

Public Abstract

First Name:Braydon

Middle Name:Alan

Last Name:Minear

Adviser's First Name:Wyatt

Adviser's Last Name:Thompson

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:The Effects of Changing Fertilizer Production Costs on U.S. Agricultural Markets: A Partial Equilibrium Analysis

This and prior studies of the U.S. fertilizer industry have been motivated by possible environmental risks associated with the over-application of fertilizer and the uncertainty surrounding volatility in fertilizer prices. Previous research, which mainly focused on demand, econometrically analyzed the U.S. fertilizer industry in a simultaneous supply and demand, partial equilibrium framework.

This study builds on prior work by estimating a partial equilibrium model with a simultaneous supply and demand framework of nitrogen, phosphorus, and potassium fertilizer markets and linking it to an existing U.S. agriculture model system in order to quantify and examine the impacts of fertilizer production cost changes on crop prices and other key agricultural economic variables. More specifically, this study evaluates the effects of a natural gas, sulfur and electric power price change on key economic variables in the U.S. fertilizer and agricultural commodity markets.

The results of these three scenarios indicate that an increase in domestic fertilizer production costs might cause agricultural producers to shift production acres from crops with intensive fertilizer usage to other alternatives. Additionally, changes in domestic fertilizer production costs have a small to nearly nonexistent effect on fertilizer usage and agricultural commodity markets.

These observations could provide useful insight for environmental policy makers. The observed low responsiveness demonstrates that a large domestic fertilizer input price change would be required to invoke changes in the agricultural sector. This finding also attests to the inelasticity of demand for fertilizer, supporting the common notion that U.S. agricultural production is highly dependent on fertilizer use.