Journal of Cleaner Production xxx (2016) 1–14

Contents lists available at ScienceDirect

Journal of Cleaner Production

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

Optimal farmland conversion in China under double restraints of economic growth and resource protection

Yao Xiao [a, b, *], Xiao-Zhong Wu [c], Li Wang [d], Jing Liang [e]

[a] Institute of National Accounts, Beijing Normal University, Beijing City, 100875, China
[b] School of Statistics, Beijing Normal University, Beijing City, 100875, China
[c] School of Business, Changzhou University, Changzhou, 213000, China
[d] School of Economic & Management, Northwest University, Xi'an, 710127, China
[e] China Academy of Chinese Medical Sciences, Guang'anmen Hospital, 102618, China

ARTICLE INFO

Article history:
Received 5 August 2015
Received in revised form
4 June 2016
Accepted 4 June 2016
Available online xxx

Keywords:
Big data
Threshold panel model
Farmland resource protection
Optimal scale
Chinese farmland conversion
Economic growth

ABSTRACT

Excessive farmland conversion carried out primarily by governments might cause serious environmental and economic problems. A government has to choose between economic growth and protection of farmland resources, which leads to the problem of how to decide the optimal scale of farmland conversion. In this study, we built a theoretical model on how farmland conversion affects economic growth, and empirically analyzed the optimal scale of farmland conversion by using both dynamic and threshold regressions based on panel data of 31 Chinese provinces from 1997 to 2013. We found that China is currently in a state of excessive farmland loss and farmland conversion. Policies based on land adjustments to improve economic growth neglect the ecological and social costs of farmland resources, resulting in excessive farmland conversion and the phenomena of short-term growth but long-run growth suppression owing to restriction of resources. The optimal scale of farmland conversion should not exceed the current level of 73.56%. To protect farmland resources and reduce excessive farmland conversion, the Chinese government should establish a unified urban–rural construction land market, improve its compensation mechanism, and reduce administrative interventions based on land pricing.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction and literature review

Excessive farmland conversion carried out primarily by governments may cause serious environmental and economic problems. A government has to choose between economic growth and protection of farmland resources, which leads to the problem of how to decide the optimal scale of farmland conversion.

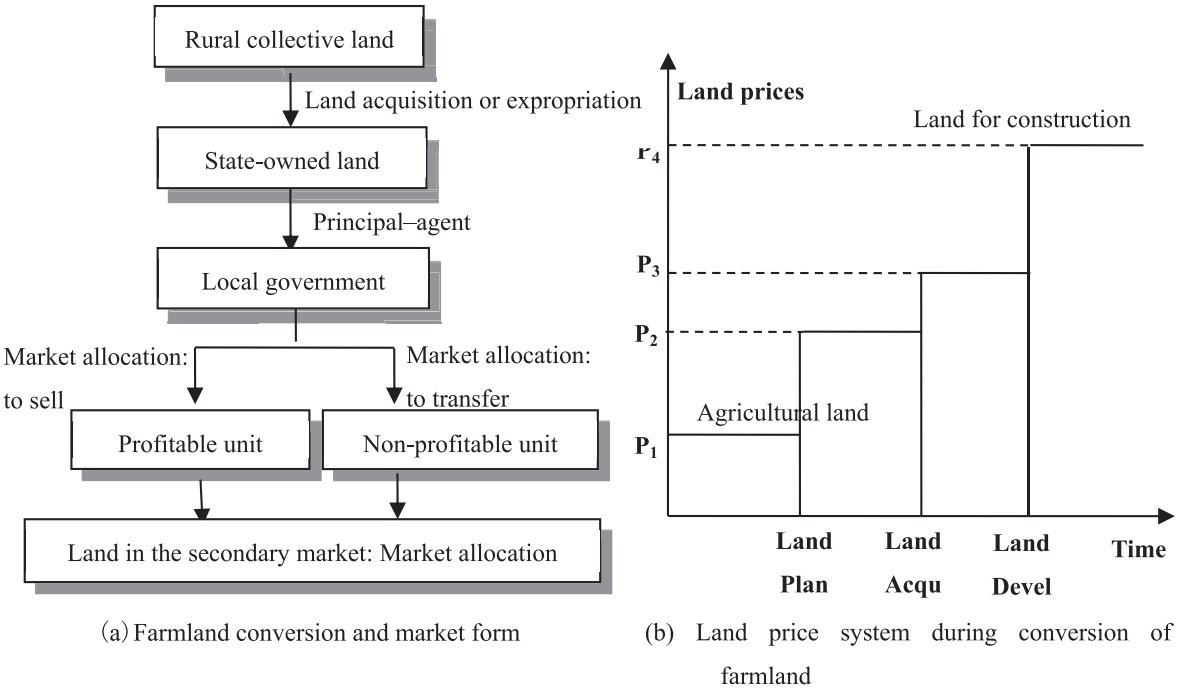
In recent years, with the deepening of reforms and promotion of urbanization, land regulation has increasingly influenced the economic growth and financial markets of China and become an important governmental tool to optimize resource allocation, regulate the macro-economy, and generate government revenue. This has resulted in the "farmland conversion" process and multilevel land-pricing structure as follows (Fig. 1). (a) Growth of the national economy and transformation of the dual urban–rural structure will surely carry forward the urbanization process. (b) Urbanization will bring problems, such as increasing demand for land and land expropriation. (c) Once farmlands are expropriated by the state, local governments representing the state will transfer land-use rights to users in such a manner that the transfer or assignment leads to transformation of farmland to construction land. Finally, (d) the new land users may transfer land held by them to other users under certain circumstances, thereby leading to a multilevel land market system and corresponding land-pricing structure.

Nevertheless, under existing fiscal decentralization in China, farmland conversion has led to a series of contradictions. On the one hand, there are differences in the marginal returns of farmlands between the agricultural sector and non-agricultural sector. Some local governments prefer to convert farmland resources into construction land to achieve their economic growth targets. However, farmland conversion consumes vast farmland resources and presents certain pressing problems, such as destruction of ecology and

* Corresponding author. School of Statistics, Beijing Normal University, Beijing City, 100875, China.
E-mail address: xiaoyao@188.com (Y. Xiao).

http://dx.doi.org/10.1016/j.jclepro.2016.06.027
0959-6526/© 2016 Elsevier Ltd. All rights reserved.

Please cite this article in press as: Xiao, Y., et al., Optimal farmland conversion in China under double restraints of economic growth and resource protection, Journal of Cleaner Production (2016), http://dx.doi.org/10.1016/j.jclepro.2016.06.027



(a) Farmland conversion and market form

(b) Land price system during conversion of farmland

Fig. 1. Farmland conversion and land-pricing structure.

social security issues for farmers who have lost land. Therefore, the relationship between economic growth and the protection of farmland resources during the conversion process must be well balanced between converting more farmland resources to stimulate economic growth and restricting farmland conversion to protect the most fundamental living environment of human society. To solve this dilemma, the Chinese government has set the following corresponding strategic objectives: acceleration of the construction of ecological civilization, improved development of national land space, saving of resources, establishment of a system of ecological environment protection, and formation of a new pattern of modernization with the harmonious development of human beings and nature. How can we put these strategies into practice with regard to protecting ecological farmland resources and what is the optimal scale of farmland conversion?

Several domestic and foreign scholars have examined the issues of economic growth and protection of farmland resources during the process of conversion from both macro and micro perspectives, but with different emphasis. From the macro perspective, these scholars have studied mainly the environmental Kuznets curve, in this case, the relationship between economic growth and farmland losses, which was found to reflect a reverse U-shaped curve during the progress of farmland conversion (Suri and Chapman, 1998; Gylfason, 2001). However, Stijns (2005) and Papyrakis and Gerlagh (2007) further studied the balance trade-off relationship between economic growth and resource losses, to find a positive correlation in the early stages, which becomes negative as the conversion progresses. Most studies consistently found the existence of a threshold value between economic growth and farmland resource losses. If this threshold value were exceeded, farmland resource losses would restrict economic growth, but the conditions would vary in different countries because each country's threshold value would be restricted by that country's specific political and economic factors.

Studies from the micro perspective mainly consider farmland values. Gardner (1977) pointed out that farmlands have external benefits, such as wide spaces, landscapes, conservation of rural living style, air and water purification, and wildlife habitation. Costanza et al. (1997) proposed an accounting method for the ecological benefits of resources based on a resource market-exchange mechanism, and Perman et al. (2003) put forward the optimal scale of land acquisition based on the theory of marginal income and marginal cost being equal.

Unlike the private ownership of land in most countries, land in China is under national and collective ownership. National directives have for long allocated non-agricultural land in China, and the country had no land transaction market in the strict sense until the middle of the 20th century, when state-dominated market-oriented land reforms appeared. These reforms effectively supported the industrialization, urbanization, and rapid economic growth of China. As the country entered the 21st century, its environmental deterioration became increasingly serious and any further economic expansion based on farmland conversion was no longer adaptable. Thus, Chinese scholars began to research farmland conversion. However, their research mainly focused on the benefit distribution, fairness and efficiency, and welfare compensation aspects of farmland resource allocation (Wu, 2014). Few studies have attempted to measure and evaluate the optimal scale of farmland conversion, but the findings of Costanza et al. (1997) and Perman et al. (2003) have been very enlightening to the present study. Furthermore, Tan and Qu (2006) examined the reasonability of the farmland conversion level considering both economic growth and ecological protection based on the data of marginal revenue and cost of farmland conversion from 1989 to 2003. Wang (2013) stated that the difference between Pareto optimal farmland area and food security-guaranteed agricultural acreage increased gradually because the growth rate of the marginal benefit of farmland was slower than that of construction land and lowered the efficiency of farmland resource allocation.

From the relevant literature, developed countries usually adjust farmland conversion by means of a perfect market-pricing system. Hence, the related economic issues are not serious topics for

Please cite this article in press as: Xiao, Y., et al., Optimal farmland conversion in China under double restraints of economic growth and resource protection, Journal of Cleaner Production (2016), http://dx.doi.org/10.1016/j.jclepro.2016.06.027

Download English Version:

https://daneshyari.com/en/article/5481215

Download Persian Version:

https://daneshyari.com/article/5481215

Daneshyari.com