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Abstracts

Contributed Papers

Production Economics (Larry L. Bauer, Clemson University)

"Impact of Risk Averse Behavior on Fertilizer Demand for Tame Forages." C. Richard Shumway (Texas A&M University) and Tesfaye Gebremeskel (Texas Southern University).

The impact of risk aversion on factor demand is examined. Nitrogen fertilizer demand schedules are derived from a risk-constrained linear programming model of a Texas Gulf Coast Beef producer in which profit maximizing and lexicographic utility functions are alternatively assumed. Demand curves derived from the latter are substantially steeper and elasticities are lower than for the former at high prices. At low prices little difference is evident. The demand curves intersect at a nitrogen price of \$.25 per pound, but responsiveness to price increases is very different. This finding in the higher price range is consistent with the hypothesis normally identified with supply that the schedule is steeper for risk-averse than risk-neutral producers.

"Agricultural Residues as an Alternative Energy Source." Cecil Oursbourn, Ronald D. Lacewell, Wayne LePori and William P. Patton (Texas A&M University).

The costs of collecting and transporting agricultural residues from the field to hypothetical energy conversion plants is calculated for the High Plains region of Texas. This cost is then compared with the price of natural gas to determine whether or not it is economically feasible to convert those residues into fuel. The analysis indicates that at the current price of natural gas it would probably be infeasible to convert wheat, corn and grain sorghum into fuel. The cost of transportation and collection alone amounts to between \$1.27-\$1.45 per million BTU. If the cost of purchasing and converting the residue is above \$0.55-\$0.73 per million BTU, the fuel will be more expensive than conventional fuel.

Cotton residue is already collected at the gin, thus no collection costs are incurred. The cost of transporting gin trash to a central location amounts to about \$0.28 per million BTU. As much as \$1.72 could be expended in conversion and indirect costs and still leave gin trash competitive with natural gas. If gin trash is used at the gin to dry cotton, it has the advantage of being available in sufficient quantity,

where and when it is needed. A drawback is that it requires pollution abatement equipment.

"The Demand for Gasoline and Diesel Fuel in Agricultural Use in Virginia." Oral Capps, Jr. and Joseph Havlicek, Jr. (Virginia Polytechnic Institute and State University).

The purpose of this article is to determine the demand relationships for gasoline and diesel fuel in agricultural use and to identify and assess the major factors that affect these relationships. Asymptotically efficient, asymptotically normal, and consistent parameter estimates were obtained by use of a generalized least squares (GLS) procedure in combining cross-sectional and time-series data. The agricultural sector in Virginia adjusts to changes in economic factors and other variables influencing the demand for gasoline and diesel fuel. This adjustment has an important implication for policymakers, fossil energy producers and distributors, and farmers. Farmers are responsive to increases in the real price of gasoline and diesel fuel when given time, specifically 9 to 15 months, to adjust their use patterns.

"Production of Young Bull Beef." Cecil W. Davison and Ronald R. Miller (USDA, Washington, D.C.)

Data from 14 reports on British breed bull-steer experiments involving 947 head of cattle were used in GLS regressions. Bulls gained 15.0 percent faster and were 13 percent more efficient in feed conversion, 7.1 percent heavier at slaughter, and two thirds of a grade lower than steers. Dressing percentages were not significantly different.

"Price, Yield and Income Variability for Selected Georgia Crops." Melvin E. Walker, Jr., and Kuang-hsing T. Lin, (Fort Valley State College, Fort Valley, Georgia).

The concept of "the coefficient of variation" was used to estimate and compare the price, yield, and income variability of 15 crops grown in Georgia. The variate difference method was applied to isolate and estimate the random component of the variability of these time

series. When applying the method, the authors chose the 1 percent level of significance in hypothesis testing and let the data at hand dictate the order of differencing to be performed on each series.

The estimated random variability coefficients show that on the average horticultural crops are much more price-variable than field crops. The yield variability is about the same for these two groups of crops on the average. As a result, vegetables involve somewhat more income risk, as measured by the relative variation of detrended gross revenue, than field crops, as expected.

"Sediment Delivery and Farm Production Costs - A Multiple Objective Analysis." William G. Boggess and John A. Miranowski (Iowa State University), Klaus F. Alt (ERS, USDA), and Earl O. Heady (Iowa State University).

Society is becoming more aware of the impacts of agricultural cropland sediment on environmental quality and is including these impacts in land and water resource analyses. Yet, many environmental impacts occur outside the market place and are unvalued. To incorporate these nonmarket impacts as well as the internal market elements, society is faced with maximizing a multiple-objective social welfare function.

This study illustrates a multiple goal approach applicable to land and water resource project analyses. It explicitly confronts the valuation of the environmental impacts of sediment and determines the implications of various relative weights placed on the components of the objective function. The results allow quantification of the tradeoff curve (efficient frontier) between the two objectives and estimation of the marginal cost curve for controlling sediment. This information can then be provided to decision makers for use in project evaluation.

"Labor Income: Management Item Response Comparisons Among Farms with Less Than 100 Hectares in BADEN-WURTEMBERG, SWITZERLAND, AND SOUTHERN ILLINOIS." J.H. Herbst (University of Illinois).

Farmers' ratings of various management factors were obtained in three regions, with mean differences tested for significance. Data were obtained or calculations made to determine family farm workers' labor income from farm and off-farm work. Labor income from farming for 1974/75 was higher for most of the Swiss and German farmers than for southern Illinois farmers on these operations of less

than 100 hectares. However, the southern Illinois family members on the farm had higher earnings from off-farm work than farm family members working on the Swiss and German farms.

Agricultural Policy (Earl A. Stennis, Mississippi State University)

"Effects of the Price Support System for Soybeans: A Retrospective Analysis Using a Monthly Econometric Model." R. McFall Lamm, Jr. (ERS, USDA, Washington, D.C.).

The original objective of the price support system was to establish minimum prices to stabilize farm income. The objective of this paper is to present the results of an analysis designed to determine the stabilization effects of government activity in the soybean market in the late 1960's and early 1970's. The central focus of the study is on retrospective policy analysis, but the implications of the study are applicable to future developments in the soybean market and to other commodities.

A monthly econometric model consisting of 10 equations is used to perform the analysis. Simulated time paths are generated by the model with and without the price support system in effect. A comparison of the distribution statistics for each simulated time series indicated that government intervention stabilized the price of soybeans and soybean products without affecting mean price levels to any great extent. This result was consistent with the design goals of the price support program.

"Analysis of the 1976 Tax Reform Act Current Use Farmland Valuation Provisions: Implications for U.S. Agriculture." Stephen F. Matthews and Randall Stock (University of Missouri).

Farm Estates will benefit in lower federal estate taxes on account of the current use provisions for farmland in the 1976 Tax Reform Act. Most bona fide farmers will be able to qualify their estates, with the maximum benefit being a reduction in the size of the adjusted gross estate of \$500,000. Average per acre value reductions for market value range from 25% to over 50% depending upon the state.

This new provision will tend to encourage existing farmland owners to retain ownership until their death, with the heirs benefiting from a reduced federal estate tax. Recapture provisions covering a fifteen-year period further decrease the likelihood that existing farmland owners will sell to aspiring young farmers other than close family members.

"Effects of EEC Agricultural Policy on European Imports of Meat, Dairy Products, and Eggs." Angelos Pagoulatos and David Debertin (University of Kentucky), and Emilio Pagoulatos (University of Missouri-St. Louis).

The quantitative effect of the "variable levy" protection system in the European Community is estimated on the basis of an econometric model describing the operation of markets for meat, dairy products, and eggs in the EEC. The estimated model contains 21 behavioral and 5 technical relationships and is based on annual data for the 1953-72 period. Simulating with the model under free trade conditions and comparing with observed trade values indicates that the adoption of "variable levies" has stimulated imports from other common market members and has led to considerable trade diversion away from non-EEC sources. Furthermore, trade diversion was particularly severe in the case of butter and milk, for which the degree of protection has been the highest.

"Measurement of Allocative Biases of Production Control Policies." Bob Weaver (Pennsylvania State University).

Design of production control policies depends upon an understanding of their impacts on production decisions. Measurements of these impacts on relative input utilization and output supply are derived from estimates of the parameters of an expected profit function which is consistent with expected profit maximizing choice on multiple product, multiple input agricultural firms. These measures, based upon a post-war time series of state level aggregate revenue, total farm expense, and price data in North and South Dakota, suggest that although wheat and feed grain acreage controls during the quota years were not Hicks' neutral in their impacts on resource allocation and output mix, the magnitudes of their biased impacts were not large. The bias toward the use of fertilizer instead of other variable inputs was found to be less than 3%. Wheat allotments led to a substitution of materials for capital services and petroleum products, capital for petroleum products and all variable inputs for labor. Similar results were found for the impacts of feed grain bases.

"An Analysis of Farmers' Response to the Commodity Credit Corporation's Loan Problem." Ronald R. Miller, William H. Meyers, and Michael A. Landcaster (ERS, USDA, Washington, D.C.).

The behavioral pattern of farmers' response to the Commodity Credit Corporation loan program is analyzed under various assumptions

about price certainty, cash flow requirements, and institutional constraints. This analysis is used to identify variables for inclusion into an econometric model which can be utilized to forecast quantities of crops put under loan with the CCC and to determine the effect of government policy instruments on loan activity.

Empirical applications of the model are presented for corn and wheat. The results indicate producer responsiveness to CCC loan rates and interest charges as well as to market prices, private interest charges, market price volatility and price expectations. The elasticities of the policy variables, CCC loan rate and interest charge, are 4.18 and -0.93 for corn and 3.65 and -0.93 for wheat, respectively. The fitted equations are used to forecast loan activity for the 1977/78 crop year.

"U.S. Grapefruit Exports and Japanese Trade Restrictions." Ronald W. Ward and John Tang (University of Florida).

A seemingly unrelated regression model for the domestic and export demand for fresh grapefruit is used to analyze the effect of Japanese trade restrictions. Volume restrictions and embargoes by Japan lead to supplies that must be absorbed in the domestic and other markets. Substantial losses are shown to occur as various levels of volume quotas by Japan are evaluated.

"Inflation and Farm Firm Growth." George F. Patrick (Purdue University).

Inflation's effects on resource accumulation of farm firms are analyzed using a simulation model. Alternatives are specified, budgeted using expectations, and anticipated outcomes are evaluated in relation to multiple objectives in the model. Inflation affects prices, costs, asset values, expectations and other relationships. Three initial resources were simulated deterministically and stochastically with different levels of management and varying assumptions about inflation.

Differences in the impact of inflation depended largely on the farm's initial resource position in the deterministic simulations. With limited initial resources, 3 percent annual inflation substantially reduced the net worth accumulation and operator's capital investment. For the intermediate resource farmers, real net worth accumulation was not greatly affected, but operator capital investment was reduced by inflation. High resource farmers generally benefitted from inflation in both real net worth and capital investment. Introducing price and yield variability through stochastic simulation led to generally lower net worth accumula-

tions. Managerial ability was important in enabling the firm to attain acceptable levels of satisfaction. If land prices and costs of production increase more rapidly than agricultural prices, resource accumulation is again reduced and the importance of managerial ability in survival of the firm increases.

Community Development (J. Martin Redfern, University of Arkansas)

"A Community Population Potential Model for Manufacturing Plant Location." B. L. Dillman, Wm. Edward Twilley, and J. S. Lytle (Clemson University).

Rural development policy-makers require knowledge concerning community factors and conditions for industrial growth. Secondstage location factors for manufacturing plants are difficult to identify because they are highly correlated and often confused with regional factors. Many second-stage factors are correlated with total population, its density and its proximity. This paper investigates the possibility of developing equations for predicting community industrial employment and wages using a distance-weighted population variable, population potential. Precise data sets for South Carolina, locating all communities, manufacturing plants and CED populations by geographic coordinates allowed political boundaries to be depreciated for analytical purpose. Population potential was found to be a good single-variable predictor of industrial location, far superior to community census population. Coefficients of determination were increased substantially by controlling for geographic subarea and for types and sizes of manufacturing plants using dummy variables.

"Household Counterstream Migration: Are Migrants Universally at a Disadvantage?" Leon B. Perkinson (ERS, USDA, North Carolina State University).

Households migrating into a small rural area had higher average household incomes than nonmigrant households. But migrant households were headed by persons who were both younger and more educated than nonmigrant household heads on the average. Multiple regression results indicated migrant households had 15 percent less income in 1974 than nonmigrant households holding age, education, and other characteristics constant.

The results of this study were consistent with those found from analyses of rural to urban migration. The explanations for rural to urban migrants having lower incomes than urban nonmigrants tend to be expressed in terms of rural migrants having inferior skills

or experience, inferior quality of schooling, or general problems associated with an origin in an economically disadvantaged area. With the study area being a rural area, in the South, and with a history of high net out-migration, such rural to urban explanations need additional evaluation. Or perhaps there may be a more general theory of migration than is frequently assumed; a theory that is not tied to geographic specification of origin or destination, vis a vis, rural vs. urban status. Are migrants' incomes lower, *ceteris paribus*, regardless of direction of migration.

"An Area Economic Development Impact Model for Extension Application." James R. Nelson (Oklahoma State University).

Estimates of income and employment impacts of development in an area or community can be very useful to local businessmen as they evaluate the effects of development on their businesses and thus on their own economic wellbeing. Estimates of the impacts of development on local tax revenues are important to local government officials and others concerned with the provision of public services.

A model which can be used by field extension personnel or community leaders to evaluate the potential impacts of economic development on a particular area or community is presented and demonstrated. Economic base and location quotient theories are applied in the model to estimate basic employment and nonbasic employment for an area, and to estimate the expected change in total employment resulting from a change in basic employment. Once such economic base information has been estimated, it can be coupled in the model with available data on population, income, and local tax structures to answer many questions about the effects of development on the area and its residents.

The model can be applied legitimately to any geographic area for which data are available. Because of its simplicity the model is particularly applicable at the municipality and county levels. Results from operation of the model should be useful to local decisionmakers, including businessmen, economic development planners, industrial developers, and local government officials.

"An Analysis of Rates of Change in Community Per Capita Income Using Discriminant Analysis." Steve Murray (Oklahoma State University).

The ability of the linear discriminant function in its Bayesian formulation to identify characteristics that distinguish between com-

munities in Arkansas in which incomes are growing rapidly and in which incomes are lagging is demonstrated. The same set of variables used to account for differences between slow- and fast-growing cities in Arkansas is applied to Oklahoma to test the validity of the model. Under proper circumstances, the results could be used for predictive or prescriptive purposes.

"Community Growth: Alternative Measures of Fiscal Impact." Kenneth C. Clayton (University of Florida).

There is a great deal of interest by community decision-makers in the assessment of costs and benefits associated with their community's growth. A critical component in all such analyses is the fiscal or public sector budget effect.

Three alternative measures for projecting fiscal impacts are presented in this paper. These include (1) per capita coefficients, (2) simple predictive equations based on population, and (3) expanded predictive equations incorporating several explanatory variables. Each is developed for the case of total annual operating expense and applied to a community growth scenario.

It is concluded that while per capita coefficients are simplest, they do have certain shortcomings. Simple predictive equations based on population are useful when per capita coefficients become inappropriate. In certain situations, moreover, expanded predictive equations incorporating additional explanatory variables can provide even better projections.

"Adapting Shift-Share Analysis to Rural Development Planning." Gerald Marousek (University of Idaho).

Shift-share analysis of employment changes in a local economy can be used as an early stage planning tool in rural development. The paper describes the adaptation of shift-share analysis to the ten-county area of northern Idaho. The model and its modifications are presented, along with a discussion of its attributes. The analysis segregates employment change in relation to total economy growth, total industry growth and local industry growth. Results revealed that the study area has had employment trends in tune with the state, region and nation, but an economic base heavily dependent upon industries with declining employment. Some of the latter, however, showed a competitive employment advantage within their respective industries. These relationships, along with favorable employment trends in several service industries,

suggest a dualistic planning strategy. Attention should be given both to developing and expanding growth industries, and to maintaining or increasing the competitiveness of high-employment natural resource-based industries in the area. The ability of shift-share analysis to measure employment change in a localized area in relation to the larger economy may alter the direction of local development efforts. For example, support and revitalization of existing competitive industries may sometimes take precedence over efforts to attract unknown new industries.

"The Relationship Between Economic and Demographic Variables for Non-Metropolitan Southern Counties, 1970-1974." Thomas F. Davis (ERS, USDA, Washington, D.C.).

This study analyzes the performance of Southern non-metropolitan counties regarding income, employment, population growth, and net migration, 1970-1974. A comparison of these data with similar data for other regions shows that Southern counties, in general, had larger income gains than any other area. Yet, examination of the South at the county level points up the fact that many non-metropolitan high-income growth counties have shown small population gains while many low-income growth counties have demonstrated large gains in population.

These observations run counter to theories that suggest a positive correlation between income and population growth. By analyzing the types of counties that have made substantial changes in population, two partial explanations for this contradictory behavior were developed. As the population has grown older and retirement benefits have become more generous and numerous, retired people who move "...go disproportionately to non-metropolitan locations, especially areas accessible to water ... scenery, or a favorable climate. They create business and employment, yet are not constrained by the need for employment themselves."

Therefore, it would appear that people were "pulled" into certain counties in the non-metropolitan South by a set of influences stronger than the past prevalent income or employment forces. Perhaps they seek preferable environment and living conditions or different activities and people. These migration motives play a significant role in explaining the inverse relationship between income and population growth.

Another partial explanation of this indirect relationship focuses on the source of income growth. Counties whose largest source of change in total personal income was from farm

operations or transfer payments and property do not typically generate incentives for job seekers to migrate into this type of county due to limited job opportunities.

Agricultural Finance and Farm Decision Making (Rudie W. Slaughter, ERS, USDA, University of Missouri)

"Projecting New Money Requests for the Baltimore Federal Intermediate Credit Bank." C. McCheyne Swortzel and Robert B. Jensen (Virginia Polytechnic Institute and State University).

A short term forecast model is developed for use by the Baltimore FICB in estimating their new money requests two months in advance. New money requests are the difference between new loans made and paydown.

New money requests were forecasted by estimating two separate equations, one for new loans made and one for paydown. Ordinary least squares was used to estimate the parameters. Results of the estimation are reported.

The forecast model developed in the study accounts for 83.59 percent of the monthly variation within the data base in new money requests. Tests of the model include Theil's inequality coefficient, turning point analysis, and forecasting beyond the data base. The results of these tests indicate that the model's estimates closely track actual new money requests. Due to the presence of multicollinearity, the individual effects of the independent variables are not identified. Multicollinearity was not a concern, however, since the model is to be used exclusively for forecasting.

In addition to the statistical results, a computerized forecasting program is developed. The program can be used to predict new money requests for the Baltimore FICB to months in advance. It incorporates the results of the research into an easy to use package requiring a minimum of user supplied input.

"A Firm Financial Simulation Model for Grain Elevators and Their Sideline Activities." Robert L. Oehrtman (Oklahoma State University).

This paper first describes a computerized financial simulation model which was developed for use by management of country grain elevators and farm supply firms to aid long-range planning and decision making. Second, an application of this long-range planning and decision making aid is presented using actual firm data to show a few of the capabilities of the model.

"Use of the Computerized Transition Plan in Evaluating Interest Rate and Equity Level Effects on Dairy Farm Survival." James B. Kliebenstein and Scott S. Sifferman (University of Missouri).

Interest rates and equity levels are two factors that are of concern to farmers. They can be important in the survival of the farm. In this report, the computerized transitional plan is utilized to evaluate interest rate and equity level impacts on dairy farm survival. The transition plan is a computerized decision model that evaluates different farm factors over time on a year-by-year basis rather than using the expected average for the time period. Examples of factors calculated are return to labor and management, cash flow, cash available for alternative uses after servicing of debt and balance sheets. The computerized transition plan was found to be quite useful in evaluating interest rates and equity level effects on dairy farm survival.

"Issues Involved in Using Computerized Decision—Marketing Models with Farmers." Larry D. Jones, David L. Debertin and Charles L. Moore, Sr. (University of Kentucky).

This paper outlines three basic issues that states must consider before using computerized decision-making models with farmers. These issues were identified from our experiences using an advanced linear programming model with grain farmers. One issue is creating an awareness with clientele of what a computer can do to help solve management problems. A theme that needs equal billing is what a computer cannot do. Many producers do not realize that computer hardware is not sufficient to solve a problem—that computer software must also be developed. A second issue revolved around whether the development and extension of models should be publicly financed or user funded? The final issue examines the merits of bringing farmers into a central workshop in close proximity to a computer versus decentralizing computer access by using remote terminals. Based on our experiences we concluded that computerized decision-aids can be effectively used with farmers. Implementation of these programs is costly necessitating the likelihood of joint public and user financing. Effective delivery of computer management aids will likely consist of a mix between central workshops and remote terminals.

"Problems Encountered When Using Public Outlook Information in Bayesian Analysis." Joseph E. Williams (Oklahoma State University).

One of the most widely discussed and researched topics during the present decade has

been "risk and uncertainty." Considerable progress has been made in theory, modeling, application, and description of decision making under uncertainty. Additional emphasis is also being placed on the need for farm managers to incorporate planning and outlook information into decision making processes.

This paper contains a discussion of some of the problems and solutions to problems encountered when public information was incorporated into an economic decision model designed to assist cattle feeders in making production-marketing decisions.

Problems were encountered when interpreting forecasts that contained a range of values, extended periods of time, and qualitative terms concerning prices or seasonal aspects of time. Additional problems concerned the lack and availability of required outlook information when needed.

Even though problems were encountered with the outlook information, the accumulated net return to the cattle feeder who incorporated outlook information into the economic decision model was \$109.86 per head capacity greater than the cattle feeder who followed a "naive" decision model during the two-year sample period.

"Impact of New Technology on Polynomial Cost Functions: An Example Using Cotton Gins." M. Dean Ethridge (Texas A & M University).

Firms are continually confronted with alternative technological innovations for which a primary incentive to adopt is the potential for reduced per-unit production costs within relevant ranges of output. Theoretical effects of technological change on cost functions are considered. Average cost functions are estimated for U.S. cotton gins, emphasizing effects of capacity utilization, plant size and location. Then efficiency gains from an experimental automatic seed cotton feeding system are assessed in terms of reduced average ginning costs. Results indicate ginning volumes necessary for taking advantage of increased processing efficiency, thereby allowing lower per bale costs by investing in this new technology.

"Characteristics, Resources, and Farm Opportunities of Small Farm Operations." David R. Orden and Dennis K. Smith (Virginia Polytechnic Institute and State University).

A study of selected small farm operators was recently completed in Virginia. Field survey data were collected from 121 small farm operators located in two counties. The purpose of the

survey study was to identify the agricultural resources, management practices, income sources, future plans, farm problems, and potential production of the operators surveyed. The farm operators differentiated on the basis of age with the older farmers dependent on fixed non-farm transfer payments and with plans to expand their farm operations. In contrast, younger farmers were dependent on non-farm employment income and planned to decrease their farm operations. Variations in the use of recommended management practices were analyzed and found to be significantly related to such variables as the annual value of farm sales, the use of the extension service, and the amount of off-farm work. Potential increases in farm incomes were estimated restricting each operator to their present resource base and farm enterprises and the yields of the top 25 percent of the surveyed farmers. Variations in the proportion of potential income presently being realized were analyzed and found to be significantly related to the operator's age, future farming plans, years or residence on the farm and the use of agricultural assistance agencies. Small farm policy implications support increased programs for older farmers to improve their economic well-being.

Agricultural Marketing (Marc Johnson, Oklahoma State University)

"Pricing and Price Reporting Problems of the Meat Industry Proposed Remedies and Implications." Willard F. Williams (Texas Tech University).

Institutionalized pricing systems, consisting mainly of forward formula pricing schemes, have been growing in popularity in the meat industry for more than a decade. They are employed primarily on carlot sales within the "mainstream" of the industry between packers and large scale retail buyers. Although formula pricing satisfies industry needs for an operationally efficient pricing system, it also produces serious pricing and price reporting problems. With high percentages of the beef and pork purchased by chain retailers now moving on a forward formula basis, the eligible population base for price reporting has been severely restricted. The system also increases incentives for manipulation of reported prices employed in the formulas. Formula pricing "on the sheet" is spreading to the livestock sector. Nine different alternative solutions are examined in this paper. Of these, outright prohibition against forward formula pricing seems to offer superior advantages.

"Peanut Market Structure: An Analysis of Its Influence Upon Peanut Trade-Offs."

James N. Trapp (Oklahoma State University).

The first significant changes in the peanut program in more than 20 years are contained in the Food and Agricultural Act of 1977. In anticipation of the changes expected to be forthcoming from the new program, the author presents an analysis of the effect of changing peanut marketing quotas and/or support prices on producer income, peanut consumer surplus, and government program costs.

The analysis consisted of developing isobudget, isoconsumer surplus, and isoincome surfaces. The surfaces were estimated by use of optimal control techniques in conjunction with a peanut demand model. By alteration of the objectives sought and the restrictions placed on permissible controls, i.e. policies used, the optimal control solutions could be used to develop relationships between combinations of policy variables (support price, marketing quotas, and program budgets) and the estimated resulting producer incomes and consumer surpluses.

Conflicts were found among peanut producers, peanut consumers, and taxpayers. No peanut policy changes can be made without harming at least one of these groups. The tradeoffs involved among these groups, as associated with various policy changes, are described and graphically displayed.

"A Risk-Programming Analysis of Alternative Coordination Arrangements in Beef Packing." Katherine S. Miller and Ronald Raikes (Iowa State University).

Shifts in the relative importance of alternative coordination arrangements between agricultural producers and first-handlers and particularly shifts from spot market transactions to forward contracts or vertical integration, may have substantial impacts on the control of agricultural production and thus may be the target of policy actions. One approach to the problem of identifying trends underway in the relative importance of alternative arrangements is to focus on the coordination-arrangement decision problems faced by individual firms. In the study reported in this paper the coordination-arrangement decision problem faced by a first-handler was formulated by using a multi-period, parametric quadratic-programming model.

A model of a representative beef-packing firm was developed. Four alternative arrangements for procuring feed cattle were included in the model: spot purchases, purchases through forward contracts, custom feeding, and packer feeding. Cash flows for

coordination alternatives were found to be autocorrelated and this was taken into account in computing variances of present values of returns.

A major conclusion is that given the dominance of spot transactions in sales of beef carcasses and byproducts a trend away from reliance on spot purchases of fed cattle and toward vertical integration is not likely, especially for risk averse packers.

"Price, Marketing Margins, and Structural Change in the King Mackerel Marketing System." Fred J. Prochaska (University of Florida).

Size of marketing margins and level of producer prices for king mackerel have received considerable industry and legal attention during the decade of the seventies. Dissatisfaction with prices and margins caused market structural change in the form of marketing cooperatives and associations and brought about legal action. To provide economic interpretation of the problem, the author analyzed the effects of supplies of raw product and marketing inputs, terminal market prices, and structural change on marketing margins and producer prices for the 60-month period from January 1971 through December 1975.

New York terminal market prices had positive equal effects on marketing margins and producers' prices. Fishermen's supply of fresh fish had significant positive effects on margins and negative effects on fishermen prices. Supplies of marketing services had no significant effects on either prices or margins. The structural change acted to reduce marketing margins and increase fishermen prices significantly. Effects of the structural change were shown to depend on the length of time after the initial shift in market structure because of continued shift in the market structure.

"Quarterly Broiler Price Forecasting Models." Stephen L. Haynes (Louisiana State University), and David E. Keyyon (Virginia Polytechnic Institute and State University).

The purpose of this study is to develop easy to use price forecasting models to predict broiler prices one, two, and three quarters in advance. The models are true forecasting models in that all values of the independent variables are estimated or known when forecasts are made. The ability of the model to forecast was evaluated outside the data base used to estimate the equations. The results indicate all three models predict better than no-change extrapolation. The models predicting broiler price two and three quarters in advance predicted better than the futures market.

"The Non-Market Economies' Balance of Payments: Implications for U.S. Agricultural Exports." James Jones (University of Idaho).

This paper addresses the problem of the communist economies' balance of payments pressures and implications for further growth of U.S. agricultural exports. It is argued that balance of payments pressures on the part of the nonmarket communist economies represent a possible bottleneck on future growth of U.S. agricultural exports. Nonmarket economy currency inconvertibility in international transactions is discussed from the standpoint of how it constrains trading activities and creates biases towards instrumenting trade through bilateral arrangements. Political and trade barriers imposed by the U.S. on imports from the non-market economies are discussed from the perspective of how such "beggar thy neighbor" policies impede those countries' efforts to obtain the financial means to procure U.S. agricultural products.

"A Study of the Impact of Three-Party Program on European Demand for U.S. FCOJ." Jong-Ying Lee (University of Florida).

An econometric model is used to measure the impact of Three-Party Program on European demand for U.S. frozen concentrated orange juice (FCOJ). The results show that the program has helped sell FCOJ to European countries, and it was more profitable to have spent the money on the program than it would have been to divert it to the domestic market. Also the results suggest that the program is an economically preferred way of generating additional exports compared to using price reductions to achieve additional sales.

Resource Economics (Leo J. Guedry, Louisiana State University)

"Economic Value of the Coastal Zone: Estimates for a Tidal Marsh." Gary D. Lynne and Patty D. Conroy (University of Florida).

The tidal (salt) marsh is an integral part of the coastal area of the United States, especially for Florida. Rapid increases in economic activity have threatened the very existence of such marsh areas in the state. A conceptual model is developed to form the basis for estimating economic value of a tidal marsh to the fishery. Service to this industry is one of the important types of values generated by tidal marshes. A preliminary estimate of the marginal value of marsh area to the fishery was \$7 per acre.

"Economic Rents Attributable to Virginia's Coastal Wetlands as Inputs in Oyster Produc-

tion." Sandra Batie and James R. Wilson (Virginia Polytechnic Institute and State University).

Recent federal and state legislation requires permitting agencies to consider the benefits of the natural services of tidal wetlands (e.g., feeding habitats for fish and wildfowl) when deliberating whether or not to allow the alteration of specific coastal wetlands. This requirement to weigh the benefits associated with nonmarket services of wetlands has stimulated interest in obtaining monetary evaluations. However, market-generated prices on which to base estimates of natural wetland values are inaccurate or absent; some form of shadow pricing is needed.

This research provides estimates of the economic values from one natural wetland service: Chesapeake Bay oyster (*Crassostrea virginica*) production. A Cobb-Douglas production function for oyster production in 17 Virginia counties was estimated by use of ordinary least squares. This function was used to calculate marginal value products accruing to natural wetlands providing inputs to oyster production. These estimates then were discounted at the discount rate of 10 percent to obtain present value estimates accruing to natural wetlands in oyster productions. Marginal present value product estimates ranged from \$1,414 to \$11. All estimates were associated with large 95 percent confidence intervals.

"Bioeconomic Modeling of the Gulf Shrimp Fishery: An Application to Galveston Bay and Adjacent Off Shore Areas." Vito Blomo, Kenneth Stokes, Wade Griffin, William Grunt, and John Nichols (Texas A & M University).

A methodology is developed whereby economic evaluations can be made of a common property resource, the Gulf of Mexico shrimp fishery. The evaluations encompass changes in institutional parameters and maximization of annual rent to the resource. A Quasi-Newton nonlinear optimization procedure is applied to a bioeconomic simulation of the brown shrimp fishery in the Galveston Bay system and an adjacent offshore area to maximize annual rent. The results indicate significant changes in annual rent and catch over a baseline when days fished for the shrimp fleet are reallocated seasonally.

"Planning Ambulance Services for a Rural Emergency Medical Service District." Joseph F. Schmidt (ERS, USDA, Stillwater, Oklahoma), Robert L. Oehrtman (Oklahoma State University), and Gerald A. Doeksen (ERS, USDA, Stillwater, Oklahoma).

A procedure is described which merges the out-

put of a transportation model and a budget analysis. This combination provides policymakers with capital and operating costs and quality of service data for alternative location of emergency medical service.

The procedure is illustrated by analyzing an ambulance service problem faced by policymakers in Latimer County, Oklahoma. A special emergency medical service district has been formed along county lines, and an advisory board must determine operating policies and procedures for the countywide ambulance system. The procedure provides policymakers with information pertaining to optimum locations(s) of a number of ambulance facilities under alternative objective functions, as well as indicators of quality of service (response time) and costs of operation for each location.

Results from the procedure can assist policymakers in their final decision, as the data allow them to compare costs and quality of service for various locations.

"Systematic and Unsystematic Risk of Rates of Return Associated with Selected Forest Products Companies." James E. Hotvedt (Virginia Polytechnic Institute and State University), and Philip L. Tedder (Oregon State University).

A statistical model resulting in a "characteristic line" is used to separate total risk in the rates of return of five large integrated forest products companies into their systematic and nonsystematic risk components. Risk analysis of this kind provides a means of estimating the degree of fluctuation or variation of investments in relation to the market as a whole. Development of the model is discussed and its parameters and statistical results interpreted. Total risks associated with the companies were similar, and their rates of return were found to be stable in relation to the market rate of return. The part of total risk accounted for by systematic, nondiversifiable risk ranged from 12.3 to 35.6 percent. These findings are comparable with results of studies of hundreds and other companies.

"Welfare Implications of Price Variability." John E. Ikerd (Oklahoma State University).

Maximization of market surplus (consumer surplus plus producer surplus) is consistent with maximization of utility from a given level of resource use and productivity. Apparent gains for consumers and producers from variable prices are actually the result of in-

creased levels of resource use or productivity in the case of consumer gains from supply shifts and income transfers from consumers to producers in the case of producer gains from demand shifts. The foregoing conclusions are not dependent on such restrictive assumptions as a closed economy, identical demand and supply curves among time periods, zero storage costs, etc. However, with the often cited model of two time periods with identical downward sloping demand curves and identical upward sloping marginal cost curves, concave from above, both consumer surplus and producer surplus will be maximized by equal prices in each time period. The analytical tools provided in this paper may provide the theoretical basis for further study of the welfare implications of price variability. Questions concerning buffer stocks, storage costs, value of market information, and other time-oriented questions also are compatible with this approach. The framework is appropriate for analysis of any two interdependent markets regardless of whether they are related by form, space, possession, or time.

"Food Stamp Redemptions: Forecasting the Government's Liability." William T. Boehm, Michael Belongia, Masao Matsumoto (ERS, USDA, Washington, D.C.).

The Food Stamp Program (FSP) has grown substantially since it became part of permanent legislation in 1964. Since FY 1973, nearly \$33 billion in coupons have been issued. While the U.S. Government is technically liable for the redemption of all coupons issued, the liability is not effected until the stamps are used and then presented to the U.S. Treasury for payment. Therefore, redemptions would not be expected to equal issuance.

The research reported in this paper is an attempt to identify both the extent of coupon loss (or nonuse) and the length of the lag between issuance and ultimate redemption. The results indicate that about \$230 million of the stamps issued since 1970 have not yet been presented for payment. Further, the results show that while most coupons are used in the month they are issued, about 35 percent of the issued stamps are not presented for redemption at the Treasury until one month following issuance. Lags in the redemption process therefore appear to be the result of lags in the banking system clearance process. Statistical models which are potentially valuable for use in managing the food coupon redemption account are presented and discussed.