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Forest loss, monetary compensation, and delayed re-planting: The effects of unpredictable land tenure in China[☆]

Stephen W. Salant^{a,b,c,1}, Xueying Yu^{d,*}^a University of Maryland, USA^b University of Michigan, USA^c Resources for the Future, USA^d Beihang University, China

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ABSTRACT

Over the past 65 years, forest tenure in China has oscillated unpredictably between private and village property regimes. This policy-induced uncertainty has distorted the harvesting decisions of individuals granted rights to grow trees and has lowered the value of China's forest output. We provide an analytical framework for assessing these effects quantitatively. Understanding the consequences of this policy-induced uncertainty is particularly important since China is currently engaged in an ambitious plan to increase its domestic supply of timber. To conduct this analysis, we extend the literature on forestry economics when there is a risk of loss due to forest fire or pests. We (1) take account of the possibility that replanting can only resume after an interval of uncertain length (with immediate replanting as a special Case); (2) investigate the effects of compensation for such losses based only on the net value of the stand of trees at the time of the loss; and (3) compare it to compensation that would leave the wealth and rotation decisions of the farmer unaffected by the presence of uncertainty.

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Introduction

Approximately 40% of China's rural population uses fuelwood as the major energy source. At the same time, the booming Chinese economy requires ever-increasing amounts of forest products. In 2010, China consumed the most wood-based panels, recovered paper, paper, and paperboards in the world and was the second-greatest consumer of industrial roundwood, sawnwood, and pulp for paper (FAO, 2012).

Yet compared with other countries, China is poorly endowed with forests. China has only 0.145 ha of forests per capita, barely one-fourth of the world average (FAO, 2010). Moreover, forests cover 20.4% of China's surface area (SFA, 2010), less than two-thirds of the world average.

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* Corresponding author. Fax: +86 10 82313231.

E-mail address: xueying@umich.edu (X. Yu).

¹ Both authors contributed equally to this work; the order of author names reflects alphabetical order and nothing more.

Table 1
Radical transitions in property rights regimes of China's nonstate forests.

Time period	Property regime	Key features and events
1950–1955	Private ^a	1. Under the Land Reform Campaign, the government confiscated most privately owned forestlands and equally distributed them to individual rural households. 2. Elementary cooperatives were established in 1953, and farmers were encouraged to pool their means of production, including forestland, although they remained as the owners of land.
1956–1980	Village	3. Private ownership and household management of forests were dominant throughout this period 4. The government terminated private ownership of forests after establishing advanced cooperatives. 5. Rural households were compensated with the value of forests. 6. Collective ownership and management of the forests were dominant. 7. The Great Leap Forward led to excessive deforestation in forest collectives. Villages cut trees as fuel for village-based steel furnaces in an irrational attempt to match British industrial output. 8. Non-timber trees and trees planted around homesteads were once returned to individual households but were re-collectivized during the Cultural Revolution.
1981–1986	Private	9. The “Three Fix” policy stipulated that the right of collective forest management should be contracted to individual households, although forestland was still nominally collective property. 10. Forest resources with undisputed ownership claims were to be returned to their original owners.
1987–2007	Village	11. Degraded and waste forestland was to be equally allocated to individual households. 12. The government suspended privatization and restored a collective regime in some regions. 13. No compensation was paid in this round of collectivization. 14. No clear-cutting was reported associated with this round of collectivization.
2008–?	Private	15. The government initiated a new round of privatization in 2003 and has expanded it to a national scale in 2008. 16. This round of privatization aims at devolution of forest management to individual rural households.

^a Private property of land was abolished in China in 1956. We use the term “private property” as a shorthand to mean that the farmer was granted the legal right to use the land for a certain period for the purpose of growing trees and was granted full ownership of products on the land, the priority to renew the land-leasing contract, and even the right to re-rent his use right to others. However, unlike a full owner of private property, he was prevented from free purchase and sale of land. When the use right of the farmer is transferred to the village, we refer to the state as “village property.” Ownership of forests by villages in China has not resulted in the free-for-all envisaged by [Hardin \(1968\)](#) nor the self-regulated democratic organizations studied by [Ostrom \(1990\)](#). Village collectives are in fact the lowest level administration agencies. In these collectives, decision making is usually based on top-down administrative orders, rather than collective consensus. Massive deforestation has resulted from the transfer of land use rights to village collectives.

Trees in China are grown in either state-owned or nonstate forests. In state-owned forests, both the land and the trees are the property of the state; these forests are controlled by state logging enterprises, state forest farms, and natural reserve agencies, and harvesting decisions are made by state-owned forest agencies. In nonstate forests, which represent 60% of the forest area nationally, the land is officially owned by village collectives ([Xu et al., 2004](#)), but the trees can be managed by the collectives, individual private households, or different private–public arrangements ([Demurger et al., 2009](#), p. 20).

Virtually all of China's fuelwood is grown domestically. In addition, China imports timber from neighboring subtropical countries to satisfy other demands of its growing economy. Its aggressive policy of importing timber has led to unsustainable exploitation of the resources of neighboring countries ([Xu and White, 2004](#)). In an endeavor to increase the domestic supply of forest products, China has launched the most ambitious reforestation efforts in the developing world ([Bennett, 2008](#)).

These reforestation efforts have been directed toward China's nonstate forests. Historically, the state forests were China's major source of timber, as they contained most of the good quality, old-growth forests. Since the early 1980s, however, most state-owned natural forests have suffered from serious deforestation and have been retired from harvesting. As timber output from state forests has declined, the development of nonstate forest plantations has become increasingly important ([Xu et al., 2004](#)). Over the past two decades, China has dedicated great effort to developing plantations, and it now has the largest area of forest plantation in the world ([SFA, 2010](#)). It was originally expected that these nonstate reforestation projects would increase China's forested area by 10–20% ([Bennett, 2008](#)). However, it has been reported that farmers in the field have little confidence in the government's reforestation plan ([Wen et al., 2010](#), p. 101; [Yin and Xu, 2002](#), p. 1765).²

Their lack of confidence is understandable, given recent history. A farmer in the southern nonstate forest region who turned 20 in 1950 may have experienced four major upheavals during his lifetime. At 20, he would have received a piece of forestland thanks to the government's policy of distributing plots of equal size to every adult farmer. Six years later, in 1956, he would have lost the use of this land because the people's commune expropriated it, although he might have been compensated for the net value of the trees he was forced to relinquish. Upon celebrating his 51st birthday in 1981, he might have regained the use right of the same forestland, or a piece of land with comparable value and area, when it was returned to him as a family plot. Some trees may have been left on the plot, although they would have been badly managed. However, the land might have been taken back a second time in 1987 by the village collective when he was 57. He probably would not have received any compensation, as he may have 31 years earlier, because the land on which he had planted trees had been

² For readers who might wonder whether farmers' confidence has returned since the cited papers were published, we conducted our own survey on this issue and found that the utter lack of confidence in the future security of the use rights which these authors had noted remains ([Yu, 2013](#), p. 179).

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