

## **Are large farms more efficient? Tenure security, farm size and farm efficiency: evidence from northeast China**

Yuepeng Zhou, Xianlei Ma, and Xiaoping Shi

College of Public Administration, Nanjing Agricultural University, Nanjing, China (zhouyuepeng@njau.edu.cn)

How to increase production efficiency, guarantee grain security, and increase farmers' income using the limited farmland is a great challenge that China is facing. Although theory predicts that secure property rights and moderate scale management of farmland can increase land productivity, reduce farm-related costs, and raise farmer's income, empirical studies on the size and magnitude of these effects are scarce.

A number of studies have examined the impacts of land tenure or farm size on productivity or efficiency, respectively. There are also a few studies linking farm size, land tenure and efficiency together. However, to our best knowledge, there are no studies considering tenure security and farm efficiency together for different farm scales in China. In addition, there is little study analyzing the profit frontier. In this study, we particularly focus on the impacts of land tenure security and farm size on farm profit efficiency, using farm level data collected from 23 villages, 811 households in Liaoning in 2015. 7 different farm scales have been identified to further represent small farms, median farms, moderate-scale farms, and large farms. Technical efficiency is analyzed with stochastic frontier production function. The profit efficiency is regressed on a set of explanatory variables which includes farm size dummies, land tenure security indexes, and household characteristics.

We found that: 1) The technical efficiency scores for production efficiency (average score = 0.998) indicate that it is already very close to the production frontier, and thus there is little room to improve production efficiency. However, there is larger space to raise profit efficiency (average score = 0.768) by investing more on farm size expansion, seed, hired labor, pesticide, and irrigation. 2) Farms between 50-80 mu are most efficient from the viewpoint of profit efficiency. The so-called moderate-scale farms (100-150 mu) according to the governmental guideline show no advantage in efficiency. 3) Formal land certificates and farmer's participation in land rental market are found to be important determinants of the profit efficiency across different scale of farms. 4) Fertilizer use has been excessive in Liaoning and could lead to the decline of crop profit.