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Farmers' willingness-to-pay for farmland based on machinery efficiency and precision technology adoption

Terry Griffin
Department of Agricultural Economics
Kansas State University
342 Waters Hall, Manhattan, Kansas 66506
twgriffin@ksu.edu

Jordan Shockley
Department of Agricultural Economics
University of Kentucky
Lexington, Kentucky

Selected Paper prepared for presentation at the Southern Agricultural Economics Association (SAEA) Annual Meeting, San Antonio, Texas, February 6-9, 2016

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Abstract

With farmland prices near record highs and machinery management becoming critical to whole farm profitability, understanding the interactions between the two becomes important. Machinery costs are one of the largest factors influencing the variation in net farm income among farmers. For a given machinery complement, the field efficiency is a leading factor in the value of the machinery to the farm. Field efficiency will vary based on field geometry such as shape and size. Farmers with a large proportion of small irregularly shaped fields would have lower realized field efficiencies compared to farmers with more acres in rectangular shaped fields. The ability to capture maximum machinery efficiency, hence lower machinery costs, should impact the willingness to pay for farmland. We evaluate the relationship between field shape and size and the associated willingness-to-pay for that land given a representative equipment set. Building upon the baseline scenarios for a range of field characteristics, we evaluate the relative benefit of adding precision technologies such as automated guidance and automatic section control that potentially increase field efficiency. Along with input savings, we evaluate how much farmers would be willing-to-pay for farmland given an increase in machinery efficiency in the field due to these technologies.

Keywords: precision agriculture, automated guidance, automatic section control, machinery, field efficiency, farmland values

JEL Codes: Q10 , Q15