The Impact of Nutrient Management Regulations on New York Farmland Values

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Manure disposal and handling (nutrient management) regulations induce livestock producers to internalize some of the environmental externalities associated with intensive livestock production. While improved nutrient management can lead to environmental and health benefits, measuring the economic cost of nutrient management regulations is difficult. Beyond the challenges of accounting for the direct costs associated with handling and disposing of manure, farms also respond to nutrient management regulations by changing management and production practices. Further, farms may also receive some benefit from decreasing fertilizer use as well as other monetary and nonmonetary benefits. While measuring these direct and indirect (net) costs is challenging, farmland values may reflect the net costs associated with nutriment management regulations. This study estimates the impact of nutrient management regulations on farmland values in New York.

As a part of classification as a concentrated animal feeding operation (CAFO), New York farms with animal units (AUs) over the levels specified in legislation are required to have a formal nutrient management plan that subject is to audit by the Department of Environmental Conservation. To the degree that these regulations require nutrient balancing, farms are required to maintain access to or control over a land based sufficient for disposal (or spreading) of manure. Over 500 dairy farms in New York would be classified as either medium or large CAFOs based on the 2012 Census of Agriculture, and are hence large enough to be subject to national CAFO regulations. While these farms may demand farmland to produce feed crops, they also require access to farmland in order to meet nutrient management regulations. While the presence of CAFOs has been anecdotally reported to drive up farmland values, the impact has not been quantified and other explanations have not been ruled out.

The study will provide the first (known) estimate of the cost that farmland markets imply for nutrient management regulations in the United States. In addition to quantifying the cost of these regulations, it will also inform the policy debate on CAFO regulations. Given that through competition for farmland, nutrient management regulations may increase the cost of farming for other operations. For example, in New York small specialty farms or new and beginning farmers may face increased costs due to competition for land to satisfy nutrient management regulations. Many policies are currently in place to support these types (i.e. new farmers, local food

producers, etc.) of operations. This unintended consequence of nutrient management should be of interest to both policymakers and researchers.

Many studies have considered the impact of livestock operations or CAFOs on housing property values, while relatively few, especially in the United States, have considered the impact on farmland values. While most studies have shown CAFOs to have a negative impact on housing values, the impact on farmland values is less certain. CAFOs could increase farmland values if there is increased competition for land to meet nutrient management regulations. Alternatively, CAFOs may lower the potential for amenity or alternative uses of farmland, which could have a downward impact.

Model

We will use a hedonic model to estimate farmland prices, which is a standard approach in the agricultural and land economics literatures. Log-linear and related models have been used in many studies of CAFO and housing values, but a recent study has suggested that more flexible function forms might best capture the relationship between real estate values and livestock operations (Kuethe and Keeney, 2012). For this study, different functional forms will be tested for best fit with the data. Studies on the suitability of different functional forms such that of Cropper et al (1988) as well as comparability with other studies will also be considered. Standard errors will be estimated to account for spatial correlation.

A potential concern for our study is the endogenity of CAFO location decisions. Livestock operations might take into account farmland availability or prices when making the decision to increase herd size or production levels, which could lead to the operation being subject to CAFO regulations. If this type of behavior is present, then our study might underestimate the impact of CAFOs on farmland values. To address this issue, we will test various instrumental variables for CAFO location. One instrument variable that we will consider is distance from new dairy processing facilities.

Data

This study will use New York farmland transactions values from 1999-2014. These transactions records are collected at the county level and are maintained at the state level by the Office of Real Property Tax Services of the New York State Department of Taxation and Finance. GIS shapefiles for all land parcels are also provided by the Office of Real Property Tax Services and can be matched with sales records using unique parcel identifiers. Given the importance of precise location data in identifying the impact of nutrient management regulations, we will use transactions data from 1999 (the most recent year available) to present. We will consider only arms-length transactions and will match the data with other GIS datasets of land characteristics. A large number of land characteristics for New York can be found in publicly available GIS datasets, and we use standard control variables or farmland value determinants in our analysis. Additionally, wind direction data may help us test for a dis-amenity effect of CAFOs on farmland values. While wind direction should not affect crop production by itself, it might affect recreational or other non-agricultural production uses of farmland that are reflect in transactions prices.

We will use three measures of the impact of nutrient management regulations. The first two will be considered for comparison with measures used in the literature on the impact of CAFOs on housing values. The first measure, distance to nearest CAFO, will capture the impact of proximity on farmland value. The impact of distance to nearest CAFO would partially reflect livestock operations having stronger demand for adjacent or nearby cropland. Second, we will also develop a measure of the local density of CAFOs. The impact of the density variable would capture competition between livestock operations for cropland. Both measures have been used in the literature on CAFOs and housing values. A third measure is novel and will take advantage of data from the Census of Agriculture. We will use “regulated” versus “unregulated” animal unit populations as explanatory variables. In other words, we will measure the impact of animal unit density above and below the CAFO threshold on farmland values.

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