



Reform and efficiency of state-owned forest enterprises in Northeast China as “social firms”

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ARTICLE INFO

Article history:

Received 14 August 2017

Accepted 9 February 2018

JEL classifications:

C14 Semiparametric and Nonparametric

Methods

General

C67 Input–Output Models

L20 Firm Objectives, Organization, and

Behavior

General

L25 Firm Performance

Size, Diversification, and Scope

L32 Public Enterprises

Public-Private Enterprises

Keywords:

Data envelopment analysis

Technical efficiency

State-owned forest enterprise

Forest tenure reform

Social firm

Tobit panel model

ABSTRACT

State-owned forest enterprises (SOFEs) in northeast China have experienced past economic loss and environmental degradation, causing government to seek reforms. Measurement of technical efficiency allows us to evaluate overall trends and how reforms affect production of social and environmental goods. Previous assessments have used small samples, short time periods, and viewed SOFEs as if they were profit-maximizers. We compared a traditional profit-maximization framework to an alternative “social firms” framework for SOFEs to classify inputs and outputs, and data envelopment analysis to measure the efficiency of 86 SOFEs from 2003 to 2009. We argue that the social firm framework is more appropriate for SOFEs given their stated objectives. We found no overall trend in pure technical efficiency over time for the social firm framework; however, there was an increase in pure technical efficiency for the profit maximization framework, consistent with past literature. At the same time, there were decreases in scale efficiency primarily due to higher levels of government investment. We compared groups of SOFEs that underwent a specific pilot forest tenure reform to those that did not, and we found no evidence to support that tenure reform improved technical efficiency.

Published by Elsevier GmbH on behalf of Department of Forest Economics, Swedish University of Agricultural Sciences, Umeå.

Introduction

Northeast state-owned forestland is an important part of the forest sector in China. State-owned forestland comprises a significant portion of China's forestland area and timber stock (Fig. 1). State-owned forest enterprises (SOFEs) are local administrative agencies which plan and implement harvesting and reforestation on state-owned forestland. 87 of 135 Chinese SOFEs are in northeast China, and they play important roles in timber production and

ecological construction¹ and protection (Jiang et al., 2014). SOFEs in northeast China have more forestland area than SOFEs in the other regions combined (SFA, 2007–2014). Northeast SOFEs have been core industrial timber producers since 1950, making contributions to regional economic and social development.

SOFEs follow executive guidelines set by the central government, and rely on government for funding (Xu et al., 2004b). At the same time, the central government sets maximum annual logging quotas. However, SOFEs have encountered some issues with unus-

¹ “Ecological construction” is a term used in China to describe the policy of ecological restoration and other efforts to improve the ecological function and resilience of agroecosystems, including activities such as “fencing grassland, planting trees, shrubs, and grass, and irrigating cropland” (Jiang, 2006).

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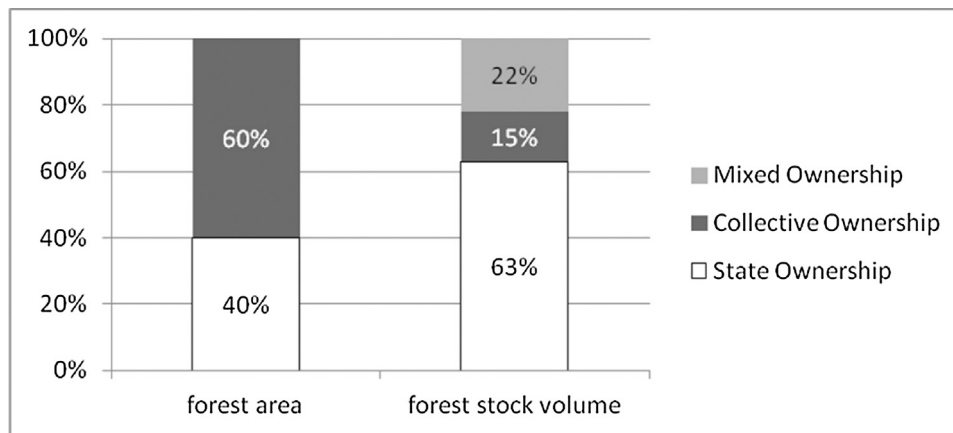


Fig. 1. Comparison of forest area and stock volume of state-owned and collective forestry.

Source: ENFRI (2014)

tainable business and development models, leading them into a situation of “two crises” – ecological degradation and economic loss (Zhang, 1998). In order to address the institutional issues and relative inefficiencies in this system, numerous policy adjustments and reforms have been undertaken, including a pilot forest tenure reform in a few SOFES beginning in 2006.

Past studies have estimated the efficiency of Chinese SOFES, either to identify areas of inefficiency for improved management (Liu and Yu, 2006), or to evaluate the impact of reforms (Chen and Jiang, 2013; Fu and Geng, 2012; Zhu and Jing, 2011). These studies have tended to reveal increasing average efficiency of SOFES, and attribute this to reforms, justifying further expansion of the reforms. We find three shortcomings of these approaches. First, some of the past studies have used only a relatively small sample of SOFES. Second, these studies use data of only two or three years, which may be subject to short-term macroeconomic changes and other variability. Due to the long growth cycle of forests, some longer-term improvements may be difficult to detect in the short-term. On the other hand, measures of some intermediate outcomes such as number of hectares reforested can be easily measured in the short-term, and can provide evidence as to whether reforms intended to align individual with community and national incentive structures have had the desired effect (Yin et al., 2013a). Therefore, a data set of intermediate length, perhaps of 5–10 years, may be desirable to evaluate the short-term reform effects while smoothing out yearly fluctuations.

Finally, and in our view most importantly, the efficiency studies of SOFES tend to evaluate them as if they were profit-maximizing firms – attempting to increase revenue or forest management activities per input of land, labor, and capital. However, the stated objectives of the government for SOFES deviate significantly from profit maximization. SOFES are likely viewed very differently by the national government, the owner of the SOFES, as well as local communities and governments – as “social firms”² that have the overall goal of improving wellbeing among the local community by increasing economic, environmental, and social outcomes (Bozec et al., 2002; Peredo and Chrisman, 2003; Soviana, 2015; State Council, 2015; Antinori and Bray, 2005). This could lead to researchers misclassifying inputs and outputs and calculating effi-

ciency scores that are not in line with the true objectives of the SOFES.

The purpose of this research is to evaluate the efficiency of SOFES during part of this reform period, from 2003 to 2009, comparing the traditional profit-maximization framework to classify inputs and outputs with an alternative framework of SOFES as “social firms”. Our study uses available data from 86 Northeast SOFES (excluding Dailing Forest Experimental Bureau, which has different objectives) from four years (2003, 2005, 2007, and 2009) during this seven-year period to estimate technical efficiency: (1) to identify overall trends in the sector during a period of ongoing policy reforms, and (2) to compare the efficiency of SOFES undergoing a specific pilot tenure reform to those not undergoing the pilot tenure reform. Finally, we discuss future opportunities, challenges, and needs.

Background

Historical Perspective of Chinese SOFES

Most of the SOFES in northeast China (Heilongjiang Province, Jilin Province, and Inner Mongolia Autonomous Region) were established in the early 1950s. In the 1950s and 1960s, the SOFES’ main task was to provide a large amount of raw material for the development of heavy industry. Thus, SOFES became forest logging enterprises focused primarily on timber harvest. In this period, the total number of forest workers and family members in northeast grew rapidly with the vigorous development of local forest economy. The population of people dependent on SOFES – including workers, retirees, and family members grew steadily until about 2004, and has since declined.

On average, forest workers have relatively low educational background and technical skills (Wan, 2004), and in many rural areas, SOFES are one of the few employment opportunities available to them. Furthermore, forest workers tend to depend on SOFES, including basic living guarantee, annuities after retirement, housing and medical treatment due to China’s planned economic system, relatively closed area and lack of labor.

Over-exploitation and deforestation without attention to management and regeneration caused a decrease in mature forests, severe disruption of stand composition, and loss of forest quality and functions (Yu et al., 2011). Therefore, by the late 1970s, northeast SOFES had entered a period of ecological degradation and economic loss, which Zhang (1998) called the “two crises”.

Beginning in 1980, China’s State Forest Administration (SFA) launched a number of forest preservation projects and policy adjustments to alleviate the increased resource pressure; however,

² Since some readers may have different interpretations of this term, it is important to note that we use the term “social firm” in the sense described by Antinori and Bray (2005). The term contrasts to profit-maximizing firms, as social firms optimize various benefits to the community and/or nation, rather than simply generating maximum revenue at minimum cost. We develop this concept in more detail in the Background and Methods sections.

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