland	-0.286 (0.59)	-0.402 (0.82)	-0.506 (1.01)	-0.513 (1.03)
Per capita other land	0.145 (0.59)	0.156 (0.64)	0.126 (0.49)	0.125 (0.48)
Household experienced shock ( $\gamma_1$ )	-4.792*** (8.53)	-7.787*** (6.41)	-6.168*** (5.88)	-7.673*** (4.17)
Yunnan dummy * Shock ( $\gamma_2$ )		4.078** (2.52)		2.581 (0.92)
Guizhou dummy * Shock ( $\gamma_3$ )		3.702*** (2.64)		2.106 (0.88)
Yunnan dummy	2.627*** (3.07)	1.196 (1.17)	2.392*** (2.74)	2.139** (2.35)
Guizhou dummy	1.354* (1.84)	0.074 (0.09)	1.239* (1.66)	1.032 (1.33)
Constant	-1.162 (0.66)	0.175 (0.10)	-1.565 (0.86)	-1.270 (0.69)
Observations	1001	1001	1001	1001
Log-likelihood	-1907.61	-1903.43	-1926.91	-1926.36
<b>Test for net effect of shock by province:<sup>a</sup></b>				
$\gamma_1 + \gamma_2 = 0$		0.88		0.90
$\gamma_1 + \gamma_3 = 0$		6.18***		0.00
$\gamma_2 - \gamma_3 = 0$		0.40		0.02

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

<sup>a</sup> Test statistic reported is the t-value.

**Table 8. Probit Regressions for Farmer's Preferences over Alternative Land Policies**

	<i>Preferred land policy</i>				
	Two Nos		Small adjustment	One Big adj't, then Two Nos	Big adjustment continuing
Village adopted two nos	0.119** (2.57)		-0.112*** (2.60)	0.028 (0.76)	0.011 (0.45)
Housholds with land certificate	-0.062 (1.22)	-0.020 (0.43)	0.079* (1.79)	-0.000 (0.01)	0.019 (0.70)
Village has right to rent	0.169** (2.40)	0.191*** (2.78)	0.028 (0.48)	-0.199*** (3.13)	-0.025 (0.69)
Share of income from agric.	0.154** (2.43)	0.159** (2.53)	-0.028 (0.48)	-0.071 (1.48)	0.005 (0.16)
Per capita income (log)	0.068*** (2.69)	0.069*** (2.75)	-0.012 (0.51)	-0.016 (0.86)	-0.008 (0.56)
No. of children migrated out	0.030** (2.16)	0.029** (2.11)	0.011 (0.84)	-0.042*** (3.18)	-0.005 (0.58)
Remittance from family member	0.028 (0.69)	0.027 (0.67)	-0.029 (0.78)	-0.012 (0.37)	-0.011 (0.50)
No. of members 10-14 years old	-0.045* (1.85)	-0.042* (1.75)	0.003 (0.16)	0.007 (0.43)	0.033*** (2.77)
No. of members 14-60 years old	0.031** (2.17)	0.031** (2.15)	0.002 (0.14)	-0.020* (1.74)	-0.011 (1.23)
No. of memebers >60 years old	0.062** (2.12)	0.060** (2.06)	-0.032 (1.23)	-0.014 (0.59)	-0.027 (1.50)
Per capita total land used	0.023* (1.79)	0.020 (1.59)	-0.032** (2.24)	0.015 (1.54)	-0.013 (1.51)
P.c.paddy land rel. to vil. Mean	0.003 (0.51)	0.003 (0.47)	0.004 (0.70)	-0.007 (0.69)	-0.002 (0.47)
P.c.upland rel. to vil. mean	-0.019* (1.84)	-0.016 (1.60)	0.004 (0.45)	0.006 (0.76)	0.007 (1.60)
Household able to borrow money between 1000 and 5000 yuan	0.006* (1.89)	0.006* (1.94)	-0.003 (1.06)	-0.001 (0.35)	0.001 (1.30)
dummy of rent-in	-0.122** (2.35)	-0.120** (2.28)	0.051 (1.08)	0.067 (1.58)	0.020 (0.73)
number of plots	0.005 (1.01)	0.007 (1.43)	0.003 (0.67)	-0.013*** (3.01)	0.000 (0.15)
Guizhou dummy	0.068 (1.28)	0.123** (2.51)	-0.148*** (3.07)	0.158*** (3.30)	-0.074** (2.47)
Yunnan dummy	0.100 (1.56)	0.121* (1.91)	-0.115** (2.20)	0.131** (2.18)	-0.007 (0.23)
Observations	956	956	956	956	956
Log-likelihood	-604.99	-608.36	-556.59	-454.79	-293.70
Observations	962	962	962	962	962
Log-likelihood	-615.77	-611.27	-562.60	-460.70	-294.96

Robust z -statistics in parentheses

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

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