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# Abstracts of Selected Papers

## **"Impacts of Coal Severance Taxes: A Rural Development Perspective." Jill L. Findeis and Susan G. Richards (Pennsylvania State University)**

Given the high rural unemployment rates witnessed in Pennsylvania, the impacts of a proposed coal severance tax on mining employment remains an important issue in Pennsylvania. This study examines the demand for Pennsylvania steam coal, providing estimates of the conditional and unconditional price elasticities of demand. Changes in coal output under alternative tax rates are estimated and translated into mining employment loss estimates, given a "worst case" scenario. Under this scenario, the maximum employment losses attributable to a severance tax on steam coal are compared to the tax revenues generated.

## **"An Empirical Evaluation of Estimates of the Minimum Risk Hedging Ratio." Laura Bertoni (Cornell University)**

Optimal hedging levels and ratios have been determined theoretically, but application to real situations depends on estimated parameters. This paper examines how estimates of the minimum risk hedge change with changes in the sampling period and hedging interval. The mean and standard deviation of the hedge ratios are calculated for six time intervals for anticipatory hedges of corn production in western New York using five different sample periods. The research concluded that estimates of the minimum risk hedge are more sensitive to changes in the sampling period than to differences in the hedging interval over the harvest season.

## **"The Importance of Skill and Experience in Commercial Fisheries.\*" Stephen R. Crutchfield and John M. Gates (University of Rhode Island)**

Fishing is traditionally characterized as an occupation where skill, experience and luck play significant roles in determining economic performance of the individual enterprise. This paper develops a model to quantify the importance of varying skill levels for commercial fisheries. Using as a case study the New England otter trawl fishery a general linear model is used to predict gross revenue per day as functions of several vessel characteristics and activity levels. The residuals are then corrected for heteroscedasticity and subject to a cluster analysis which classifies observations according to their distance from the mean predicted value of the dependent variable. The data are then partitioned into five classes and dummy variables defined to rank observations by their gross revenues. Finally, a general linear model is refitted using these dummy variables as indicators of the captain's skill. It is found that correcting for skill increases the precision of the estimates. Additionally, substantial vari-

ations were found between <sup>4</sup>low skill" and "high skill" vessels; the highest skill vessels typically showed revenue seven to ten times those of the lowest skill vessels.

## **"Estimating the Economic Benefits of Tourism: The Mansions of Newport, Rhode Island." Stephen R. Crutchfield (University of Rhode Island)**

In recent years many communities have begun to stress tourism and related activities are substitutes for more traditional economic activity. This paper examines the experience of Newport, Rhode Island; in particular, the economic benefits to Newport from tourism activity attracted by seven historic properties managed by the Preservation Society of Newport County. A survey of visitors was conducted to determine the level and variety of tourist expenditures by visitors. A weighting factor was derived to account for multiple purpose visits and correctly attribute a partial share of associated expenditures to the tourism opportunities afforded by the seven mansions. Based on the survey results it is concluded that the mansions attract between \$35 and \$56 million annually in direct and indirect expenditures to the city of Newport, thus generating substantial economic benefit for the local economy.

## **"Alternative Waste End Fee Methods of Revenue Generation for the New Hampshire Hazardous Waste Cleanup Fund." Bruce E. Lindsay and Stephen J. Graefe (University of New Hampshire)**

In reviewing the New Hampshire system of waste end fees for hazardous waste generation, three areas of concern surface. They are: (1) the need for incentives to modify the waste management behavior of hazardous waste generators, (2) the need to lessen the regressiveness of the present flat rate fee system, and (3) the need to raise additional revenues for the Hazardous Waste Cleanup Fund. The study of two waste end fee variations ("net and recycling ratio" and "net and number of employees") suggests that each has the potential to successfully address the three areas of concern.

## **"Computable General Equilibrium Model Structures with Markets for Transferable Discharge Permits." James S. Shortle (Pennsylvania State University) and K. D. Willett (Oklahoma State University)**

Transferable discharge permit (TDP) systems are drawing considerable attention as an alternative to the existing regulatory approach to pollution control in the U.S. The main appeal of the approach is that appropriately defined TDP systems will be cost-effective in achieving environmental standards provided that permit markets are competitive. However, the realized gains from replacing existing

policy structures with TDPs will depend upon how a number of practical design issues are resolved. This paper presents two mathematical programming structures for computing competitive equilibria for an economy in which pollution control is provided by TDP systems. The purpose of these structures is to provide tractable frameworks for numerically examining the impacts of alternative TDP configurations in a general competitive equilibrium setting. The structures are explicitly developed for a differentiated ambient concentration type of TDP system. However, they may be modified to examine other configurations. A discussion of such modifications and of the implementation of the models for policy analysis is provided.

**"Economies of Size and Substitution Elasticities for Milk Based on a Translog Production Function." Boris E. Bravo-Ureta (University of Connecticut)**

This paper presents empirical estimates of economies of size and Allen elasticities of substitution for milk production based on a modified translog production function. The results show that the function coefficient increases monotonically with farm size suggesting an "L" shaped long run average cost of production for milk. Allen elasticity of substitution measures indicate that milk production technology is relatively inflexible especially as farm size becomes larger.

**"An Analysis of Production Decisions and Operator Characteristics of Pennsylvania Dairy Farms." Margaretha C. Haussler and William Grisley (Pennsylvania State University)**

This paper presents an application of a model based on the duality relationship between the production function and the variable profit function for a sample of dairy farms in Pennsylvania. In addition to analyzing the more general production response relationships, the model provides an assessment of the influence of the years of operator experience and operator education levels. A dual approach is formulated, employing a normalized restricted translog profit function and the corresponding system of derived share equations. Estimates of price elasticities and elasticities with respect to the fixed factors are derived.

**"The Effects of Various Dairy Price Support Alternatives.\*" Paul C. Westcott and Clifford M. Carman (ERS, USDA)**

Three scenarios of a dairy sector model are simulated through 1987 to examine some of the implications for the dairy sector of the effects of alternative price support levels. Results indicate that rising milk cow inventories and production per cow will again lead to increases in production near or exceeding increases in commercial disappearance un-

less price supports are substantially reduced. Consequently, in the absence of substantial price support reductions, net government removals of dairy products would be expected to remain large and could begin trending upward again.

**"Modeling the Cost Effectiveness of Soil Conservation Practices for Stream Protection." Bradley M. Crowder and C. Edwin Young (ERS, USDA, Pennsylvania State University)**

This paper discusses the cost effectiveness of best management practices (BMPs) for controlling soil and nutrient losses resulting from crop production, and is derived from the economic evaluation of the Conestoga Headwaters Rural Clean Water Program (RCWP) project in southeastern Pennsylvania. Physiochemical and economic modeling of BMP impacts were undertaken to characterize the cost effectiveness and overall effectiveness of BMPs for controlling agricultural nonpoint pollution. The CREAMS model was used to estimate field-edge losses of soil, surface runoff losses of nitrogen (N) and phosphorus (P), and nitrate (NO<sub>3</sub>) leached out of the root zone.

**"Potential Impact of Selling Costs on Seller Behavior in a TDR Market." Mary Patricia Gallagher (New York—New Jersey Milk Marketing Area, Office of the Market Administrator) and Donn A. Derr (Rutgers University)**

The impact of commission rates, federal tax policies (cash vs. installment sale basis), the value of DRs per acre, the significance transaction costs and alternative real property tax policies are examined. The results indicate that the real estate commission is a significant transaction cost but should not be avoided given the value of real property involved and the complexities of land development. Shifting this cost to the public is possible as government participation increases. Installment sales of DRs offer little advantage if the future cash flow is discounted. Imposing roll-back penalties under use value assessment will increase selling costs, but they are partially offset by federal tax savings.

**"Technological Structure of U.S. and Northeast Agriculture." Conrado M. Gempesaw II and James W. Dunn (Pennsylvania State University)**

Past studies of national or regional farm input demand and output supply behavior use single equation models with theoretical foundations based on *ad hoc* decision rules. More recent studies use duality theory motivated models and improve upon these *ad hoc* formulations. However, these studies still assume input-output separability (one-output case) or two-output separability conditions. This paper conducts technology tests on the production structure of U.S. and Northeast agriculture to verify the validity of previous studies' output and input

model specifications. Furthermore, a test is also conducted to evaluate whether Northeast product supply and factor demand responses are significantly different from national responses. The test results indicate that previous approaches of evaluating national or regional technologies through the use of single output or two-input measures may provide biased estimates due to model misspecification. In addition, equality between national and Northeast regional responses is rejected, indicating the importance of estimating regional elasticities.

**"Pesticide Productivity and Potato Productions Relations Under Collinearity." Douglas D. Ofiara (University of Georgia), John M. Gates and Thomas F. Weaver (University of Rhode Island)**

Empirical studies often estimate input-output relationships on a total rather than unit basis (e.g., per acre) basis. This practice seems an overreaction to the dangers of ratio variables. In the case of field crops, this practice invites heteroscedasticity and can aggravate collinearity. To illustrate these points, this paper describes the results obtained with a particular data set. The data comprised cross-sectional, time series primary data collected by Ofiara from Southern New England potato producers.

Failure to obtain data on pest population counts before and after pesticide applications resulted in a severe identification problem. Specifically, coefficient estimates associated with pesticide inputs are confounded estimates of two opposite effects. One effect is the productivity of pesticide inputs. It is an indirect effect exerted through a pesticide kill ratio. The second effect is the behavioral response of producers to elevated pest populations. The bias which results from this identification problem resulted in a coefficient which exceeds its standard error of estimation by a factor of 2.3 but which has the "wrong" sign.

Collinearity diagnostics are useful in a narrow, purely numerical sense, to indicate the maximum imprecision in coefficients. In a larger sense, however, the problem is one of incremental information contained in collinear variables. By pinpointing variables which are collinear, the diagnostics are also useful in formulating future sampling designs; both to reduce collinearity per se, and to improve the specification of variables to be measured in a sample.

**"The Relationship Between Farm Size and Technology Adoption: Some Empirical Results." Michele C. Marra (University of Maine) and Gerald A. Carlson (North Carolina State University)**

Just and Zilberman have developed a theoretical model of technology adoption under uncertainty that gives rise to some theoretical 'expansion paths' of technology adoption with firm size. This paper extends their theory to include human and physical capital resource constraints on the adoption process and also provides some empirical evidence on the "expansion path" of the adoption of double cropping as a new technology. Tests of hypotheses on the important factors affecting the double cropping-farm size relationship are presented and discussed.

**"Changes in Transportation Costs and Interregional Competition in the U.S. Apple Industry." James W. Dunn and Lynn A. Garafola (Pennsylvania State University)**

An interregional competition model of the U.S. apple industry is constructed. This model includes the consumer products of fresh apples, applesauce and apple juice. The validation of the model showed that it did a good job of estimating consumer's quantity demanded and prices and a reasonable job of estimating utilization. This model was used to study the effects of transportation cost changes on the industry in the short- and intermediate run. The total production and consumption levels changed by moderate amounts with changing transport costs while the utilization of a region's crop was quite sensitive to such changes.

**\* "Analysis of the Impact of Fish Imports on Ex-Vessel Prices of New England Groundfish." D. H. Wang (National Marine Fisheries Service) and V. J. Norton (University of Maryland)**

A partial adjustment model was used to analyze the impact of fish imports on domestic ex-vessel prices of six New England groundfish species. Monthly data from January 1974 to December 1982 were used in analyses with Zellner's seemingly unrelated regression procedures. The results indicate that fresh fish imports have an adverse effect on New England ex-vessel prices. Price-import flexibilities at sample means ranged between  $-0.04$  and  $-0.17$  for the six species. This indicates that in recent years, ex-vessel prices of these species would have been about four percent higher if fresh fish imports would have been 10% lower.