# Abstracts of Selected Papers

# Recreation and Forestry

**(Chair: Tom Grigalunas, Univ. of Rhode Island)**
**"Valuing Whitewater Rafting on the Gauley River: A Trip Response to Individual Travel Cost"**
**D.B.K. English, J.M. Bowker (USDA/FS), and J.A. Donovan (Univ. of Georgia)**

Estimating consumer surplus via individual travel cost models for recreation resources that most people visit only a few times per year can be problematic. This paper presents a trip response (intended behavior) alternative to using a zonal model. Changes in the annual number of outfitted river trips are modeled as a function of contingent changes in outfitter fees under a Poisson distribution. Results show that visitors are more likely to change the number of trips if faced with a price increase than with a price decrease. Per trip consumer surplus estimates range from $12.80 to $31.75.

**"The Role of Expectations and Heterogeneous Preferences for Congestion in the Valuation of Recreation Benefits" J.A. Michael and S.D. Reiling (Univ. of Maine)**

This paper improves upon previous contingent valuation studies of recreation benefits by relaxing the assumption of homogeneous preferences and accounting for the effect of pre-trip expectations for congestion. To test these hypothesis, a dichotomous choice contingent valuation model is estimated for day hikers in Maine's Caribou-Speckled Mountain Wilderness. The results show pre-trip expectations of congestion to have a stronger impact on willingness to pay the actual level of congestion, and that the willingness to pay of non-peak visitors are much more sensitive to congestion than peak season visitors.

**"Modeling the Demand for On-Site Time: New Theoretical Avenues for Addressing Recreational Behavior and Welfare" R.J. Johnston (Univ. of Rhode Island)**

Most recreation demand models make the implicit assumption that recreational behavior is adequately characterized by the observed number of trips to a site. These models cannot address situations in which exogenous changes do not influence the frequency of trips, or in which the number of trips is a poor measure of recreational quantity. In such cases, observed changes in on-site time may provide a better measure of recreational behavior and demand. This paper explores theoretical models that derive welfare-significant demand functions for on-site time. Two models are presented: a one-constraint model that derives standard welfare measures, and a two-constraint model that measures price, demand, and welfare entirely in time units.

**"A Hedonic Property Value Study of Water Quality in Maine's Lakes" H.L. James and K.J. Boyle (Univ. of Maine)**

This paper explores ways of modeling lake water quality in a hedonic-price equation using water clarity measurements. Four models of the water clarity measurement were used in the hedonic model. Although all of the water clarity variables were significant they showed very different marginal effects on property price. The marginal effect of water clarity measures varied between variables up to $16,000. These results indicate that empirical investigators should use caution when choosing readily available environmental quality variables in a hedonic equation, because the choice and measurement of the variable can effect benefit-cost analysis calculations and policy recommendations.

**"A Comparison of Structural Quasi-Structural, and Reduced Form Estimation of the Timber Harvest Decision" B. Provencher (Univ. of Wisconsin)**

This paper examines various estimable models of the timber harvest decision. Results demonstrate the need for caution in applying reduced form estimation techniques (typically logit and probit estimation) to data generated by a dynamic decision process.

# Changing Input Usage in Agriculture

(Chair: Bob Yonkers, Penn State Univ.)
**"The Environment and Economic Impact of IPM Adoption: A Preliminary Analysis"**
**J. Fernandez-Cornejo (USDA/ERS)**

This paper calculates the impact of Integrated Pest Management (IPM) on pesticide use, yields, product quality, and revenues for fresh tomato producers in eight states accounting for most of the U.S. production. The methodology used accounts for self-selectivity and simultaneity by expanding Heckman's two step method. Our preliminary results support the notion that among tomato growers IPM adopters apply significantly less insecticides than non adopters. Others advantages of IPM adoption appear to be increased yield and revenues and reduced variance of yields and revenues. A disadvantage appears to be the reduced product quality. Ongoing research will provide final conclusions.

**"Pesticides, Farm Programs, and EPA's Special Review Process: Distinguishing Regional Impacts of a Pesticide Cancellation" P. Szmedra (USDA/ERS)**

Federal regulatory actions against pesticide products used in agriculture aim to protect the public domain from unmitigated risk to human health and/or environmental degradation. These actions often have differing economic impacts on farmers within a particular region depending upon whether they are users of the pesticide in question. Interregional impacts can often times be significant as well. This paper reports the regional impacts of a possible regulatory action against the use of 2,4-D and the phenoxy class of herbicides in row crop production using partial budgeting and simulation analysis. Results indicate that farmers in the Southeast, Delta, and Appalachian regions using phenoxys and participating in farm programs would experience significant declines in per acre returns in the production of corn, sorghum, oats, and peanut as a result of decreasing yield and the increased cost of alternative weed control methods and materials.

**"Estimation of Technical Change Biases with Non-Stationary Data" J.S. Clark (Nova Scotia Agri. College) and K.K. Klein (Univ. of Lethbridge)**

Estimation of microeconomic relationships under the assumption that data are integrated processes is a neglected area of applied econometric research. This paper applies cointegration estimation of the derived demand for inputs. Given the assumption that time series data used to estimate input demands are integrated processes, testing for technical change biases using a time trend to measure technical change is equivalent to testing for non-deterministic cointegration. Conditional factor demands estimated using seemingly unrelated canonical cointegrating regression finds no technical change biases for central Canadian agriculture.

**"Seed Value and the Plant Variety Protection Act" M. Ollinger and M. Gill (USDA/ERS)**

This paper examines the impact of the Plant Variety Protection Act seed values. The major result is that the Plant Variety Protection Act has a positive but modest effect on seed values and farmer seed purchases. Results also suggest that relative crop value growth, the ease with which yield gains are achieved positively affect seed values.

# Economic Development Issues

(Chair: Tim Kelsey, Penn State Univ.)
**"A Shift-Share Analysis of Employment Growth in West Virginia and Massachusetts" T.G. Gebremedhin (West Virginia Univ.) and D.A. Lass (Univ. of Massachusetts)**

A shift-share was used to examine changes in the economies of industrial sectors in West Virginia and Massachusetts and make comparisons to changes in the national economy. The shift-share analysis decomposes employment growth in three components by farms, nonfarm establishments and government between 1981 and 1991. The results show that employment has decline in agriculture and related industries, manufacturing industrial groups and government sector. The results indicate that employment in West Virginia and Massachusetts decreased their share to total U.S. employment. Thus, state policy makers may wish to design appropriate development strategies to improve the competitiveness of local economies.

**"Economic Restructuring in the Northeast: Nonmetro Counties in a Changing Economy" K.S. Kreahling and S.M. Smith (Penn State Univ.)**

This study documents economic transitions from 1950 to 1990 in nonmetropolitan countries in the Northeast, and determines factors related to successfully maintaining employment. From 1950 to 1990, only 28 of 177 nonmetro counties had absolute employment declines. Average employment increase was 75 percent. The most successful counties experienced shifts to a services or diversified base. Less successful were counties initially extractive based, remaining in manufacturing, and initially in manufacturing. Other key influences were adjacency to a large metro area, a larger county urban population, higher levels of education (particularly after 1970), and an older population in the younger working age years. After 1970, the more rural counties were associated with greater success in increasing employment.

**"The Cyclical Nature of Industry Performance in the U.S. Food Manufacturing Sector" M.K. Field and E. Pagoulatos (Univ. of Connecticut)**

This paper provides evidence on the cyclical behavior of domestic price-cost margins for a panel of 42, four-digit U.S. food manufacturing industries from 1972 to 1987. A recent study found that price elasticity of demand behaves procyclically for this sector in the aggregate, but those industries characterized by high concentration and high import shares behave counter cyclically. Assuming an inverse relationship of elasticity and price-cost margin, this would suggest that price-cost margins move in an opposite direction along the business cycle, i.e. countercyclical in the aggregate and procyclical for concentrated industries with high import share. Using a fixed effects model we empirically confirm this response.

**"Agriculture in Delaware: An Economic Impact Analysis" R.V. Tanjuakio, S.E. Hastings, and P.J. Tytus (Univ. of Delaware)**

The relative size and make-up of agriculture have changed dramatically over the last century. Increasingly, more broad definitions of agriculture have emerged to emphasize the importance of agriculture to a state economy. To assess the impact of agriculture on the Delaware economy, IMPLAN, an input-output modeling software was used. Impacts under three definitions of agriculture were examined. The sector's total value-added (including indirect and induced effects) contribution ranged from 2.6% to 8% of Delaware's Gross State Product in 1991. Employment effects ranged from 19 jobs per million dollars of output to 27.

# Groundwater Protection and Management

**(Chair: Jim Opaluch, Univ. of Rhode Island)**
**"On-Farm Costs of Reducing Residual Nitrogen Use on Cropland Vulnerable to Nitrate Leaching" W.Y. Huang, D. Shank, and T. Hewitt (USDA/ERS)**

A farm-level dynamic nitrogen balance model is used to evaluate costs to farmers to reduce nitrogen fertilizer use on cropland vulnerable to nitrate leaching. Using the steady-state solution of the model, we show that it is indeterminate whether the cost to farmers to reduce nitrogen fertilizer use is higher or lower for cropland with high vulnerability to leaching. An Iowa case study, however, shows that cropland of a high-leaching potential has a smaller compliance cost than cropland of a low-leaching potential.

**"An Integrated Physico-Economic Model of Groundwater Protection" H. Besedina, J.H. Gorres, A.J. Gold, and J.J. Opaluch (Univ. of Rhode Island)**

This paper describes an integrated physical-economic model that was developed to analyze policies regarding aquifer protection from nitrate contamination. A key feature of the model is the ability to incorporate inherent uncertainties into groundwater protection. First, the physical model estimates a probability distribution on nitrate concentrations using the nitrogen fate model LEACHA and the Rhode Island Geographical Information System. Next, the economic model identifies least cost means of achieving chance constraints on aquifer concentrations, whereby policy is based on setting a maximum probability of violating a safety standard. Finally, the integrated model is used to evaluate various policy issues.

**"Economic Determinants of Local Efforts to Manage Groundwater Resources in Pennsylvania" C.W. Abdalla, W. Delavan, and A. Owino (Penn State Univ.)**

An analysis of factors affecting local government officials' efforts to manage groundwater resources was completed using categorical dependent variables representing attitudes concerning present and future management activities, perceptions of risk from groundwater threats and the importance of groundwater issues. The analysis pays specific attention to measures of communities' economic well-being and changes in this status as it affects ground water protection activities.

**"Costs and Benefits of Improving Water Quality in Southwestern British Columbia by Composting Livestock Wastes" R. Athwal (Nova Scotia Agri. College) and G.C. van Kooten (Univ. of British Columbia)**

The economic feasibility of composting is assessed by comparing private costs to social benefits-reduction of nitrate-nitrogen in water. Dichotomous choice, open-ended and defense expenditures models are compared and used to estimate willingness to pay for better water quality. Results from the contingent valuation models indicate that the benefits are not sufficient to cover the high losses livestock producers would incur by composting animal waste.

**"A Conjoint Analysis of Willingness to Pay for Changes in Groundwater Quality" J. Sparco (Univ. of Delaware)**

Sussex County, Delaware is heavily reliant on agriculture for income. Over 20% of private domestic wells in the county exceed the EPA standard for nitrate in drinking water. This paper uses conjoint analysis to estimate the marginal benefits of improvements in ground-water quality. In addition to nitrate concentrations, atrazine concentrations, bacterial contamination and risks-of-illness are included. Principal component and cluster analysis are used to capture the effect of respondents' attitude on the valuation decision.

# Management Alternatives in Production Agriculture

(Chair: Rick Wackernagel, Univ. of Vermont)
**"An Agricultural Production Diversification Model for Poultry Waste Management" S. Lam and R. Aull-Hyde (Univ. of Delaware)**

This article uses a mathematical programming model to determine the economic benefits of a representative broiler farm diversifying into grain crops. The model specifically considers the impact of using poultry manure as fertilizer for corn, soybeans and sorghum. Approximate rates of nutrient removal (nitrogen, phosphorus, and potassium) for these three crops were considered in the application of poultry manure as crop fertilizer. Results indicate that diversification generates significant savings in crop production cost, capital overhead cost and waste disposal cost.

**"The Impact of Risk Preferences on Crop Rotation Choice" L.J. Maynard, J.K. Harper, and L.D. Hoffman (Penn State Univ.)**

Stochastic dominance analysis of five crop rotations using 19 years of experimental yield data returned results consistent with current Pennsylvania cropping practices. The analysis incorporated yield risk, output price risk, and government commodity program participation. A two years corn, three years alfalfa hay rotation was dominant for approximately risk neutral and risk averse preferences, as was participation in government programs. Willingness-to-pay for government programs ranged from —$2.50 to over $25 per acre.

**"The Economics of Kenaf as an Alternative Bedding Material for Broiler Production" F.Z. Albay, C.M. Gempesaw, H.D. Tilmon, and G.J. Elterich (Univ. of Delaware)**

The economics of using kenaf core as an alternative broiler bedding material in a representative Delaware farm is evaluated in this study. This objective was achieved through the use of CHICKSIM III, a comprehensive, farm-level, stochastic, capital budgeting simulation model. The performance of specialized and integrated farms producing broiler, beef, corn, and kenaf were simulated. Results show that the use of kenaf core as broiler bedding material and the use of broiler litter as fertilizer and feed rationing ingredient can increase farm profit.

**"Comparison of Profitability, Risk, and Labor Requirements in Conventional and Low-Input Production Systems" J.E. Lindholm, J.K. Harper, M.G. Heberling (Penn State Univ.), and K. Kroll (Rodale Research Institute)**

Using 12 years of data from the Rodale Research Institute's Farming Systems Trial, comparisons of profitability, risk, and labor were made for three alternative production systems. The conventional system had the highest average profitability ($198.84/A), followed closely by low-input animal ($194.17/A). Low-input legume had the lowest average returns at $148.83/A. Stochastic dominance results indicate that a treatment in the conventional system dominated the others. Average labor requirements in low-input rotations were 21-56% higher than conventional rotations.

**"Revolutions and Revelations in Grain Revenue Insurance" K. McNew and B. Roe (Univ. of Maryland)**

With the signing of federal crop insurance reform, the issue of optimal futures and options use under different crop insurance policies remains. Optimal portfolios are simulated for Iowa and Maryland corn producers under different insurance contracts. Insurance compliments futures and options while inducing more futures than options in the portfolio.

# Fish Marketing and Production

(Chair: Rudy Nayga, Rutgers Univ.)
**"The Economics of a Large Scale Trout Hatchery in the Northeast Region" J.R. Bacon, C.M. Gempesaw, W.W. Lussier (Univ. of Delaware), and J.W. Dunn (Penn State Univ.)**

A case study was designed to evaluate the economic viability and regulatory impacts on a trout egg production facility in the Northeast region. The hatchery, designed to have the economies of scale to produce the production requirements for a large portion of the United States, was simulated using a dynamic, stochastic, capital budgeting simulation model. The results show that the trout hatchery would not be able to withstand a modest increase in price competition from hatcheries located in the West. Two scenarios were designed to capture the economic effects of animal health regulations. The shutdown scenario required the hatchery to cease production for two years to ensure eradication of a serious disease. Another scenario required the destruction of the trout eggs and the treatment of the brood stock. The economic simulation results show that it is better to shut down and correct a serious disease problem rather than try to continue to operate and experience the destruction and loss of production due to a violation of a regulatory policy. The results illustrate the importance of examining the economic impacts of present and potential regulatory policies on aquaculture operations.

**"Characteristics of Frequent Seafood Purchasers: At-Home and Restaurant Purchases by U.S. Consumers" G.P. Rauniyar, G. Hanson, and R. Herrmann (Penn State Univ.)**

Factors affecting the frequency of purchase of seafood for at-home and restaurant consumption were investigated. A nationwide sample of adult men and women was questioned in telephone interviews. Purchase for at-home and restaurant use were reported more frequently by respondents with more formal education from households with higher incomes and no younger children present. Positive perceptions of fish also were related to more frequent purchases of seafood. In addition, respondents who were older, non-white, urban/suburban residents were found to be more frequent purchases for at-home use. In contrast, whites were found to be more likely to be frequent purchasers. Region of residence also was found to affect purchase frequency.

**"Consumer Attitudes Toward the Safety of Farm-Raised Fish Products and Seafood Inspection" J.R. Bacon, C.M. Gempesaw, U.C. Toensmeyer, and C. Robinson (Univ. of Delaware)**

A logit procedure was used on data from a mailed survey, to assess factors influencing consumers' attitudes toward seafood. The EATMORE model indicated by targeting higher income consumers, increased seafood consumption is attainable. The FEELSAFE model revealed that consumers would feel safer eating farm-raised fish that were branded and contained nutritional labeling. The FARMRASE model revealed that consumers with at least some college placed less value on "farmraised," while older consumers indicated its importance. The INDGOV model showed those with a high school education or less preferred industry-controlled inspection, while consumers from urbanized areas favored governmental inspection given the choice.

**"A Conjoint Study of Mid-Atlantic Retailer Preferences for Aquaculturally Produced Finfish" C. Fraiz, C. Halbrendt, Q. Wang, and J. Pesek (Univ. of Delaware)**

Conjoint analysis is used to examine retailer preferences toward major attributes of tilapia, Atlantic salmon, rainbow trout and catfish. Purchase price and freshness are found to be important attributes in the product preference rating for all four fish species. Furthermore, larger fish size is preferred for Atlantic salmon and tilapia but smaller fish size is preferred for catfish and rainbow trout.

# Issues in Non-Market Valuation

**(Chair: Mike Bowker, USDA/FS)**
**"Measuring the Differences in E(WTP) When Dichotomous Choice Contingent Valuation Responses are not Independent" G.L. Poe (Cornell Univ.), M.P. Welsh (HBRS, Inc.), and P.A. Champ (USDA/FS)**

Dichotomous choice contingent valuation surveys frequently elicit multiple values in a single questionnaire. To the extent that responses are correlated across scenarios, the standard approach of estimating willingness to pay (WTP) functions independently for each scenario, and then evaluating differences in mean WTP distributions across scenarios can provide biased estimates of the actual difference in mean WTP values. This paper develops an alternative bivariate probit approach that explicitly accounts for correlation across responses in the estimation of WTP and mean WTP distributions. Correlation across responses is found to have an effect on the significance of mean WTP difference tests.

**"Zero Bidders and Payment Vehicles in Dichotomous-Choice, Contingent-Valuation Studies—A Bivariate Probit Analysis" H.F. MacDonald and K.J. Boyle (Univ. of Maine)**

A bivariate probit model reveals that respondents reporting a zero value (zero bidders) in a dichotomous-choice, contingent-valuation analysis do not occur randomly within the sample. This suggests that the latent c.d.f. is spiked at zero. Consequently, welfare estimates derived from a conventional dichotomous-choice model with be misleading. In addition, an examination of the effects of alternative dichotomous-choice payment vehicles indicates that payment vehicles involving voluntary contributions result in significantly lower willingness-to-pay estimates than those from a referendum.

**"Psychological Foundations of Nonmarket Resource Values" T.A. More (USDA/FS), J. Averill, and T.H. Stevens (Univ. of Massachusetts)**

In this paper, we view nonmarket resource values from a psychological perspective. Nonmarket values arise because natural resources play important roles in furthering human goals. This goal perspective contrasts with intrinsic value—the idea that natural objects have value as ends in themselves regardless of their relationship to man. Because of the lack of precise definitions, elements of intrinsic value are often mixed with existence value, creating confusion in the literature. These resources values need to be examined on a logical as well as an empirical basis. We argue that careful scrutiny reveals problems with both existence value and intrinsic value so that it is possible to question their role in policy formation and analysis.

**"The Economics of Ground Level Ozone Control in Connecticut" B.T. Heninger and F.A. Shah (Univ. of Connecticut)**

In Connecticut and the entire Northeast, both stationary and mobile sources are major contributors to the region's air quality problems with ground-level ozone. A cost minimization model is developed to allow a closer examination of the tradeoff in emissions control between stationary and mobile sources. Regulators exercise control over total emissions from stationary sources, but typically only control emissions per mile from mobile sources, taking vehicle miles of travel as given. Using data from Connecticut, it is shown that controlling vehicle miles of travel (through a gasoline tax policy) can significantly reduce the social cost of emissions control.

# Land Use and Farm Land Preservation

**(Chair: Doug Morris, Univ. of New Hampshire)**
**"Sustaining Environment Benefits in the Northeast: An Evaluation of the Conservation Reserve Program" P.J. Parks and J.P. Schoor (Rutgers Univ.)**

A conceptual model is developed to analyze agricultural land owners' decisions to continue agricultural use, to participate in conservation programs, or to sell land. The model supports an economic study of participation in the Conversation Reserve Program by Northeastern land owners. Results identify significant differences between metropolitan and nonmetropolitan counties in the region, and indicate that the Conversation Reserve Program is relatively unimportant to agricultural land owners in metropolitan counties. If environmental benefits are desired in metropolitan counties, alternative policies (e.g., purchase of development rights, zoning legislation) may be required.

**"Conflict at the Rural/Urban Interface: Mushroom Farms in a Suburbanizing Environment"**
**T.W. Kelsey and L. Singletary (Penn State Univ.)**

Farmland preservation programs have broad general support from the public, but this does not necessarily translate into support for farming itself. This study examines the conflict between farmland preservation and one traditional farm type in a rapidly suburbanizing country. The study found that the size of the farm and the number of homes nearby were significant factors for explaining which mushroom farms receive complaints. The results suggest that simply preserving farmland may not avert the loss of traditional agriculture in suburbanizing areas, and that it is important to clarify what the public specifically desires to protect with farmland preservation program.

**"Effectiveness of Use-Value Assessment in Preserving Farmland: A Search-Theoretic Approach"**
**E.M. Tavernier (Rutgers Univ.) and F. Li (Johnson & Johnson)**

The framework of search theory is applied to question of land price determination and the effectiveness of use value assessment in preserving farmland. The search model developed is empirically tractable and supports the findings of past land market studies. The results suggest that farm income, uncertainly and distribution of future offer prices play an important role in land price determination and farmland preservation through their effects on the reservation price of farmers.

**"A New Way Around NIMBY? Testing the Facility Siting Credo" J.M. Halstead and T.C. Walker (Univ. of New Hamsphire)**

This paper examines the so-called "siting credo" for its usefulness in helping to address the siting dilemma. Specifically, this study examines three principal issues: first, can the results of previous analyses of the siting credo be replicated? Second, will the results of applying the credo differ by type of facility examined? That is, in identical communities, might the credo "work" for a composting facility but fail for a hazardous waste incinerator? Finally, statistical issues in past empirical studies of the credo are examined.

**"Preserving Agricultural Land with Farmland Assessment: New Jersey as a Case Study" P.J. Parks and W.R.H. Quimio (Rutgers Univ.)**

A conceptual model links agricultural profits, capital gains, interest rates, and property taxes to the sale of agricultural land by profit-maximizing owners. The model motivates an empirical analysis of New Jersey data form 1949–1990. Results suggest that nonagricultural considerations may overpower the economic incentives provided by such policies as farmland assessment. Consequently, alternative policies (e.g., purchase of development rights, land use zoning) may be needed to sustain agriculture in rapidly urbanizing areas.

# Dairy Marketing and Production

(Chair: Jim Dunn, Penn State Univ.)
"Agricultural Finance Extension with FINPACK: Application to Intensive Grazing" L. Cunningham and G. Hanson (Penn State Univ.)

FINPACK financial management software was utilized in a study of intensive grazing on dairy farms. Several implications for extension programming design are developed including the importance of: establishing standards for the new technology, sequential adoption of technology, focus on specific production "Bottle-necks," development of on-going extension input and effectively communicating across the gap that frequently exists between research conditions in university experiment stations and resource and management limitations on typical farms. The statistically representative study results are among the first showing intensive grazing was profitable. Example fact-sheet information from the study is provided to illustrate the scope of study results.

"Analysis of Fluid Milk Consumption Using a Demand System with Binding Non-Negativity Constraints" B.W. Gould (Univ. of Wisconsin)

An application of the Wales and Woodland's demand system is applied to U.S. fluid mild demand. We improve upon their application by using household survey data encompassing a wide geographical area, allowing for price variability and the direct incorporation of such prices into the model. We also improve upon their analysis by using a data set which covers an entire year of household purchases, avoiding possible problems of infrequency-of-purchase and ensuring that zero expenditures represent actual corner solutions.

"Stochastic Frontier Estimation of Dairy Farm Efficiency and Analysis of Associated Factors" A. Elbehri, S.I. Gripp, and R.D. Yonkers (Penn State Univ.)

A stochastic econometric model was applied to measure technical efficiency using survey data from a sample of Pennsylvania dairy farms. Efficiency estimates for individual farms ranged from 48.9 to 99.4 percent, with a majority of sample farms operating close to full efficiency. A censored regression model with 18 farm characteristics explained 43 percent in efficiency variation. Several management variables and farm factors were significantly associated with efficiency. This paper also discusses methodological implications for dairy farm efficiency analysis, with emphasis on the type of data sets and the choice of variables in empirical applications of efficiency.

"Seemingly Unrelated Regression with Unequal Numbers of Observations: An Application to Hedonic Pricing of Milk Components" W.J. Gillmeister, R.D. Yonkers, and J.W. Dunn (Penn State Univ.)

The standard seemingly unrelated (SUR) model assumes an equal number of observations across equations. This paper develops a generalized form of the SUR model for an unequal number of observations across equations. It also proposes a test for testing the null hypothesis of no contemporaneous correlation across equations. The SUR model for unequal observations and the associated hypothesis test is then applied to a hedonic price model for estimating the value of milk components. The results show that contemporaneous correlation exists among the markets analyzed. Also, water receives a positive value unlike the zero value assumed in many studies.

**"Landlord and Farm Operator Returns: A Comparison Using Farm-Level Data" C.B. Dodson and R. Dubman (USDA/ERS)**

Returns received by landlords on cash leases are compared with farm operator returns using USDA's Farm Costs and Returns Survey. While landlord returns exceeded operator returns for all farms, farm operator returns tended to be greater than landlords for farms with annual sales over $1 million. Using a PROBIT analysis, farms with returns greater than landlords were found to be larger, more productive, more diversified, and more likely located in the South and West. Also, operators of these farms were more reliant on farm income and less likely to be under 40 years of age.