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Forest Policy and Economics

journal homepage: www.elsevier.com/locate/forpol

Reprint of: Why did the 1980s' reform of collective forestland tenure in southern China fail?☆

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ARTICLE INFO

Keywords:

Collective forestland tenure reform
Deforestation
GMM with robust estimation
Southern China
Timber market liberalization

ABSTRACT

Both the reform of forestland tenure and timber market liberalization are important for forest resources management worldwide. This paper employs a unique provincial level panel dataset of 8 National Forest Resource Inventories and related price and investment data to estimate the effects on the forest of China's reforms of collective forestland tenure and timber prices in the 1980s. The system Generalized Method of Moments with robustness (controlling for endogeneity) and fixed effects models were used to identify the determinants of these reforms for the collective forest region of southern China. Our empirical results indicate that these two reforms jointly caused deforestation and forest degradation. As much as 13.5% of the total forest area was lost, and 14.9% of the forest volume was removed. Deforestation in the 1980s was followed with widespread negative long-term impacts on forest growth and afforested area. These policy failures suggest the important lesson that a well-conceived framework for monitoring and regulation needs to be in place for successfully implemented reforms.

1. Introduction

Both the reform of forestland tenure and the liberalization of timber markets (LTM) are important themes in contemporary discussions of forest policy throughout the world. Tenure is important for the allocation and use of forest resources because tenure determines the incentive framework and, therefore, the benefits and costs accruing to the holders of forest land (Luckert and Haley, 1990; North, 2005; Alchian and Demsetz, 1973). However, previous research has not found a consistent and conclusive relationship between forest tenure and the conditions of the forest itself. Besley (1995), Holden et al. (2009) and Godoy (1992) found that more secure forest land use rights facilitate investment, while Barr et al. (2001), and Caveness and Kurtz (1993) argued that tenure insecurity has no effect on forest management. Coleman (2009) argues that the enforcement of the rules of tenure is an important determinant of the physical condition of the forest but, according to Agrawal et al. (2008), formal forest tenure is not strongly related to forest sustainability.

The timber market is also important for holders of forestland. Rising

timber prices usually lead to an increase in forest investment. However, higher timber prices alone are only a weak incentive when the institutions governing timber and credit markets are poorly developed (Hyde and Seve, 1993; Hyde and Amacher, 1996).

Questions about both tenure and market liberalization are important for China. The successful implementation of the household responsibility system (HRS) in China's agriculture sector triggered a first wave of large scale reforms of collective forest tenure (Hyde et al., 2003). Beginning in 1981 the government replaced the People's Commune system that had been in existence for more than 20 years with family forestland management and HRS for forestry. Meanwhile, the timber market changed, first from mandatory planned pricing to a dual price system, then to an open market. However, unsustainable logging followed and the government reversed these reforms in 1987 (Ministry of Forestry, 1989; Hyde et al., 2003; Liu and Edmunds, 2003; Yin and Newman, 1997).

A small number of studies discuss the household response to China's forest reforms, but only a very few examine their impacts quantitatively (Démurger et al., 2009; Albers et al., 1998; Holden et al., 2013;

DOI of original article: <http://dx.doi.org/10.1016/j.forpol.2017.07.008>

☆ “A publisher's error resulted in this article appearing in the wrong issue. The article is reprinted here for the reader's convenience and for the continuity of the special issue. For citation purposes, please use; Forest Policy and Economics Volume 83, 2017”.

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<https://doi.org/10.1016/j.forpol.2017.12.009>

Received 9 July 2016; Received in revised form 15 July 2017; Accepted 15 July 2017
1389-9341/ © 2017 Published by Elsevier B.V.

Prosterman and Ye Schwarzwald, 2000; Yin and Newman, 1997). The causal effects of tenure reform and price liberalization on the physical condition of the forest, and on harvest levels and on reforestation and afforestation are not well understood, and no attempt has been made to estimate the extent of deforestation using econometric techniques. The goal of this study is to estimate the extent of these effects for the important collective forest region of southern China (CFRS); the provinces of Fujian, Guizhou, Hunan, Hubei, Guangdong, Guangxi, Hainan, Zhejiang, Anhui and Jiangxi.

This paper adds to the literature on forest reforms in several ways. First, we estimate the combined effect of the reform of forest tenure reform (RCFT) and LTM on the physical condition of the forest, and then partition this overall effect into its two (tenure and market) components. We seek to explain why the collective reforms of the 1980s failed in the CFRS. Second, we examine the impact of these reforms on the specifics of timber harvests and reforestation and afforestation, which, taken together we will call forest renewal.¹ Both harvests and forest renewal affect the future physical condition of the forest. We want to identify whether the sources of large-scale deforestation were either excess harvesting or a decline in forest renewal activities, or both. Third, as we conduct our analysis, we control for endogeneity, an issue that has been almost neglected in the prior literature. We do this by employing the system Generalized Method of Moments (GMM) with robust panel data for our econometric estimations. This controls for unobserved time invariant effects. The data for our analysis are a balanced province-level panel of eight National Forest Resource Inventories (NFRIs), together with annual provincial socioeconomic and forest resource management information, which has not been used in previous studies.

The structure of our paper, following the introduction, begins in Section 2 with an overview of the RCFT and the LTM in the 1980s. Section 3 presents the research theoretical framework, methodology and econometric specification. Section 4 reviews the data and their descriptive statistics. Section 5 presents the empirical results. A final section discusses our findings, offers our conclusions and suggests their policy implications.

2. An overview of the collective forest reforms in the 1980s

Since the early 1980s, many countries have introduced legislation and new policy implementing tenure reform through decentralization and devolution (FAO, 2010). Although most of the world's forests remain publicly and collectively owned, the area of forest now owned by or designated for use by local communities and indigenous people increased from 20% in 2002 to 27% in 2008 in 25 of the world's 30 most forested countries (Sunderlin et al., 2008). The outcome of these reforms, however, has differed across political jurisdictions because of differences in the degree to which specific rights and benefits were transferred (Agrawal and Ostrom, 2002).

As part of its strategic reorientation, China's government, in 1978, altered the institutions established during the People's Communes, permitting some market-oriented production while still keeping central planning in place. Agrarian reforms began shortly thereafter, shifting rural land management from the collectives to individual households (Coase and Wang, 2012). These agricultural reforms, characterized as the HRS with price reform, were followed by rapid increases in grain production, in cropland productivity and in rural income. They are widely recognized as the propelling force for expanding the economic reforms to other sectors (Lin, 1992; Lipton, 2010).

The successful implementation of the HRS in the agricultural sector and serious degradation and deforestation in forestry triggered China's

forest reforms. Local households, especially those in regions with large areas of collective forests, demanded HRS for the established forests and family forestland use rights (Hyde et al., 2003). The RCFT and LTM were introduced in the early 1980s, following those earlier and similar agrarian reforms.

2.1. Reforms of collective forestland tenure (RCFT)

During the period of the People's Communes, the collective forests were managed by community units including production brigades and production teams. The People's Communes were dismantled in the late 1970s and China's rural areas underwent reforms in the 1980s. The State Council issued *the Resolution on Several Issues Concerning Forest Protection and Development* in 1981 in an effort to stabilize forest use rights, delineate self-retained mountainous land for villagers and formalize both family forest management and the HRS within the collectives. Marginal forestland with few or no trees was allocated to individual households under a system known as family forestland. The collectives retained ownership of these lands while individual households within the collective gained permanent inheritable use rights and owned the trees they planted. Transfers of these land use rights were not permitted.

A second system, commonly known as collective forestland HRS, maintained the collectives' ownership of established forests but contracted egalitarian reallocations of these forests for household management. Local households were assigned forested plots by their village or sub-village administrative committees. They shared forest products and income with their administrative village or sub-village according to contracted quotas and retained the right to any additional products beyond their quota. The HRS forest contracts specified periods of 5–15 years, which is too short for most forest species and sustainable forest management (Holden et al., 2013). These contracts were extended to periods of at least 15 years in 1984.

By the end of 1981, the RCFT had been introduced in 1695 counties. By the end of 1982, the RCFT reallocations were complete in 1069 counties and 66% of the sub-villages, transferring 11 million ha of collective forestland to 45 million households. By the end of 1983, the RCFT reallocations were complete in 65% of the counties and 79% of all villages. The RCFT had been accepted by 75% of the administrative villages in China (Ministry of Forestry, 1984) by the end of 1984.

Ministry of Forestry (1986) estimated that 11.33 million ha were allocated to 50 million households as family forestland. An additional 40 million ha of established forests were contracted to households as HRS forestland. The progress of RCFT varied from one province to another and its implementation at the local level was inevitably rather complicated. For example, 92% of collective forests were reallocated to household management in Jiangxi Province but only 32% were reallocated in Fujian where a joint-stocking and share-holding system was adopted in some counties (Song et al., 2004) (see Table 1). The two programs, family forestland and HRS forestland, were integrated in Anhui and Guangxi after 1984 and this caused some households to be concerned that their forest tenure was incomplete and impermanent, and might be altered again.

2.2. Timber market liberalization (LTM)

During the period of the People's Commune, the state controlled the timber market with a unified procurement system. Villages sold their timber to the state at prices that were set centrally at a level, which was normally well below the market (Lu et al., 2002). An increase in the prices for agricultural products (including timber and other forest products) was officially announced in 1978 and, as a result, average agricultural (and timber) prices increased by 24.8% in 1979 (Zhang, 2014).

From 1981 to 1984 households were required to contract with their administration village or sub-village committee to produce a given level

¹ Reforestation includes replanting following harvests or other tree removal on existing forest. Afforestation is the act of planting previously unforested land. Obviously, both involve planting with the promise of long-term growth.

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