
Topics Available for Thesis Research in
Agricultural Economics

Purdue University

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PHILIP C. ABBOTT

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Institutional Innovation in the Cocoa Trade	IITA/USAID
MS/PhD	Food Security Following Trade Liberalization	ERS USDA

Institutional Innovation in the Cocoa Trade

Chocolate manufacturers and cocoa producers argue that the world cocoa market has become “broken”, with a wide gap between farmers’ incentives and consumer demand for quality. One factor may be the elimination of state marketing agencies in West Africa, allowing multinational cocoa processors (ADM, Cargill and Barry Callebaut) to exercise market power against both farmers and chocolate manufacturers. Other factors may be changes in consumer information and preferences, yielding increased willingness to pay for the environmental or social attributes of production processes. An important issue related to cocoa trade and social attributes of production, driving the overall USAID effort now, is child labor. This study asks whether and how the introduction of new marketing institutions (e.g. identity preservation, Fair Trade, mega-cooperatives) can help the world cocoa market become more competitive, aligning farmers’ incentives with consumers demand, and addressing social concerns related to cocoa production.

Food Security Following Trade Liberalization

Many developing countries fear that with trade liberalization they have given up tools to address both chronic and acute food insecurity. Hence, food security is prominent in their WTO negotiating positions on agriculture. But economists argue that trade liberalization should enhance food security, enabling imports to offset production shortages. The purpose of this research is to determine how governments address long-run chronic and short-run acute food insecurity, and whether that has changed as a result of the considerable trade liberalization already undertaken by developing country food importers, largely due to conditionality of structural adjustment programs. Lessons will also be drawn for the design of future trade policy reforms that could further impact food security.

CORINNE E. N. ALEXANDER

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS	Evaluation of Farmer Benefits from Transgenic Corn Modified to Control for Corn Rootworm	Potential

Currently, corn rootworm management consists primarily of controlling larvae using crop rotation and soil insecticides. In the mid 1990s, the use of insecticides on corn after soybeans has increased dramatically, from 10% in Indiana in 1994, to 65% in 1996. This is an interdisciplinary project with entomology and weed science. The economic portion has two components. First, a cost-benefit analysis will be used to identify the maximum potential benefit from the transgenic corn. The economists will collaborate with the entomologists, weed scientists and growers to identify the cost differences both in terms of materials, and changes in labor costs. Second, a survey will be used to identify those growers who are most likely to adopt this transgenic corn, taking into account corn rootworm pressure, current control methods, and marketing opportunities.

TIMOTHY G. BAKER

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Risk Management	Pending
MS/PhD	Financing and Hog Contracting	Maybe
MS/PhD	Stochastic Dominance	No
MS	Machinery Cost	No

Risk Management

This project is to provide the background research for the department's risk management extension work. Essentially risk management alternatives are to be identified (marketing alternatives, hedging, crop insurance, diversification, revenue insurance, etc.), then the probability distribution of returns under the various alternatives will be determined.

Financing and Hog Contracting

This is a joint project with the University of Illinois. A survey of lenders attitude toward lending for contract vs. independent production has been completed and a simulation model is being built. There is the possibility that a student could define a thesis topic that would complement the work under way.

Stochastic Dominance

The literature on stochastic dominance includes the work by Jack Meyer on stochastic dominance with respect to a range of risk aversion. Meyer's procedure uses a range of coefficients of absolute risk aversion. There is little agreement in the literature on the relevant range of absolute risk aversion, and many times stochastic dominance is performed on returns per acre and returns per dollar invested. This research is to rework the method of Meyer to use relative risk aversion. There is much less controversy regarding the range of relative risk aversion, and some of the problems associated with multiplicative gambles are alleviated.

Machinery Cost

This project is to use the machinery repair and remaining value equations in the literature to determine the marginal cost of using machines. Such costs are very relevant in the partial budgeting situations that frequently arise. The current literature contains frequent reference to average costs, but the marginal cost is often inaccurately assumed to be equal to the current repair cost per unit of use (without considering future repairs, remaining value, and trading time).

JOSEPH BALAGTAS

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
PhD	Economics of GM-free Labels	None yet
PhD	Fruit & Vegetable Planting Restrictions	None yet

Economics of GM-free Labels

Monsanto's recombinant bovine somatotropin (rbST) technology is one of the so-called first generation genetically modified technologies, a genetically engineered hormone that increases milk production when administered to dairy cows. The FDA has approved rbST for use in the United States, but consumer advocates and some dairy farmers and processors have argued that potential animal and human health risks associated with rbST warrant caution, and that consumers have a right to know if they are consuming milk from cows treated with rbST. Indeed, dairy demand studies have found that some consumers are willing to pay for non-rbST milk. However, milk from cows treated with rbST is indistinguishable from non-rbST milk; that is, non-rbST is a credence attribute. Thus, absent some mechanism to overcome the information asymmetry, the market would supply less non-rbST product than is socially optimal.

The signaling mechanism in use in the U.S. is voluntary labeling; dairy processors may use labels that indicate that a product was produced from milk from cows that were not treated with rbST. Voluntary labeling has been shown conceptually to lead to increased provision of credence attributes, increase choice for consumers, and increase consumer welfare. However, in the case of U.S. dairy markets, non-rbST labels appear to have had the opposite effect on consumer choice. In recent years, major milk processors including Dean Foods, Wal-Mart, Costco, Kroger, and Starbucks have begun to sell only non-rbST dairy products, requiring that the cooperatives and dairy farmers that supply milk to their plants not use rbST. Thus, contrary to the predictions of the extant literature, voluntary labeling of non-rbST has not expanded consumer (and producer) choice, and has made at least some consumers (those indifferent to the rbST technology) worse off.

The purpose of this research is to explain the unexpected effects of voluntary non-rbST labels, and to evaluate the consequences for consumers and dairy farmers. This project will incorporate microeconomic theory as well as empirical methods in order to evaluate the effect on provision of rbST and non-rbST products under voluntary labeling, and the implications for consumer and producer welfare. More generally, this research explores the economics of food labels and supply and demand for food attributes.

Fruit & Vegetable Planting Restrictions

Current U.S. farm programs make payments to farmers based in part on historical base acres planted in particular program crops, including corn, soybeans, cotton, etc.

Eligibility for payments requires that farmers not plant horticultural crops on such base acres. The fruit and vegetable planting restriction on base acres potentially influences planting decisions, and thus has been challenged successfully in the WTO for trade distortions. However, the extent to which the planting restrictions influence planting decisions remains to be debated, and is ultimately an empirical question. Similarly, the extent to which planting restrictions are trade-distorting is also an empirical question that has yet to be settled. This research involves econometrics and partial equilibrium simulations to model and measure the economic effects of the F&V planting restrictions in U.S. policy.

JAMES BINKLEY

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
PHD	Self Control in Food Consumption and Obesity: Food at Home and Away	Purdue Research Foundation

A self-control problem occurs when present behavior does not accord with a rationally chosen desired future outcome. In economics this has been variously modeled as “hyperbolic discounting” and as a principal agent problem. These models explain why consumers often make commitments in the present to certain forms of future behavior. Voluntary restriction on future choice serves as a mechanism to impose self control before the fact by increasing the time between decision and consumption. Examples abound in personal finance. For example, buying a home is often cited as a method of forced savings.

Self control problems are especially relevant to food consumption. In the obesity debate, one economic study attributes much importance to the role of innovation in reducing the time for food preparation and thus the delay before consumption. “People with self-control problems respond more to the ready availability of food than people without such problems.” One such innovation is the vast growth in the restaurant sector and the availability of a large variety of highly palatable, reasonably-priced offerings. In the case of home consumption there is a significant delay between choosing foods in the supermarket and final consumption of the meal. A shopper may be able to resist fattening foods simply because consumption will occur in the future. Refusing to purchase these items imposes a restriction on future behavior. “Dieters try not to keep cheesecake in the refrigerator.” This mechanism is not available when dining out: the delay between decision and consumption is nearly eliminated, and giving in to temptation is likely for someone with self-control problems.

This project will investigate the importance of self-control by mining several large USDA data sets. In particular, data on individual food intakes will be used to measure and compare behavior in restaurants and when dining at home, and to relate differences to variables related to self control, especially weight status (BMI). A second possibility is to use commercial household “homescan” panel data purchased by USDA to examine home food consumption. For example, if diminishing time between food purchase and consumption is causing consumers to choose tasty, calorie-laden foods, frequent shoppers would be expected to buy more such items than “major trip” shoppers.

MICHAEL D. BOEHLJE

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Industrialization and Vertical Coordination in the Agricultural Sector	No
MS/PhD	Strategic Risk, Assessment and Management for Agribusiness Firms	No

Industrialization and Vertical Coordination in the Agricultural Sector

Significant changes are occurring in the agricultural sector — changes often described as the industrialization of agriculture. One of these changes is increased use of alliances, contracts and negotiated coordination between the various stages of the food chain. As quality and other product attributes become more important and valuable to consumers, and technology for producing and measuring these attributes develops, the benefits of negotiated coordination are likely to increase. The objective of this project would be to evaluate the efficiency gains, transactions costs, and quality impacts of changing technology to measure quality and other product attributes, and changes in market coordination systems in the markets for nutritional and industrial products in the agricultural sector. Results will be useful in anticipating both structural changes in the sector and strategies that agribusiness companies may adopt to increase efficiency and market share. (in collaboration with Allan Gray)

Strategic Risk Assessment and Management for Agribusiness Firms

The accelerating speed of change in the food and agribusiness industries is resulting in more risk and uncertainty – the future is becoming much less predictable. Not only is the future more uncertain, the drivers of that uncertainty are also changing – strategic risk which generally has a low probability of occurrence, but large consequences, is becoming an increasingly important component of the decision environment. Managing these risks requires not only new assessment tools such as scorecarding and mapping, but also more systematic decision frameworks that can be best structured as decision trees. And managing time to redefine a strategic choice in an uncertain environment into a growth, divest, exit, pause or follow-on option that truncates the loss exposure and allows capture of the profit potential transforms strategy under uncertainty from a defensive posture of minimizing losses and protecting positions to an offensive posture of creating and capturing value. This work would expand the risk assessment tools and techniques typically used in agricultural economics to include strategic risks, options analysis and scorecarding and mapping and the application of these tools and concepts to the development of strategy for agribusiness firms. (in collaboration with Allan Gray).

JOHN M. CONNOR

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/ MS/PhD	Cartel Efficiency	Possible
MS/PhD	Determinants of Cartel Recidivism	Possible
MS/PhD	Is the Deterrent Effect of Imprisonment Exaggerated?	Possible
MS/PhD	Is there a Threshold Degree of Concentration for Cartel Formation?	Possible
MS/PhD	The Harshness of Corporate Cartel Sanctions I	Possible
MS/PhD	The Harshness of Corporate Cartel Sanctions II	Possible
MS/PhD	Trade Associations	Possible
MS/PhD	Cartels and Controlled Market Experiments	Possible

Cartel Efficiency

Maybe the Lerner Index is not the best measure of cartel pricing effectiveness. From the Overcharges sample, find studies that calculated both the Lerner Index and the monopoly price (e.g., Roeller and Frode 2006). The ratio of the two I call cartel pricing efficiency. Create a proxy from hundreds of observations of average and peak cartels prices in the PFO data set. Explain why it varies using variables that capture market, internal cartel structure, and temporal variables. Further, what public policies might encourage low cartel efficiency, which is a desirable policy goal.

Determinants of Cartel Recidivism

Bosch and Eckard (1991) found that 14% of all US cartelists convicted during 1962-1980 were recidivists, but they did not study their characteristics. Recidivism in any field of crime is a direct measure of the failure of legal sanctions to deter that crime, including price fixing.

From the Private International Cartel (PIC) data set, we have a continuous measure of recidivism the hundreds of repeat offenders in 1990-2006. There are about 500+ firms with two or more violations. What company, industry, or geographic/cultural variables explain variation in recidivism frequency? Can comparing recidivists to a portfolio of one-time violators reveal predictable characteristics of recidivists?

Is the Deterrent Effect of Imprisonment Exaggerated?

Hammond (2006) and many other American criminal-law cartel enforcers believe that prison sentences are more effective at deterring cartel recidivism than fines. Maybe it's a cheaper form of deterrence (uses fewer agency resources?). Other antitrust officials, mainly in Europe, assert that only high corporate fines will deter cartel formations. But they too are concerned that fines are becoming politically unacceptable.

Optimal deterrence theory is clear that a dollar of sanctions in one jurisdiction is equivalent to a dollar imposed elsewhere. Is there a way to measure the trade-off or complementarity of the alternative (corporate vs. personal) sanctions? One possibility is to assign monetary values to the opportunity cost of foregone income and freedom of jailed executives. From the recidivism model above, one could test the relative size of negative (probably lagged) effects of real corporate fines (specific deterrence), industry-wide fines (general deterrence), and the number of individuals fined or (even better) the number of months of incarceration imposed on conspirators.

Is there a Threshold Degree of Concentration for Cartel Formation?

Some authors/models (e.g., Selten) predict formation when the number of cartelists (with minimum degree of supply control?) falls below 5 or 6. Philips and Ferris say it is $HHI=1667$. Dick has different, more complex HHI hypothesis. Using either PFO or PIC data, we can test the relative predictive power of these alternative hypotheses.

The Harshness of Corporate Cartel Sanctions

For the US, EU and Canada, examine the determinants of the variation in the fine/sales ratios using whole cartels as units of observations; for the US, also look at the settlements/sales ratios. See Geradin and Henry (2005) as a model that will be easy to surpass. Are the ratios rising over time, and do changes in policies (e.g., leniency awareness) or political regimes (Presidential in the US, Commissioners in the EU) have explanatory power? Are fines higher in the EU if preceded by a US finding of guilt? Do joint raids have an effect? Do settlements rise if timed after a criminal conviction? Do they vary by court Circuit or District? What explains the larger number of firms convicted in settlements compared to criminal? [Repeat for sanction/damages ratios?]

Cartels and Controlled Market Experiments

Starting with Marco Haan's (2005) survey of laboratory experiments that involve collusion with full communication, derive parameters of factors that facilitate cartel formation or that have significant positive effects on the equilibrium market price. Compare the predictive value of these parameters with the same parameters from "real world" observed cartels in the PIC data set.

Craig Dobbins

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Drivers of Indiana Farmland Values	None
MS/PhD	Economics of Cropping Systems	None

Drivers of Indian Farmland Values

Research has shown that farmland values are influenced by both agricultural earnings and nonagricultural factors. One possible project in this area would be to identify those factors that are important in determining the value of Indiana farmland and in forecasting their future value.

An important source of income to an investor in farmland is the rent received from a tenant. Over time, the most common type of lease used for farmland rental has shifted from a crop-share lease to a fixed cash rent lease. With the upward spike in commodity prices, there is increased interest in using a flexible cash lease or other type of lease that adjust automatically to such unexpected surprises. This project would explore various types of lease arrangements and determine how the terms of a flexible lease may shift the risks and rewards for the tenant and landlord.

Economics of Cropping Systems

The technologies associated with the cropping systems used in the Midwest continue to evolve. Questions have arisen regarding the appropriate application rate for nitrogen fertilizer on corn. The use of corn grain and plant cellulose for ethanol production has raised questions about the appropriate crop mix. The development of controlled drainage and underground irrigation systems has raised questions about the profitability of such systems. This project could explore one or more of these issues associated with cropping systems.

OTTO DOERING

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
1. MS	Resource Policy, Conservation and Water Quality Issues, Energy and Biofuel Issues for Agriculture	Unsure
1. MS	Energy, Renewables, New Technology and Energy Policy	Limited

Resource Policy

The areas of interest here include water quality issues related to agricultural production affecting such things as the dead zone in the Gulf of Mexico. Also included here are water issues stemming from biofuel production coupled with land use issues stemming from increased crop and biofuel feedstock production. There may also be an opportunity to work on economic issues related to reactive nitrogen pollution and trade-offs in nitrogen use. There is no firm funding at the moment.

Energy

There may be limited funding to work on projects dealing with a range of energy related subjects. Much of the work will be related to renewables and assessment of new technology. Conservation and energy policy issues will also be involved. Such work would likely be done jointly with other faculty in the Department and faculty in other Departments. There is no firm funding at the moment.

RAYMOND J.G.M. FLORAX

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
PhD	Modeling Spatial Dynamics in Regional Economic Growth	Likely (CRD)
PhD	Meta-analysis in Economics: Does Publication Bias Distort our View of the World?	Possible
PhD	The Impact of Spatial Spillovers in Complying with Environmental Regulation	Possible

Modeling Spatial Dynamics in Regional Economic Growth

Data availability at relatively low levels of spatial aggregation has contributed to the use of spatial econometric techniques in the study of economic growth. Although the utilization of such techniques is proliferating, their application has been rather mechanical and explicit links to theory are oftentimes not very well developed. This project focuses on analyzing regional economic growth data (for US counties, with a special emphasis on the Mid West and the state of Indiana) in comparison to NUTS 2 regions in Europe. The theoretical emphasis includes developing a link to the New Economic Geography literature, where a strong emphasis has been put on the relevance of agglomeration economies. In addition, the development of a link between the literature on economic growth and income (in)equality, for which specific spatial econometric techniques are available, will be pivotal. A potential extension of the project could focus on the development and use of appropriate econometric techniques to analyze space-time data.

Meta-Analysis in Economics: Does Publication Bias Distort our View of the World?

Meta-analysis centers on the use of statistical tools to analyze and summarize an existing body of empirical literature. The technique was originally developed in the context of experimental sciences, but its use in economics is quite extensive nowadays and includes publications in high quality journals. The merits of meta-analysis in the economics profession are, however, not necessarily undisputed and two issues are rather prominent in the assessment of the pay-off of meta-analysis. One issue focuses on the assessment of the validity of the technique in a non-experimental (or quasi-experimental) setting, which is relevant for large parts of the economics literature. The other concerns the potentially distorting role of publication bias, which has been raised some ten years ago by Card and Krueger discussing the impact of minimum wages. The main purpose of this project is to assess the potentially distorting role of publication bias in meta-analysis in economics. Specific objectives of the project include: a) a theoretical and conceptual analysis of selective sampling and publication bias, b) a review of basic statistical indicators that have been used to test for publication bias, c) the development of a statistical test in a meta-regression framework, and d) the determination of the impact of publication bias in a prominent empirical literature.

The Impact of Spatial Spillovers in Complying with Environmental Regulation

Spatial spillover effects are at the core of many areas of applied economic research. For instance, in trade theory, economic growth, location theory (including Foreign Direct Investment), rural-urban linkages, etc. In environmental economics spatial spillovers are relevant as well, but their impact has not been very thoroughly investigated. Exceptions include work on the environmental Kuznets curve, the valuation of air quality, and hedonic pricing models. This project focuses on modeling spatial spillovers in environmental economic models. The project centers in particular on determining the impact of spatial spillovers in complying with environmental regulation (e.g., set maximum values for air pollution). Spatial spillovers are likely to be relevant both with respect to economic development of an area as well as with respect to air pollution, making a systems approach desirable. Concurrently, several problems related to the spatial sampling design of air quality data need to be tackled, for instance, because it is not uncommon that air quality monitors are located in relatively polluted areas only.

KEN FOSTER

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
PhD	Time Series Testing of Market Power	Yes
PhD	Monte Carlo Valuation of Investment Options	No

Time Series Testing of Market Power

First order conditions for profit maximization suggest that input prices and the value of marginal product should be cointegrated regardless of the degree of competition. However, the first order conditions for oligopolistic firms lead to very different hypotheses about the value of the cointegrating vector versus those of the perfectly competitive firm. While the methods for testing these hypotheses have been worked out, they are tedious to apply and the connection between market power and the cointegrating vector has not been previously addressed in the literature on market power. Furthermore, the traditional structural models used for testing market power suffer from multicollinearity and specification bias, and data driven time series specifications can alleviate these problems to some degree.

Monte Carlo Valuation of Investment Options

Recent developments by Brody and Glasserman using monte carlo methods to value options and derivatives make it easier to estimate option values where the stochastic process does not necessarily follow Brownian Motion. Closed form solutions do exist for other classes of stochastic process, but these processes are restrictive. This research would focus on using time series methods to estimate discrete approximations to the stochastic processes of interest and use Brody and Glasserman's monte carlo approach to value important agricultural investment or policy options such as farmer investment in cooperative processing.

JOAN FULTON

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Economic Implications for Producer Investments in Value-Added Business	No
MS/PhD	Structural Change in Cooperatives and Agribusiness: Joint Ventures, Strategic Alliances and Mergers	No
MS/PhD	Word of Mouth Marketing	No

Economic Implications for Producer Investments in Value-Added Business

This research addresses one of the critical issues the industrialization of agriculture poses for producers. Part of the industrialization process involved forming more tightly aligned supply chains that extend from the producer through the first handler to the processor or potentially the retailer. Examples of these organizations include New Generation Cooperatives, limited liability companies, as well as joint ventures and strategic alliances. The purpose of this research is to identify the returns and risks for producers who take the initiative in the formation of food supply chains through investment in value-added first handling, processing or other downstream activities. Key success factors associated with value-added businesses will be identified as part of this research. The results will be useful for producers as they consider significant capital investment in value-added processing.

Structural Change in Cooperatives and Agribusiness: Joint Ventures, Strategic Alliances and Mergers

The structure of all sectors of agribusiness is currently undergoing rapid change, including increased consolidation due to mergers, acquisitions, joint ventures and strategic alliances. This research will explore the structural changes in agribusiness, related to mergers, acquisitions, joint ventures, and strategic alliances, and identify the driving forces behind the reorganizations as well as the factors that contribute to the success of the new structures. The objectives of the research are to (1) analyze theoretically and develop a model of the structural change that is currently occurring in cooperative and investor oriented agribusinesses with particular emphasis on mergers, acquisitions, joint ventures and strategic alliances, (2) continue with the database development of the mergers, acquisitions, joint ventures, and strategic alliances that have occurred in the United States among cooperative and investor oriented agribusinesses at the regional and national level during the 1990s. In addition to listing the partners involved in the restructuring the database will contain the driving forces behind the reorganization as well as the factors that contributed to the success and/or failure of the reorganization. (3) perform empirical analysis of the data, draw conclusions and identify implications for agribusiness decision makers and policy makers.

Word of Mouth Marketing

In the changing, industrialized agriculture agribusiness firms are looking for new and innovative marketing approaches in order to remain competitive. One method of marketing that has not been the subject of a lot of research is word of mouth marketing. This research will examine how agricultural producers respond to different types of word of mouth marketing. Producers who have been part of a structured program (often a facilitated teleconference) will be interviewed to determine how effective the marketing program was. Demographic factors, associated with the participants, as well as characteristics of the program that have the greatest influence on success will be identified. The results of this research will be useful to agribusiness firms as they adapt their marketing programs to meet the changing economic conditions.

ALLAN W. GRAY

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/Ph.D.	Industrialization and Vertical Coordination in the Agricultural Sector	None
MS	Understanding Large Commercial Producer Buying Behaviors and Attitudes	Possibly

Industrialization and Vertical Coordination in the Agricultural Sector

Significant changes are occurring in the agricultural sector — changes often described as the industrialization of agriculture. One of these changes is increased use of alliances, contracts and negotiated coordination between the various stages of the food chain. As quality and other product attributes become more important and valuable to consumers, and technology for producing and measuring these attributes develops, the benefits of negotiated coordination are likely to increase. The objective of this project would be to evaluate the efficiency gains, transactions costs, and quality impacts of changing technology to measure quality and other product attributes, and changes in market coordination systems in the markets for nutritional and industrial products in the agricultural sector. Results will be useful in anticipating both structural changes in the sector and strategies that agribusiness companies may adopt to increase efficiency and market share. (in collaboration with Mike Boehlje)

Understanding Large Commercial Producer Buying Behaviors and Attitudes

Every 5 years the Center for Food and Agricultural Business conducts a survey of large commercial producers regarding the input purchase behaviors and attitudes. The new survey will be conducted in January of 2008 with new data available by April of 2008. This dataset can be used to explore a number of issues associated with large commercial producer buying preferences. In the past research has been conducted on producer brand loyalty, segmentation of producers according to preferences for various attributes of the marketing bundle, and producer preferences for distribution channel linkages. Many other questions related to producer buying behavior remain and the dataset provides a rich source to explore these questions.

Jess Lowenberg-DeBoer

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS	Impact of Cowpea Storage Technologies in West and Central Africa	Gates Foundation
PhD	Biotechnology and the Economics of the Seed Sector in West Africa	NGICA &/or AATF

Impact of Cowpea Storage Technologies in West and Central Africa

Purdue and its partners in Africa are engaged in a ten country effort to disseminate the use of non-chemical cowpea storage technologies in West and Central Africa (<http://news.uns.purdue.edu/x/2007a/070606FultonGates.html>). Cowpeas (*vigna unguiculata*) are known as “blackeye peas” to most Americans. They are particularly susceptible to insect damage in storage. Insecticides can be used to control the storage insects, but in Africa the insecticides are often unavailable locally, too expensive for farmers, or if available and affordable frequently misused by illiterate growers. Every year the media in Nigeria reports illnesses and deaths linked to misuse of storage insecticides on cowpeas. Purdue faculty and researchers in Cameroon and Senegal have developed low cost and effective non-chemical alternatives to storage insecticides. (<http://www.entm.purdue.edu/entomology/research/cowpea/Extension%20bulletins/english.htm>). The objective of this research would be to measure the change in adoption of cowpea storage methods linked to the extension effort and factors that make the extension effort more (or less) effective. This research involves surveys to in several West and Central Africa countries, plus analysis using economic surplus methods and logistic regression. The surveys will focus on cowpea storage practices, economics of cowpea storage and how storage practices are influenced by extension communication.

Biotechnology and the Economics of the Seed Sector in West Africa

In West Africa the formal seed sector is not well developed. Most of the public sector seed system built in the 1970s and 1980s has collapsed. Only a few countries have for-profit seed companies (e.g. Ghana, Nigeria) and those companies are struggling. The main off-farm source of seed is from non-governmental organizations (NGOs), but they are not perceived as the long term solution. Seed sector underdevelopment has always constrained the dissemination of improved varieties in the region, but it becomes particularly important when genetically modified (GM) seeds are considered. With biotechnology seed companies typically acquire the additional responsibility of implementing biosafety and resistance management (e.g. refuges, rotations) plans.

A key hypothesis is that in West Africa the seed sector has not developed because improved varieties were not sufficiently better than traditional varieties to justify the

transactions cost involved in seed marketing. Bt cowpea varieties may change that situation with 200% to 300% yield increases over traditional no-insecticide production. The first step in this research would be focus groups and key informant interviews with seed sector participants throughout West Africa. Case studies would be done of both functioning and failed seed businesses. Simulation may help us understand how introduction of Bt cowpea may affect the seed sector. This work would be done as part of the Network for Genetic Improvement of Cowpea in Africa (NGICA) plan to create Bt cowpea.

THOMAS HERTEL

Degree Level

Research Topic

Funding

PhD

Climate Volatility and Poverty Vulnerability World Bank or NSF

Climate Volatility and Poverty Vulnerability

The impact of increased GHG concentrations in the atmosphere has important implications for agricultural production due to the impact of global warming and increased climate volatility on productivity. Should GHG concentrations continue to increase, further global warming of 1.1 to 6.2 °C is expected by the end of this century. How such changes in global mean temperature will affect *climate volatility* is of particular concern. Because key thresholds associated with poverty can be closely linked to the frequency and magnitude of severe climate events, changes in climate volatility are likely to have a significant impact on the world's poor, who often lack the resources to develop infrastructure for buffering against such volatility. Additionally, the poor are particularly sensitive to changes in the agricultural sector, both because the majority of the poor rely on agriculture for their livelihood, and because they spend a large share of their income on food.

In this project we will utilize a global economic model called GTAP. The great strength of the standard GTAP model is the ease with which it can be modified. In this work we utilize with a variant of GTAP which has been designed for energy and climate policy analysis. We will also include a micro-simulation module to simulate the poverty impacts climate volatility. Given the vulnerability of the poor to volatile food prices it is important to investigate the source of such volatility. The two sources of commodity price volatility that will receive special attention here are adverse climate events, including extreme heat, droughts and floods on the one hand, and energy price volatility on the other. The former has always been recognized as an important driver of commodity price volatility and poverty vulnerability. However, the latter is a more recent phenomenon, driven by the increasing role of biofuels in farm level demand for agricultural commodities.

Simulation of commodity price volatility in the GTAP framework is now well-established. In the case of agricultural commodities, (e.g., staple grains), climate outcomes for a given country in a given year can be interpreted as exogenous supply-side shocks to sector productivity. Controlling for trends, climate outcomes affecting grains production can thus be considered draws from a probability distribution of inter-annual grains productivity changes. We generate such productivity change distributions for all regions in the model by implementing zero-mean normal distributions characterized by standard deviations of interannual staple grains productivity changes estimated from FAO data. It is then possible to consider, for example, the productivity change that corresponds to a once-in-30-year climate extreme. These outcomes can be compared to future climate volatility

by spreading or tightening these productivity distributions as dictated by the climate/productivity analysis. The goal of the study is to assess the likely impacts of future changes in climate volatility for poverty vulnerability.

MATT HOLT

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
Ph.D.	Evaluation of the Impact of Technological Advances on Retail Agronomic Firms	Possible
Ph.D.	Structural Change in Local Basis Relationships	None

The Impact of Mid-frequency Climate Events such as El Niño on U.S. Commodity Markets

In recent years there has been growing interest in the effects of large-scale climate events such as El Niño on economic activity, including world primary commodity prices. The research that has been conducted to date examines the role of El Niño in commodity markets by using linear models. There is substantial evidence, however, that El Niño-type events are consistent with nonlinear behavior. That is, small shocks seem to have different effects than large shocks, and that positive shocks (i.e., La Niña's) may differ from negative shocks (i.e., El Niño's). There is also mounting evidence that commodity prices are better described by nonlinear processes. The goal here is to use multivariate versions of smooth transition models to describe behavior of the El Niño phenomenon as well as commodity prices. The models will be validated by considering both in-sample and post-sample (i.e., predictive) performance. The estimated models will also be compared with linear counterparts. From an econometric perspective, very little work has been done to date on multivariate smooth transition models. This proposed work is therefore important from both a market analysis as well as an econometric standpoint.

Structural Change in Local Basis Relationships

Over the past decade Brazil has become a major player in the global soybean market. Given that production in the Southern hemisphere occurs in the winter months in the Northern hemisphere, the rise of Brazil has likely had a large impact on basis relationships for soybeans, soymeal, and soyoil. Specifically, how has the seasonal pattern of these relationships changed over time as Brazil has risen to prominence in soybean production? The idea would be to investigate these possible changes by using new time series techniques in the form of time-varying vector autoregressions, that is, time-varying autoregressions for cash and futures prices. The resulting models will be validated by using both in-sample and post-sample performance evaluations. Similar analyses could be done for other seasonal commodities, including corn and wheat.

MARIA MARSHALL

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Entrepreneurship/ Small Business Development	No
MS	Farmer Response to the Tobacco Buyout in IN/KY	Possible
MS/PhD	Small Business Demise and Recovery after a Natural Disaster	Possible

Entrepreneurship/ Small Business Development

There are several topics within this area that have potential. Topics of interest in this area are family business management practices, self-employed women, minority business ownership and management practices. Another area of interest is the comparison of small farm businesses to non-farm family businesses. This is collaborative study with Consumer and Family Science. The data set has been identified. The main objective of this research is to determine if farm businesses and non-farm family businesses are significantly different in terms of management style and business and growth strategies.

Famer Response to the Tobacco Buyout in IN/KY

The price support and quotas on tobacco production in the U.S. were introduced by the Agricultural Adjustment Act of 1933 and were in place for nearly seven decades until they were terminated by The Fair and Equitable Tobacco Reform Act of 2004. Removal of quotas and price support programs was expected to change the economic climate in tobacco-dependent states of the U.S. The Tobacco Transition Payments Program, sponsored entirely by the tobacco companies, was designed to provide compensation to recent quota holders and to tobacco growers (i.e. quota lessees). It was supposed to ease the transition from a regulated to free tobacco market by compensating for various divestment costs. The stream of payments to tobacco farmers began in the summer of 2005 and will continue until the summer of 2015. The question remains as to what types of farms and farmers are staying in the industry and whether the tobacco buyout program was helpful in reducing the negative effect of exit barriers.

Small Business Demise and Recovery after a Natural Disaster

The process of business recovery from disaster has yet to be studied comprehensively. Understanding this process is important not only to characterize and reduce attrition post-disaster but also to determine whether private and government disaster relief policy, business owner practices and family and community factors are leading to recovery. Research to date has narrowly focused on business characteristics and not on the interactions and interdependencies among businesses, the business owner's family, and the community. A systems theory approach advocates considering simultaneous stressors on

the business, family, and community to understand what leads to business demise or recovery. Comprehensive data on business owners and their families will be gathered to assess the extent to which family considerations and owner patterns of adjustment to change impact business recovery or non-recovery. The study will also examine disaster aid practices and policy and the role of community in business owner decisions post-disaster.

WILLIAM A. MASTERS

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Causes and Effects of Farm Policy Choices	Possible
MS/PhD	Nutritional Poverty and Household Income	Possible
MS/PhD	Incentives in Contests	Possible

Causes and Effects of Farm Policy Choices

In recent years, Purdue staff have collaborated on a large World Bank project assembling a new dataset on agricultural policies around the world (www.worldbank.org/agdistortions). There are many opportunities to use these data to study those choices, over time and across countries. For example, a government's degree of support to agriculture rises with the country's per-capita income, with important nonlinearities in that relationship. What can explain this pattern of correlation?

Malnutrition and Household Income

A person's nutritional status is closely related to their household income, but differs in systematic ways. We have a few papers exploring these differences, but there is much more to be done. For example, we know that the fraction of households with incomes below the poverty line falls with rising average incomes. How does the malnutrition rate change, and why?

Incentives in Contests

Institutions differ widely in how they reward effort. We can test various reward schemes using laboratory contests, to detect differences in how people respond. One important finding is that winner-take-all contests, which are very widespread in economic and social life, have unexpected limitations. We find that these can sometimes be overcome using shared prizes that reward all entrants in proportion to their achievement. Under what circumstances would shared prizes really be better than winner-take-all awards?

PHILIP L. PAARLBERG

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS	Consumer Price Expectations during Livestock Disease Outbreaks	Possible
MS/PhD	Plant Disease Surveillance Prioritization	Possible

Consumer Price Expectations during Livestock Disease Outbreaks

Traditional modeling of consumer demand specifies demand as a function of current prices and income which means single price elasticities capture consumer response to price changes during a livestock disease outbreak. Observed behavior suggests that consumers react differently to situations where price changes are perceived as temporary deviations versus situations where price changes are viewed as structural. This project is intended to support U.S. livestock disease surveillance efforts by re-specifying consumer demands for livestock products and crop products to incorporate long-run price expectations.

Plant Disease Surveillance Prioritization

Traditional methods of prioritizing plant disease surveillance efforts rely on crop production value. Crops with the highest production value receive the bulk of surveillance efforts regardless of the disease risk and likely spread. This research prioritizes surveillance efforts by combining disease risk, disease spread, and economic criteria. It develops a series of commodity models that can be shocked with demand and supply impacts from plant disease outbreaks to determine comprehensive measures of economic consequences. Supply shocks are based on disease spread. Using probabilities determined from risk assessment, expected welfare measures can be calculated and compared for alternative surveillance options.

GEORGE F. PATRICK

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS	Risk Management for Hog Producers	Possible
MS	Risk Management Strategies for Farmers	Possible

Risk Management for Hog Producers

The hog industry has undergone major changes in recent years with increasing integration of producers. Reduction of the risk, especially price risk, faced by producers is a significant cause of integration. Recently, the Risk Management Agency has introduced two pilot insurance programs for livestock. Livestock Risk Protection (LPR) for hogs offers producers the opportunity to purchase price insurance based on the futures prices. Unlike crop insurance, LPR offers no protection from physical losses of production. An expected ending value is based on the futures price and a producer can purchase coverage prices of 70% to 95% of the expected ending value. If the actual ending value is below the coverage price, the producer receives an indemnity for each hundredweight insured. The program is similar to an option and is partially subsidized. An alternative program allows a producer to insure a gross margin and incorporates corn and soybean meal prices. The emphasis in this project would be to evaluate how these programs would have performed had they been available in the past and how they are likely to perform in the future. (This project would be conducted jointly with Tim Baker.)

Risk Management Strategies for Farmers

Agricultural producers face many sources of variability which can affect the cash flow, net returns, and economic progress of the farm firm. The risks which producers face may have been significantly affected by the 2002 Farm Bill. The direct payments, marketing loans and loan deficiency payments, and counter cyclical payments impact on cash flow and risk bearing ability. Less than fully equity in the farm business creates financial risk which may compound the effects of the business risks which all farmers face. Farmers typically combine production, marketing, and financial responses to risk and practice risk balancing. Past research has often failed to consider the sequential nature of the decision-making and knowledge which becomes available during the production process. For example, grain storage investments are often analyzed assuming storage will be used each year without considering the effect of alternative market situations. This project will analyze the interactive effects of various risk responses in a whole farm situation. Emphasis will be given to the short and long run consequences of alternative risk management strategies on representative farm firms.

PAUL V. PRECKEL

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
PhD	Analysis of the Impact of Carbon Policy on Indiana Electricity Supply, Demand and Pricing	Indiana Utility Regulatory Commission (IURC)
PhD	Evaluating Auction Markets for Financial Transmission Rights	Possible IURC or PJM/MISO Market Monitors
MS or PhD	Managing Intermittency of Renewable Generation	IURC
MS or PhD	Analysis of Energy Efficiency Programs in Indiana	Possible IURC or Office of Energy Development

Analysis of the Impact of Carbon Policy on Indiana Electricity Supply, Demand and Pricing

As evidence of Global Warming accumulates and dire predictions of the potential impacts proliferate, it is clear that the legislation restricting the production of greenhouse gases, and CO₂ in particular, are likely in the near future. The most likely candidate for a CO₂ policy is a “cap and trade” regime wherein a cap on total CO₂ production is established and a system of tradable emission permits is used to encourage economically efficient emission reductions. The idea is that emitters that can reduce their emissions at low cost may over-comply, reducing their emissions even below their allocated cap, while emitters that would incur very high costs to reduce emissions could simply purchase extra permits. Determining the impact of these alternative policies on electricity generation in Indiana is important because the vast majority of Indiana’s electricity production is based on coal-fired generation, which produces a great deal of CO₂ per unit of electricity produced.

Evaluating Auction Markets for Financial Transmission Rights

Markets for electricity are complex and evolving. The transmission system, which was originally designed for ensuring reliable electricity supply, is now being used for economic purposes to facilitate electricity trade across traditional service areas. In support of this economic activity, the Federal Energy Regulatory Commission (FERC) has established rules requiring open access to the transmission network. One aspect of the transmission network is limited capacity of the lines. When a particular line hits its

capacity, a charge must be imposed to serve as a mechanism to economically allocate that capacity. (This is a capacity rental rate.) To avoid market exploitation by electricity generating companies that also own transmission lines, contracts for transmission line capacity have been introduced. These contracts, called financial transmission rights (FTRs), allow the owners of the transmission lines to be compensated for their investment, but without receiving payments for congestion on their lines. Rather, the owners of the contracts receive these rents. These contracts are sold through a multi-round auction process. There is preliminary evidence that suggests that the structure of these auctions allows bidders to systematically use information garnered from early auction rounds to design bids in later rounds that reap certain (i.e. non-stochastic) profits. This is not the intent of the independent systems operator (ISO) that designs the auctions. If the preliminary evidence is confirmed, then it suggests the need for redesigning these markets to reduce the potential for exploitation.

Managing Intermittency of Renewable Generation

The intermittent and uncertain nature of wind has led many to completely discount it as primarily an energy only resource. While it is true that the available capacity during periods of peak electricity demand is low (wind speeds are often low during the hottest periods), it is not likely to be zero. Furthermore, preliminary analysis by SUFG has indicated that the higher outputs during other periods could have an impact on the type of generation (baseload vs. intermediate vs. peaking) that is needed going forward. The goal is to determine the impact of intermittent generating resources on the need for other generation assets. This is an important issue as the amount of intermittent resources is rapidly growing in Indiana.

Analysis of Energy Efficiency Programs in Indiana

Indiana's energy efficiency and demand-side management efforts have been carried out by a number of different entities, from electric and natural gas utilities to governmental agencies. There is little to no coordination in administering these programs or in reporting their effects. This has become more significant recently with the influx of energy efficiency money resulting from the American Recovery and Reinvestment Act of 2009. The goal of this effort is to develop a central repository for energy efficiency efforts throughout the state, analyze the information, and produce a report summarizing the efforts on an aggregate, statewide basis. Information to be collected include participation rates, incentives, gross and net energy savings, peak demand reductions, tax incentives, and required technology and software.

GERALD SHIVELY

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Agricultural Intensification and Deforestation in the Philippines	Possible
PhD	Dynamic Time Series Models of Agricultural Price Formation	Possible

Agricultural Intensification and Deforestation in the Philippines

I have an ongoing research project focusing on the impacts of agricultural development near the forest margin in a remote part of Palawan, in the Philippines. I am using panel data to study the ways in which technological advances in agriculture (in this case irrigation development) have had spillover environmental effects.

Estimating Dynamic Time Series Models of Agricultural Price Formation

I have an ongoing interest in time series econometric work focusing on dynamic models of agricultural price formation and market integration, including models with spatial characteristics, structural breaks, and changes in regime. I have very interesting sets of data from Ghana and the Philippines that are ideal for graduate students interested in advanced time series econometric work. The data are available for term paper and thesis writers.

WALLACE E. TYNER

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	Economic Analysis of Renewable Energy Policy Issues	Yes
MS/PhD	Comparison of Biofuels with Other Energy Pathways	Possible
MS/PhD	Systems Analysis for Renewable Energy Development	Possible

Economic Analysis of Renewable Energy Policy Issues

The United States and other countries have embarked on massive programs to stimulate increases in renewable energy production. There are many policy approaches that can be used to stimulate added production. The impacts of these policy alternatives can differ significantly in terms of reduction of risk for the private sector, cost to the government, and environmental and climate change impacts. The purpose of this research is to conduct economic analysis of a wide range of policy alternatives in these three dimensions.

Systems Analysis for Renewable Energy Development

Our renewable energy future likely will include a mixture of feedstocks including cellulosic materials. We do not have a good understanding of the economics of production, processing, or distributing these fuels. This project, which could involve two or more students, will involve building process models for bio-chemical and thermo-chemical conversion of cellulosic materials and estimating the impacts of various policy alternatives on the development of those sectors. It may also entail developing regional supply curves for these fuels. The analysis will be complete life-cycle including greenhouse gas emissions and environmental impacts. Some of the research also will entail using GTAP to estimate global land use impacts of cellulosic biofuels.

Comparison of Biofuels with Other Energy Pathways

Biomass can be converted to biofuels or converted to electricity. The economic and life-cycle impacts of these renewable energy pathways differ from wind, photovoltaics, and conventional fossil energy pathways. At least a couple of research projects are envisioned that would evaluate biofuels pathways in comparison with other energy futures. At least one of these projects likely will also evaluate water impacts of cellulosic biofuels.

Terrie L. Walmsley

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
MS/PhD	International Migration, Demographics and Gender	GTAP/ World Bank
MS/PhD	Development of a Dynamic CGE model for examining Climate Change issues	GTAP

International Migration, Demographics and Gender

Recent work in this area has included the modeling of undocumented workers in the USA and building a dynamic model to examine the impact of the movement of natural persons. There are a number of topics in this area that are yet to be explored including the interaction between migration and severe climatic events in Bangladesh or elsewhere, demographics and migration, migration and gender, and migration and poverty impacts.

Recently I have been working with the World Bank to develop a time series dataset (1960-2005, 10 year intervals) on international migration by gender. The resulting database is rich in country detail and opens up the possibility of undertaking econometric and modeling work in migration and gender issues. To date lack of data has been the main impediment to this kind of analysis.

Development of a Dynamic CGE Model for examining Climate Change Issues

Interest in environmental issues is growing both in the US and abroad. We hope to extend the GDyn model to examine the impact of climate change policies. This requires the inclusion of the GTAP-E model into the Dynamic GTAP model and the development of a long run baseline of CO₂ emission. There is also some interest in improving the treatment of the electricity sector in the model to better capture the impact of climate change issues.

STEVE WU

<u>Degree Level</u>	<u>Research Topic</u>	<u>Funding</u>
Ph.D.	Agricultural Market Structure and Robust Contract Design	Pending
Ph.D.	Experimental Economics and Applications to Agricultural Problems.	Yes, for carrying out experiments only

Agricultural Market Structure and Robust Contract Design

This project will use cutting edge methods from contract theory and algorithmic game theory to design and test robust contractual trading mechanisms (rules) that promote efficiency while imposing constraints on rent-seeking (where the party with market power seeks to use contracts to extract profits from weaker parties). An obvious application is in agricultural contracting markets where there is a perceived imbalance of market power between integrators and growers/smallholders. Recent research has shown that market concentration in contractually based industries does not necessarily decrease efficiency although it can lead to contracts that facilitate rent-seeking which can create perverse distributional outcomes. In the absence of efficiency losses, standard economic theory would treat rent-seeking as a distributional issue. However, in practice, rent-seeking can create political pressure to regulate which can indirectly reduce the competitiveness of U.S. agriculture. In development contexts, the introduction of new value added processing industries may provide new market outlets for farmers or small holders. However, these new opportunities might not improve farmer or smallholder welfare if rent-seeking occurs. Our goal of creating contractual and bargaining mechanisms that are robust to rent-seeking can provide model private strategies that can be used to preempt pressures to regulate and improve the welfare of the weaker party. Even in cases where regulation is unavoidable, our goal is to create efficient rent-seeking proof mechanisms that can provide benchmarks by which new regulatory proposals or contractual boiler plates can be measured.

Experimental Economics and Applications to Agricultural Problems

Ph.D. students who are interested in experimental economics are encouraged to present ideas or jointly develop ideas with professor Wu to conduct economic experiments. Funding will be available for experiments that have potential to lead to joint publications. Professor Wu is flexible with regard to subject matter and is open to questions related to agriculture, development, energy, mechanism design, agribusiness, and/or contract theory/organization design. The primary criteria is that the idea is interesting and important, addresses an agricultural economics related issue, and potentially leads to publications and at least one dissertation essay.