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Outstanding Master's Thesis for 1990

Firm Efficiency: Theoretical Issues and Empirical Analyses of New York Dairy Farms

Arthur Charles Thomas

Cornell University
Advisor: Loren W. Tauer

This thesis first theoretically explores the issue of input aggregation and its effects on measured technical efficiencies. Specifically, when nonparametric approaches and inputs aggregated linearly by value are used to measure technical efficiencies, it is shown that resulting efficiencies will never be greater than those calculated using nonaggregated inputs. Allocative inefficiency causes this bias. Hence, resulting measures of technical efficiencies calculated using aggregated inputs are actually combined technical and allocative efficiencies.

Two measures of technical efficiency, one with eight inputs defined and one with two inputs defined, were calculated annually for 125 New York dairy farms from 1981 through 1987. Overall cost efficiencies were also determined. Mean efficiencies ranged from 96% for the eight-input technical-efficiency measure to 70% for the overall cost-efficiency measure.

Scale efficiencies were determined and regressed on average herd sizes to determine whether the technology set of the farms exhibited increasing, decreasing,

or constant returns to scale. In general, increasing returns to scale existed.

As an explanatory model, a farm's change in efficiency was modeled as a function of changes in asset levels and changes in the price of milk, both of which were statistically significant and negatively related to the change in efficiency. The static level of efficiency was modeled as a function of operator and farm characteristics. Age was found to be negatively related to efficiency. Average herd size was positively related to efficiency. Milk price was negatively related to efficiency. Farmers in northwestern and northern New York State were found to be more efficient than those in other regions.

Finally, efficiencies were correlated with standard performance ratios. The capital-efficiency ratios of assets per cow and capital turnover are reasonably good proxies for a farm's technical and overall efficiency. The production ratio of milk per cow was also a good measure of a farm's overall efficiency. Ratios of cows per man and debt to assets were less useful as measures of farm efficiency.

Master's Thesis Award of Merit

Intercropping and Diversity: An Economic Analysis of Cropping Patterns on Smallholder Farms in Central Malawi

Louise Janet Shaxson

Cornell University

Advisor: Loren W. Tauer

This thesis analyzes the diversity of cropping patterns on smallholder farms in Malawi using a framework that explicitly incorporates the extent of intercropping practices in each field. Six indices of diversity are constructed and calculated for each of 208 sample smallholder farms.

A welfare-maximizing farm household model is used to examine the reasons for diversity in cropping patterns. Regression results suggest that farmers use more substitutive than additive patterns in their intercrop designs and that an increase in labor availability over the production period is associated with a more diverse cropping pattern. Farmers who grow a nonfood cash crop (tobacco) are found to have more diverse cropping patterns than those who do not.

A health demand function is used to analyze the effect of diversity on household welfare. Three sets of regressions examine the relationship between the change in the nutritional status of preschoolers, and community, household, and individual characteris-

tics. These relationships are modeled over the hungry season and the harvest period, using both the short- and long-term measures of nutritional status, weight-for-height and height-for-age, respectively. The strongest determinants of the change in preschooler nutritional status in all three models are their previous nutritional status and their age. The children of Teba households (those where the male head works in South Africa) suffer the most weight loss during the hungry season; although they subsequently gain the most over the harvest period, they remain the most stunted of the sample preschoolers. The level of off-farm income has a weak positive effect on the change in nutritional status over the hungry season and a weak negative effect in the harvest period. An increase in the diversity of the household's overall cropping pattern has a weak negative influence on the change in nutritional status over the hungry season but does not appear to influence nutritional status over the harvest period.

Master's Thesis Award of Merit

An Economic Analysis of Compliance in the Rhode Island Inshore Clam Fishery

Casey Eben Bean

**University of Rhode Island
Advisor: Jon Sutinen**

An empirical study of the Rhode Island quahaug (*M. mercenaria*) fishery is presented in this study based on information obtained from a mail survey of 414 fishermen. Respondents gave their perceptions of violation activity in the fishery and the effectiveness of the enforcement program. A follow-up telephone survey of 86 fishermen was also employed to gain insight into the reasons for nonresponse to the mail survey.

A two-stage ordinary least squares model was used to estimate how violation activity in the fishery is a function of the overall probability of being detected and convicted, socioeconomic characteristics of the

violation, his experiences with the enforcement authorities, and the area of the Narragansett Bay where he fishes. Avoidance tactics and equipment used by a violator were also examined.

In summary, the results indicated that the model is useful for understanding compliance behavior in a fishery. One additional benefit of the study was in gaining insight into the socioeconomic status of the quahaug industry. Further research is necessary in the area of psychological determinants believed responsible for a significant degree of compliance behavior.

Journal Article of the Year for 1990

An Economic Analysis of the U.S. Generic Dairy Advertising Program Using an Industry Model

Donald J. Liu, Harry M. Kaiser, Olan D. Forker, and Timothy D. Mount

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