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Special Issue: Educational Materials about Industry and Market Developments
(Special Guest Editor: David Hall)

AAEA Agricultural & Applied Economics Association

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Applied Economics Teaching Resources

Applied Economics Teaching Resources (*AETR*) is an online, open access, and peer-reviewed professional publication series published by the Agricultural an Applied Economics Association (AAEA).

The aim is to provide an inclusive outlet for research, teaching and Extension education scholarship encompassing but not limited to research articles, case studies, classroom games, commentaries, experiential learning, and pedagogy. The goal is to support and advance teaching and Extension education within the scholarly areas of agricultural and applied economics, and agribusiness economics and management. AETR seeks to publish articles that are diverse in both scope and authorship. It serves as a platform for addressing and contributing to our understanding of important societal issues, including inequality and discrimination, as well as how shifts in pedagogy (e.g., growing reliance on remote and hybrid learning modalities) may impact accessibility and inclusion.

AETR welcomes submissions on:

1. Teaching and Extension education scholarship and research
2. Classroom and field educational innovation (e.g. classroom games, online teaching tools, Extension applications, and experiential learning activities, and other interactive learning innovations)
3. Case Studies in all areas of applied and agricultural economics, and agribusiness economics and management
4. Teaching and education commentaries (e.g. notes on pedagogy, evaluations of teaching effectiveness, evaluation and review of applied economics textbooks, curriculum development and educational methodology).

Applied Economics Teaching Resources

AAEA Agricultural & Applied Economics Association

Teaching and Educational Commentary

Educational Materials Addressing Industry and Market Developments: Introduction to the Special Issue

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JEL Codes: A2, Q1, Q11, Q13, Q14, Q16, Q18
Keywords: Agri-food industry, teaching, learning, technological change, regulatory affairs

Abstract
The agriculture and agri-food industries rely on useful case studies and teaching materials to assist in knowledge communication and transfer of matters relating to technology change and adoption of new innovations, a supportive regulatory environment, equitable access to information, and corporate responsibility, among other issues. Valuable case studies and lesson materials may be underappreciated where it is not accompanied by rigorous data analysis and hypothesis testing. This introductory note summarizes the importance of eight contributions to the teaching literature and argues that these contributions can play substantial a role in helping with teaching fundamental concepts in agricultural economics and agribusiness.

1 Motivation for the Special Issue

Narratives relating to communication of industry and market developments, government and private programmatic impacts and delivery, educational or extension initiatives, and other training and learning methodologies in partnership with or exclusively within industry and non-governmental organizations are often not documented in the agricultural and applied economics literature due to a lack of hypothesis testing, statistical rigour, or theoretical foundations. This introduction to the Special Issue on Educational Materials about Industry and Market Developments argues that there is educational value in sharing and explaining how such technical developments are communicated, in addition to communication of insights into government programs and impacts, market and industry reports, and successes and failures of efforts to support programs and initiatives in government and industry. Such articles and information may serve as models for adoption and modification of new innovations and processes by future industry and serve as tools in the classroom for educational purposes.

For this Special Issue, we have collected eight interesting and informative papers that each provide a different approach to examining and learning from case studies in agribusiness, including communication of new technologies and government programs in support of agribusiness, addressing regulatory barriers, consumer trends and impact of exogenous shocks, corporate social responsibility, and demand for risk management education. Each considers both the student and career professional and most include teaching notes or models for adapting lessons in the university classroom and extension curriculum.

We expect this Special Issue will be of interest to agriculture and agri-food industry stakeholders including producers, agribusiness managers, producer support groups, input providers, processors, local to federal government agencies, and extension personnel. Students and educators of agricultural and applied economics, agribusiness economics and management and related agri-food disciplines interested in knowledge and information transfer will also be interested in the Special Issue.

2 Highlights of Papers in the Special Issue

Bina and Tonsor et al. (2023) describe a publicly available Meat Demand Monitor (MDM) dashboard, a monthly national survey covering more than 2,000 responses representative of U.S. Census Bureau estimates for various demographic factors summarizing domestic meat demand and consumer behavior. Summary reports address characteristics influencing demand, awareness of US meat industry issues, and other related topics. Reports and raw survey data are available through the MDM project website. Questions can be posed *ad hoc* relating to, for example, meat consumption during food safety incidents and attitudes relating to meat related topics. These and other questions can inform policymakers on matters such as consumer-level impacts of an economic disruption or during volatile market conditions. The MDM is discussed as an alternative, time-efficient approach to extension education, combining survey design methods, statistical analysis, and web application development.

Bhattari and Davis (2024) present a mixed motive bargaining game that can be used to assist in teaching the economics of corporate social responsibility (CSR) and the trade-offs involved. As a teaching tool, the game is designed to be played in class. An Excel workbook and instructions are included. As agri-food industries seek to enhance their CSR visibility and credibility, it is important that students of economics and other disciplines such as law, science, etc., are able to interpret critically the balance between social responsibility and business interests. The authors cite several examples including legislation that aims to improve production animal welfare. The tool is a mixed motive bargaining game that will help students understand better situations where opposing views exist but where sides must come to some agreement, often involving a compromising resolution. The authors also provide results of an application of the game in a class of 70 students.

Garwood and Coffey (2024) observed that in the food and agriculture industry there is a gap in the market for risk management executive education, as well as a lack of research addressing preferences and willingness to pay for such education. To address that gap, the authors conducted an online survey of professionals in the food and agriculture industry, as well as follow-up interviews. From those activities, the authors concluded that respondents highly value such education as well as opportunities to apply that knowledge and develop their network of professional associates. Participants indicated a willingness to pay between $1,500 and $2,000 for a two- to three-day executive education experience.

Dewbre et al. (2024) present an interesting equilibrium displacement model applied to supply and demand of corn that links to hog and pork markets. The model is developed with lesson files to allows students the opportunity to apply exogenous shocks and develop policy options emulating market conditions from farm to retail. Both consumer and producer perspectives are considered, allowing students to challenge their economic knowledge and intuition regarding the impact of such shocks. Teachers of agricultural policy, consumer and producer economics, and agricultural trade will find these models considerably helpful in the classroom.

Kim et al. (2024) researched communication strategies to improve equitable access to the Paycheck Protection Program (PPP) as a source of relief for agricultural producers. Past research indicates that lack of knowledge about eligibility and the application process negatively influenced PPP approval rates for areas with a higher population of female and African American producers during COVID-19. The authors found that communication strategies used at the time to inform minority farmers about the PPP were not as effective as they could have been. Communication weaknesses and challenges are discussed. Recommendations to increase communication efficiency were identified as building a connection with farmers prior to using online resources, using personalized communications, and seeking partnerships to leverage their social capital. Agricultural extension personnel and government

agencies working with minority farmers will find this study particularly interesting.

Peralta et al. (2024) argue that experiential teaching in postgraduate agribusiness requires both classroom engagement and wider industry experience. They present two examples from the Master of Global Food and Agricultural Business program at the University of Adelaide, which incorporates both study tours and agribusiness internship opportunities. The authors reflect on experiential learning theory to assess benefits of their approach, including reflection on assessment tasks that link both knowledge base and internship experiences. In the context of agribusiness, challenges are discussed, including setting and aligning expectations, communication in non-academic settings, and intellectual property issues. Suggestions are provided for both undergraduate and graduate level programs.

Gurung et al. (2024) note that while the concept of food freedom (the right to buy and sell foods of one's choice with reduced government regulation) has been promoted since 2013, little is known regarding economic viability, resilience, and industry growth potential of the Home Cooking Movement (HCM). Their case study addresses progress and challenges of the HCM industry, examining HCM legislation, the underlying economic systems, and the application of Diffusion of Innovation Theory. Teaching notes are provided to enhance the value of this case study for students of agricultural economics and agribusiness, as well as policymakers and industry advocates.

Westover and McCarty (2024) present an interesting case study involving marketing of a technology to convert shipping containers into hydroponic animal feed production systems. The technology has been developed by Renaissance Ag and allows a single shipping container to produce 1.5 tons of livestock feed per day, requiring less water than conventional agriculture. This case study requires students to consider trade-offs of selling in different markets, and to consider how a limited marketing budget might most efficiently be utilized to address those markets.

3 Discussion

Agricultural and agri-food industries rely on innovative research and development, technological progress, and a supportive policy environment in order to thrive in competitive environments. This Special Issue has brought together eight diverse papers of interest to students, instructors, and industry professionals involved in agriculture and agri-food industries. Each paper reports on a particular case study or perspective of relevance to one of the essential elements of our industry noted above. Many papers in this issue also include teaching tools for application in the classroom and extension education settings. Readers who are also educators are encouraged to spend time to familiarize themselves with those valuable teaching tools.

The topics discussed and the case studies of this Special Issue address matters of high concern to our profession, including welfare distribution and risk management; market development, consumer preferences, and corporate responsibility; communication of opportunities, experiential learning, and regulatory affairs. Most of these topics, if not all, are essential learning for the agricultural economics and agribusiness students and professionals. This Special Issue makes valuable contributions to learning material to support knowledge transfer of those topics.

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References

Bhattari, A., and G.C. Davis. 2024. "Teaching the Economics of Corporate Social Responsibility: A Mixed Motive Bargaining Simulation Game." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Bina, J.D., and G.T. Tonsor. 2023. "Demand Dashboards: Interactive Tools to Communicate Consumer Behavior." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Dewbre, J., W. Thompson, and S. Chiuchiarelli. 2024. "Applied Economic Models of Commodity and Input Markets to Assess Prices, Quantities, Farm and Other Input Supplier Impacts, and Consumer and Taxpayer Costs." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Garwood, E., and B.K. Coffey. 2024. "Risk Management Education for Executives in the Food and Agriculture Industry." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Gurung, S., J. Ritaccoa, L.A. Chena, and J. Laia. 2024. "A Case Study on the Home Cooking Movement – Legalization, Market, and Competition." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Kim, K., A.C. Sant'Anna, and I. Demko. 2024. "Minority-Owned Agricultural Businesses and Challenges with the Paycheck Protection Program: Seeking Ways to Reach Farmers." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Peralta, A., C. Johns, and A. Loch. 2024. "Expanding Beyond Case Studies in Postgraduate Agribusiness Teaching to Enhance Experiential Benefits and Student/Teacher Outcomes." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

Westover, C. and T. McCarty. 2024. "Renaissance Ag: Identifying the Who, How, and Where of Marketing a New Technology." *Applied Economics Teaching Resources* (AETR) 6(4). Available at: www.aetrjournal.org.

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Teaching and Educational Commentary

Demand Dashboards: Interactive Tools to Communicate Consumer Behavior

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JEL Codes: Q11, Q13, Q19
Keywords: Dashboard, extension education, meat demand

Abstract
A publicly available dashboard is developed and discussed as an alternative, time-efficient approach to extension education, reflecting an intersection of survey design methods, statistical analysis, and web application development. The dashboard targets consumer behavior in the U.S. meat sector and serves as a dynamic and easily accessible source of market information for users with unique data needs and limited time. An overview of the dashboard and examples of its value to industry professionals are provided.

1 Introduction

Academic research conducted at land-grant universities is generally distributed to the public via written reports, radio interviews, and extension meetings. Such traditional methods, though impactful when thoughtfully prepared, necessitate stakeholders' investment of both their time (e.g., listening to a radio broadcast, searching for articles online) or physical attendance (i.e., attending an in-person extension seminar). Additionally, most available information on the domestic meat industry is either production focused or highly aggregated both geographically and over time. An example of such production data includes the United States Department of Agriculture (USDA) Agricultural Marketing Service's Estimated Weekly Meat Production Under Federal Inspection or SJ_LS712 report (U.S. Department of Agriculture, Agricultural Marketing Service 2023). On the consumer side, meat disappearance data is provided by the USDA Economic Research Service's supply and disappearance tables (U.S. Department of Agriculture, Economic Research Service 2023), but is available only at the national level and experiences a delay in reporting.

Meat protein is a significant portion of U.S. consumers' food expenditures, having notable impacts on the broader agricultural industry. Changing consumer behavior in this market over time and space has important economic implications. This, combined with a society that increasingly values timely, refined insights and data visualizations, has created the need for innovation in extension education and distribution of consumer-focused domestic meat data.

A collection of online extension tools exists to better inform production decisions in both crop and livestock operations. The University of Missouri provides "Missouri Ag Intel," serving as a resource to help local producers learn about alternative agricultural opportunities and assess the suitability of their farm ground for growing alternative crops (University of Missouri 2022). Kansas State University has created a hay inventory calculator to aid livestock producers in determining how much hay is needed for their cowherds and in estimating storage losses (AgManager.info 2022c). Relating to agricultural finance, Colorado State University provides a ratio analysis decision tool to help farm operations better understand their liquidity, profitability, and a host of other indicators of financial health (Colorado State University 2022). These are just a handful of the numerous available production-focused online extension tools.

Recently, a series of dashboards have been created by Purdue University's Center for Food Demand Analysis and Sustainability. These include dashboards conveying price, supply, and production information, but also consumer behavior data obtained from their Consumer Food Insights survey

(Subramaniam, Polzin, and Lusk 2022). The monthly consumer survey assesses trends in food demand, food security, and other factors. Additionally, the center provides "#Meat," a dashboard that tracks broad sentiment toward various animal and alternative proteins on social media and news outlets (Widmar et al. 2022). These educational tools motivate our work.

This paper provides an example of how a publicly available dashboard can be utilized to effectively and broadly convey academic research on domestic meat demand to producer groups and other food industry participants. The dashboard discussed here is an alternative, time-efficient approach to extension education, reflecting an intersection of survey design methods, statistical analysis, and web application development. Further, to the best of our knowledge, it is the first to offer agricultural industry stakeholders with results from discrete choice experiments and the first to target consumer behavior in the economically important U.S. meat industry.

The dashboard provides current and easily accessible summaries of raw survey data that can be viewed at the user's discretion. These survey results provide industry users with information on consumers' preferences for meat, trends in spending behavior over time, and measurements of important issues in the domestic meat industry—all quickly found within a single online location and from any electronic device. Additionally, interactivity allows users to select the geographic location and measure of consumer behavior that most aligns with their unique information needs. As such, the dashboard is an innovative and powerful tool to communicate market developments and industry performance.

2 Meat Demand Monitor Survey Overview

The Meat Demand Monitor (MDM) project was launched in February 2020 with funding support from the beef and pork checkoff programs. The MDM is a national survey issued monthly and designed to be representative of U.S. Census Bureau estimates for various demographic factors, including age, education, gender, income, region, and race. Each month, more than 2,000 survey responses are typically available for subsequent analyses after data quality filtering (AgManager.info 2022a). Monthly reports summarizing the latest national results, survey instruments, project methodology, and raw survey data are available through AgManager.info (AgManager.info 2022b).

The MDM survey focuses on domestic meat demand and consumer behavior, both in retail and foodservice outlets. Month to month, core topics remain the same. These include question blocks about respondents' awareness of a variety of issues in the U.S. meat industry (e.g., gestation stalls, bird flu, high protein diets), the importance of various food characteristics when making protein purchasing decisions (e.g., price, environmental impact), and a recall of prior day meat consumption.

Also included each month is a choice experiment providing survey participants with a list of meat products and associated prices.[1] Varying the prices of each product over nine choice sets, mean willingness to pay for the respective meat products is calculated and discussed in monthly MDM reports. That is, utilizing the results from the choice experiment, a multinomial logit model is estimated to determine how much the average U.S. citizen is willing to spend on a specific meat product as well as that product's share of the market for meat. This provides a measure of demand for the listed products and how demand is changing month to month. Furthermore, the willingness to pay estimates are regressed against respondents' demographic information to determine the factors impacting demand for the most popular retail and foodservice meat products.

Beyond topics relating to meat demand, the MDM survey has the flexibility to ask sets of ad hoc questions each month, providing a valuable source of information on more general topics and on current

[1] Half of the monthly respondents are provided a retail-focused choice experiment. The listed retail meat products include items such as ground beef, chicken breast, and bacon. The other half of respondents are provided a foodservice-focused choice experiment. Foodservice meat products include dinner meals with entrée items such as ribeye steak, pork chops, and baby back ribs.

issues faced by U.S. consumers. This has included respondents' weekly household food expenditures, financial sentiment, economic impact payments received during the COVID-19 pandemic, and price expectations for various meat products, to name a few. Specifically, the MDM showcased its usefulness in capturing trends in a rapidly changing U.S. meat market during the onset of the pandemic. In Spring 2020, several questions were included in the survey to quantify the amount of meat that respondents had on hand in their homes and to record the availability of meat in respondents' most recent grocery store visit (in terms of volume and type of product). Answers to these and similar ad hoc questions can directly inform policymakers on observed consumer-level impacts of an economic disruption and illustrates U.S. residents' experiences during volatile market conditions.

Over its short life, the MDM has already been used in a variety of academic research efforts. These include refereed articles on meat consumption amid media coverage of "meat avoidance" (Tonsor and Lusk 2022), consumption and perception of beef versus plant-based proteins (Taylor et al. 2022), and consumer behavior in domestic meat markets during the COVID-19 pandemic (Tonsor, Lusk, and Tonsor 2021). The survey data has also been used in government testimony at both the state and federal levels (KS Legislature 2021; Tonsor 2021) as well as in a variety of media outlets.

3 Meat Demand Monitor Dashboard

Approaching three years of data collection, the MDM has received more than 80,000 usable survey respondents and can now speak deeply to geographic variation in consumer behavior and preferences over time. With geographic heterogeneity of U.S. consumers in mind, we developed the MDM Dashboard to provide state-level information in a timely manner. The dashboard includes national aggregates similar to those provided in the monthly MDM reports, but additionally includes the same metrics of consumer behavior disaggregated by state—all from an easily accessible online platform. Figure 1 provides a sitemap of the MDM Dashboard, showcasing the structure of the application.

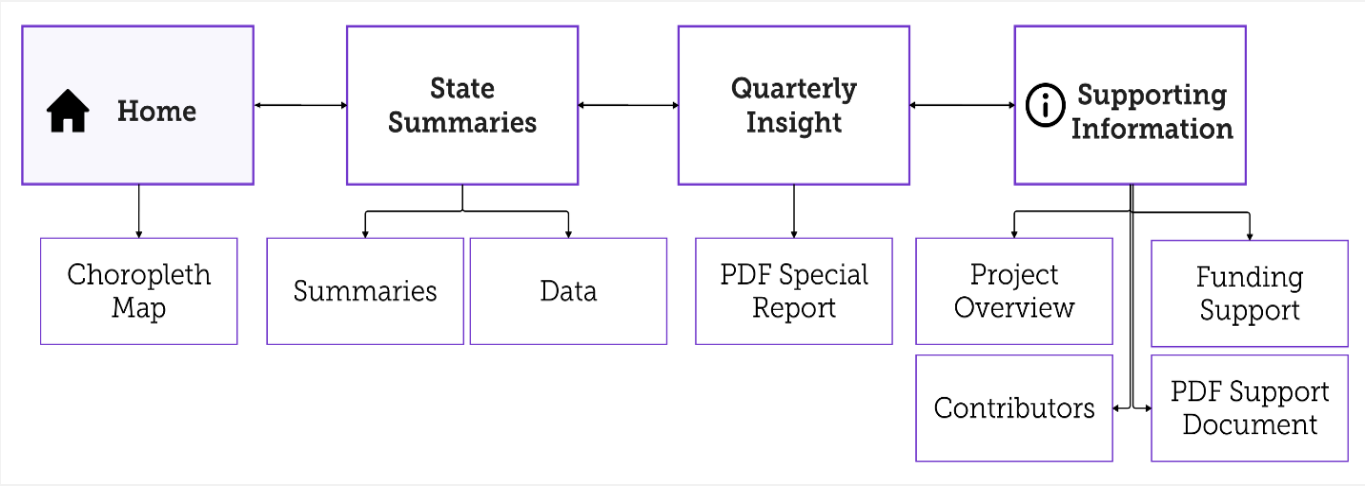

Figure 1: MDM Dashboard Sitemap

When the dashboard is opened, the user is presented with a home page that includes choropleth mapping of the fifty U.S. states and Washington DC. States are colored by their respective averages across respondents for the selected quarter (year) and variable of interest. Coloring is done by quartile. That is, states with averages in the bottom 25 percent for the selected variable are colored with the lightest shade of purple while states with averages in the top 25 percent are colored with the darkest shade of purple. Figure 2 serves as an example, displaying state-level averages for household income in

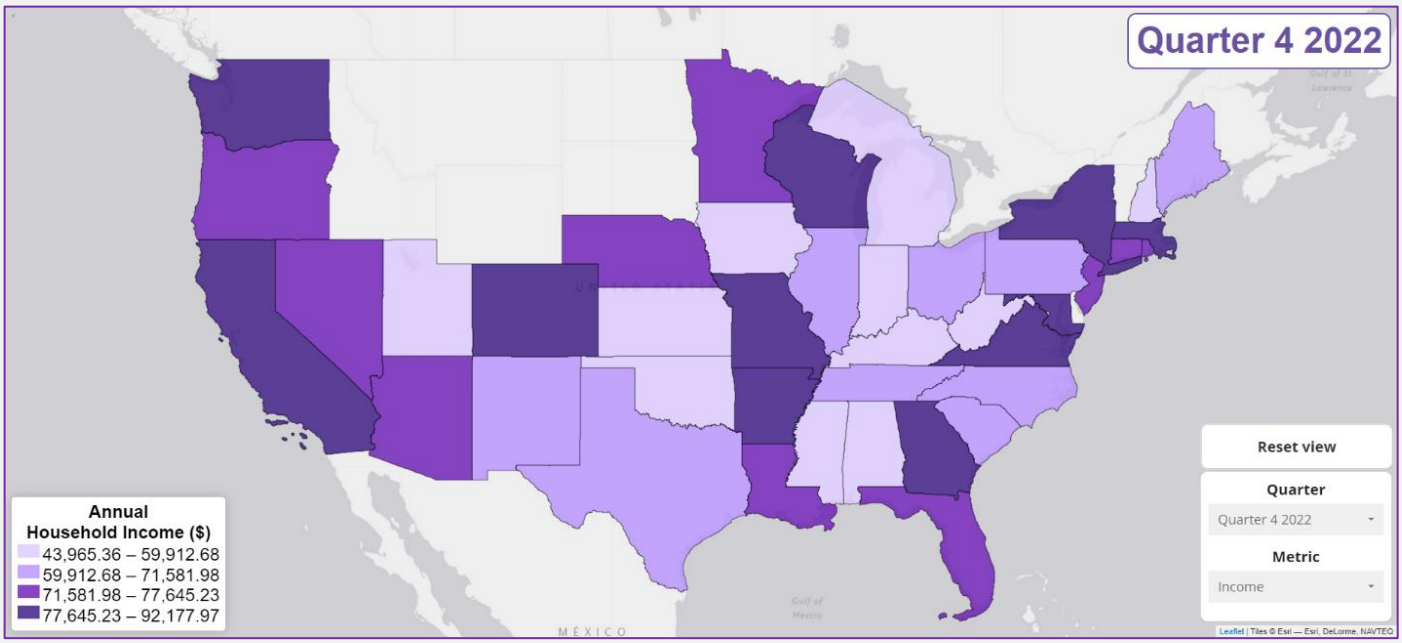

Figure 2: Example of MDM Dashboard Home Page Map

Quarter 4, 2022.[2] Note, a block of states in the Northern Plains are not colored. We implement a threshold of at least 30 respondents in the state and survey quarter (year) to be included as a data point on the home page map.[3] This serves as a quality measure, omitting thinly sampled states whose results we cannot assign a reasonable degree of confidence. On that note, and in the interest of transparency, we provide the number of respondents from each state and quarter (year) throughout the application. Additionally, rather than home page choropleth maps, quarterly and annual results for thinly sampled states are available under the "State Summaries" tab, if desired.

The "State Summaries" tab provides a more refined view of survey results by state. Again, the user can select the desired survey quarter (year) and state. The number of respondents for the selected period and state are displayed at the top of the page, along with average household income and weekly food expenditures. A variety of graphics are also provided on this page, including respondents' awareness of issues in the meat industry, relative importance of various meat product characteristics, measures of both meat consumption and demand, diet split (e.g., vegetarian, vegan), and price expectations. All graphics are created dynamically, automatically updating the underlying data, titles, and axis labels based on the user's selected period and state. Accordingly, the downloadable graphics are ready for use without further manipulation by the dashboard user.

A summary of variables, or metrics, provided in the MDM Dashboard, and available for download in the "State Summaries" tab, is depicted in Table 1. This information is also available to users in the dashboard's "Supporting Information" tab, discussed in ensuing sections.

[2] All graphics and data provided in the dashboard can be downloaded by the user.

[3] Although the MDM is a monthly survey, we elected to provide quarterly and yearly state-level averages in the dashboard. We are more confident in these results for typically lower-sampled states than the monthly results.

Table 1: MDM Dashboard Variable Descriptions

Variable	Description
Survey	The year or quarter (an aggregate of the respective twelve or three survey months)
State	The state or all states (a national aggregate consisting of all 50 states plus Washington DC)
Respondents	The number of useable survey respondents after all filtering
Income	The average annual household income ($)
FAH	The average weekly household expenditure on food at home ($)
FAFH	The average weekly household expenditure on food away from home ($)
`Awareness_Animal Welfare` … `Awareness_Salmonella`	The average awareness of the topic (0 to 5)
`CE_FoodServ_Baby back ribs` … `CE_FoodServ_Shrimp`	The average number of selections of the item from a nine-scenario, food service-focused choice experiment (0 to 9)
`CE_Retail_Bacon` … `CE_Retail_Shrimp`	The average number of selections of the item from a nine-scenario, retail-focused choice experiment (0 to 9)
`Diet_Flexitarian/semi-vegetarian` … `Diet_Vegetarian`	The share of respondents reporting the diet (0 to 1)
`ExpPriceChange_Bacon` … `ExpPriceChange_Ribeye steak`	The average expected percentage price change of the item for the next month (-10 to 10)
`ExpPriceMovement_Bacon_Higher` … `ExpPriceMovement_Ribeye steak_Same`	The share of respondents reporting expected price movement of the item for the next month higher, same, or lower (0 to 1)
`ExpPriceMovement_Bacon_Relative` … `ExpPriceMovement_Ribeye steak_Relative`	The percentage of respondents reporting higher expected prices for the item next month minus the percentage reporting lower expected prices (0 to 100)
`Prior_Alternative proteins` … `Prior_Pork`	The average number of yesterdays' meals containing the protein (0 to 3)
`PV_Animal welfare` … `PV_Taste`	The average importance of the value when making purchasing decisions (-1 to 1)
`PV_Animal welfare_Rank_Least` … `PV_Taste_Rank_Most`	The share of respondents reporting the value is among their most, medium, or least important when making purchasing decisions (0 to 1)
`PV_Order_1` … `PV_Order_12`	The values ordered from most (PV_Order_1) to least (PV_Order_12) important when making purchasing decisions
`PV_Order_1_MeanImp` … `PV_Order_12_MeanImp`	The average importance of the ordered values

Also provided in the MDM Dashboard is a "Quarterly Insight" tab that provides a special report on some ad hoc or "hot topic" issue that is not already discussed in the MDM monthly reports or included in the rest of the dashboard. This quarterly report highlights some important economic issues and creates an additional incentive for industry users to return to the dashboard.

The final tab, labeled "Supporting Information," provides a brief overview of the MDM project with a URL link to the AgManager.info webpage, from which further information and raw data can be obtained. Similarly, URL links are provided to the beef and pork checkoff programs' respective webpages. Importantly, a PDF file is embedded on this page offering an overview of data filtering and survey weighting procedures used for the dashboard. All variables are also defined in the document should users desire to download the underlying state-level data.

4 Educational Value

The MDM Dashboard offers a variety of important insights into consumer preferences and market developments, from which industry users can better understand customers' behavior and make more informed, forward-looking business decisions. Benefits of the dashboard as an educational tool can also be realized in an academic setting.

4.1 Extension Education

Of notable interest to food retailers and restaurant chains are changes in dietary patterns and an uptick in expenditures on plant-based proteins (Zhao et al. 2022). Quarter 4, 2022, survey estimates indicate, on a national level, 69 percent of respondents self-declare to regularly consume meat, 12 percent are flexitarian (i.e., those who mostly follow a vegetarian diet but occasionally eat meat or fish), and 13 percent are either vegetarian or vegan vegetarian. Implications for regional plant-based protein product placement and advertising can be addressed with the dashboard's addition of state-level diet breakdowns. Notably, a group of states in the Eastern Corn Belt (i.e., Indiana, Kentucky, etc.) have the largest share of respondents self-declaring to regularly eat animal protein products. Efforts to place plant-based alternatives in these areas of the country are likely to be less effective relative to other areas. Conversely, the highly populated states of California, Illinois, and New York experienced larger shares of respondents self-reporting a vegetarian or vegan diet (between 8 and 12 percent) over the same period, perhaps indicating increased opportunity in those states for manufacturers of plant-based proteins and an opportunity for expansion of restaurant menus into more vegetarian options.

Dietary trends can be evaluated in further detail with prior-day consumption recall information collected from each survey respondent. This information indicates separately for each meal (i.e., breakfast, lunch, and dinner) where the meal was consumed (i.e., at or away from home) and which animal or alternative protein was included in the meal, if any. Furthermore, if respondents report having eaten an animal or alternative protein, they are prompted to provide the specific product. Such disaggregated consumption data provides a valuable resource for industry stakeholders to understand which consumer groups are driving protein purchases and where product needs to flow geographically.

The MDM Dashboard currently includes prior-day dietary recall information for four major animal proteins: beef, chicken, fish/seafood, and pork. Quarter 4, 2022, national results indicate respondents ate those broad protein classifications in roughly 0.7, 0.8, 0.3, and 0.5 of their prior-day meals on average, respectively. The dashboard's state-level reporting provides additional important information. Inclusion rates of pork in respondents' meals are relatively higher for states in the Southeast. Respondents from Alabama, Arkansas, Georgia, Louisiana, and Mississippi consumed pork in 0.62 to 0.76 of their daily meals on average. Conversely, states in the Northeast and Southwest have lower pork consumption with daily meal inclusion rates of around 0.25 to 0.35 in Arizona, Massachusetts, New Hampshire, and Utah. Prior-day beef consumption rates for the same quarter were higher in the Southern Plains and Mississippi Delta regions of the country. Arkansas, Kansas, Louisiana,

Mississippi, and Texas respondents indicated eating beef in 0.8 to 1.1 of their prior-day meals on average. Beef consumption rates were lower for the Northeastern states of Maine (0.51), Massachusetts (0.57), and New Hampshire (0.6).

A related, but distinct demand (rather than just prior-day consumption) measure is also captured in the MDM survey. It is important to recognize that consumption of a good is not the same as demand for the good. Consumption is an equilibrium quantity at a given price. Purcell (1998) states per-capita consumption measures per-capita supply, not demand for a good. Prices will adjust to the required level to clear per-capita supply (Purcell 1998). Demand, on the other hand, is the schedule of quantities taken by consumers across various prices (Purcell 1998) and holding other factors constant.

A nine-question choice experiment is presented to each MDM respondent to assess demand for retail and foodservice meat items. Randomly assigned to either a retail or foodservice-framed choice experiment sequence, respondents are asked to choose from a list of eight meat items and a ninth "opt out" alternative (Tonsor et al. 2021). Prices of the meat items vary across the nine questions. Monthly MDM reporting and Tonsor et al. (2021) utilize a conventional multinomial logit model to recover mean willingness to pay for each meat alternative.

For the purposes of the MDM Dashboard, a simple sum across each respondent's nine choice sets and for each meat alternative provides a measure of the respondents' demand for various products on a scale of one to nine. Put another way, if over their nine retail-framed choice sets, a respondent chooses ground beef three times, we then have a quantified measure of the respondent's retail demand for ground beef (equal to three). Calculated in this fashion, products with a total number of selections closer to nine display higher demand relative to products with selections closer to zero. For dashboard reporting, averages of the respondent-level sums are calculated for each state.

At the national level for Quarter 4, 2022, chicken breast and ground beef experienced relatively higher demand in retail with average selections just over 2. Retail demand for pork chops follows with a national average of around 1.25. Ribeye steak, bacon, and a variety of non-red meat proteins experienced the lowest relative demand. For assessments of geographic demand differences, our state-level dashboard reporting provides useful information. Retail ground beef demand for Quarter 4, 2022, was highest in several Great Plains and Eastern Corn Belt states. Respondents from Kansas, Nebraska, Ohio, and Pennsylvania reported on average summed selections of 2.68, 2.30, 2.35, and 2.32, respectively, for ground beef on the retail choice experiment. Retail demand for pork chops was higher in the same period in the Midwestern states of Illinois and Missouri and in the Northeast relative to other areas of the country, while retail demand for chicken breast was higher for states in the Eastern Corn Belt. Figure 3 highlights the regional difference in retail demand for chicken breast as available on the home page of the MDM Dashboard.

Analogous comparisons can be made from the foodservice-oriented choice experiment. National results for Quarter 4, 2022, indicate higher demand in dinner meal restaurant settings for beef hamburger, with an average number of selections exceeding 2. This was followed by ribeye steak, chicken breast, and shrimp, all with average selections of around 1.3. Pork chops and plant-based patties experienced the lowest relative foodservice demand with average selections below 0.5. Demand for beef hamburger was relatively higher in the Southern Plains, with Kansas and Oklahoma having an average number of selections of 2.77 and 2.69, respectively. Demand for chicken breast in foodservice outlets

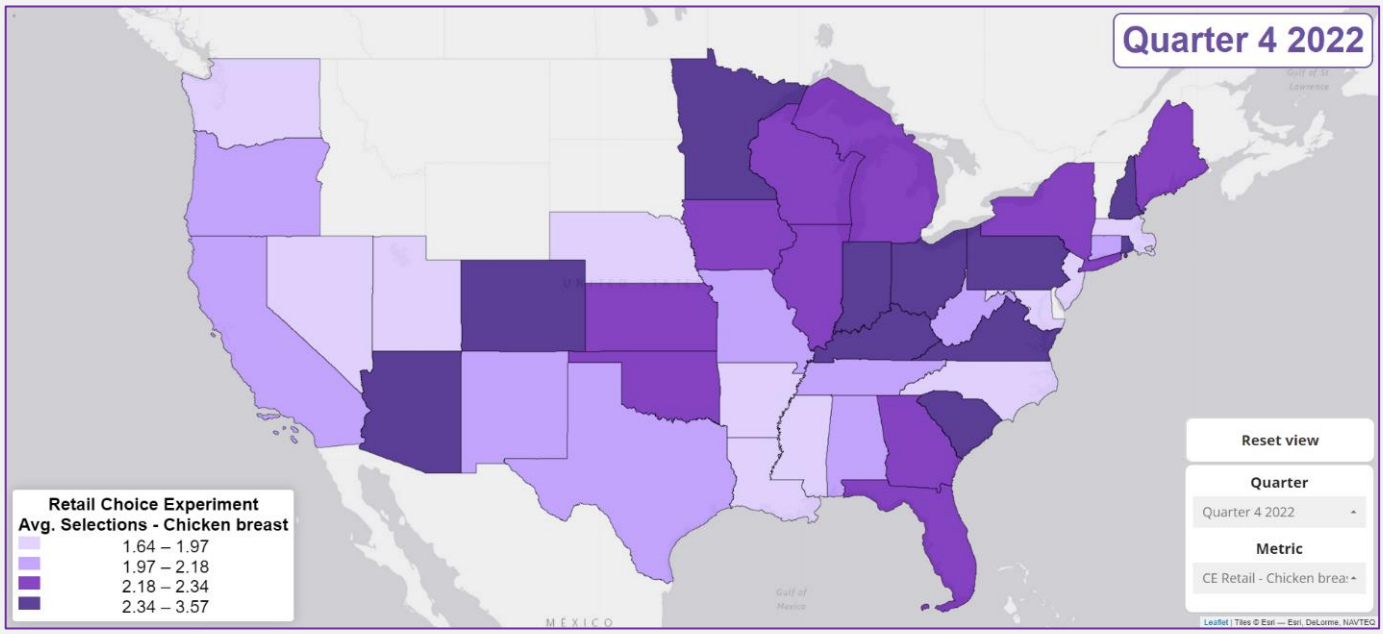

Figure 3: Retail Choice Experiment

was relatively higher in the Northeast. Respondents from Maine, Massachusetts, New Hampshire, and Rhode Island had average selections of chicken breast of between 1.6 and 3.1. States in the Southeast displayed comparatively lower demand for chicken breast in foodservice settings. Foodservice demand for shrimp was higher along the coastal states of Georgia, South Carolina, and Virginia, likely a reflection of higher quality and availability of fresh seafood. Respondents from these states reported average shrimp selections of around 1.6 to 1.9 while respondents from landlocked Kansas, Nebraska, and Utah reported average selections of around 0.9 to 1.

The MDM also prompts respondents to provide the importance they assign to various food characteristics when making a protein purchasing decision. These characteristics include appearance, animal welfare, convenience, environmental impact, freshness, health, hormone or antibiotic free, nutrition, origin or traceability, price, safety, and taste. The questionnaire block implements a forced ranking method so that four characteristics are assigned as "most important," four are assigned as "medium important," and four are assigned as "least important." If selected as one of the respondent's most important considerations when purchasing, the characteristic, or "protein value," takes a value of one. If selected as having medium importance, the protein value takes a value of zero. Product characteristics deemed as least important in the purchasing decision are given a value of negative one. Averages are then taken to rank protein values relative to one another, with protein values having a higher (or more positive) average considered as more important to the typical consumer than protein values with a lower average. Figure 4 is obtained from the "State Summaries" tab of the dashboard and displays the national results for Quarter 4, 2022.

MDM respondents report placing higher importance on product characteristics such as taste, freshness, and price when purchasing protein items. To illustrate, respondents reported on average a value of 0.26 for price and 0.20 for nutrition. This indicates that price was 1.3 times more important than nutrition to respondents for the quarter. Lower importance is assigned to hormone- and antibiotic-free labeling, animal welfare concerns, environmental impact, and origin and traceability of the product. These results are consistent over survey months and quarters, and have important implications for effectiveness of advertising campaigns promoting environmentally friendly or hormone-free foods. Interesting patterns emerge using the dashboard to compare state-level results. As an example, environmental impact is a more important consideration for respondents from the West Coast and New York, and, surprisingly, a string of states in the south-central portion of the country. However, the

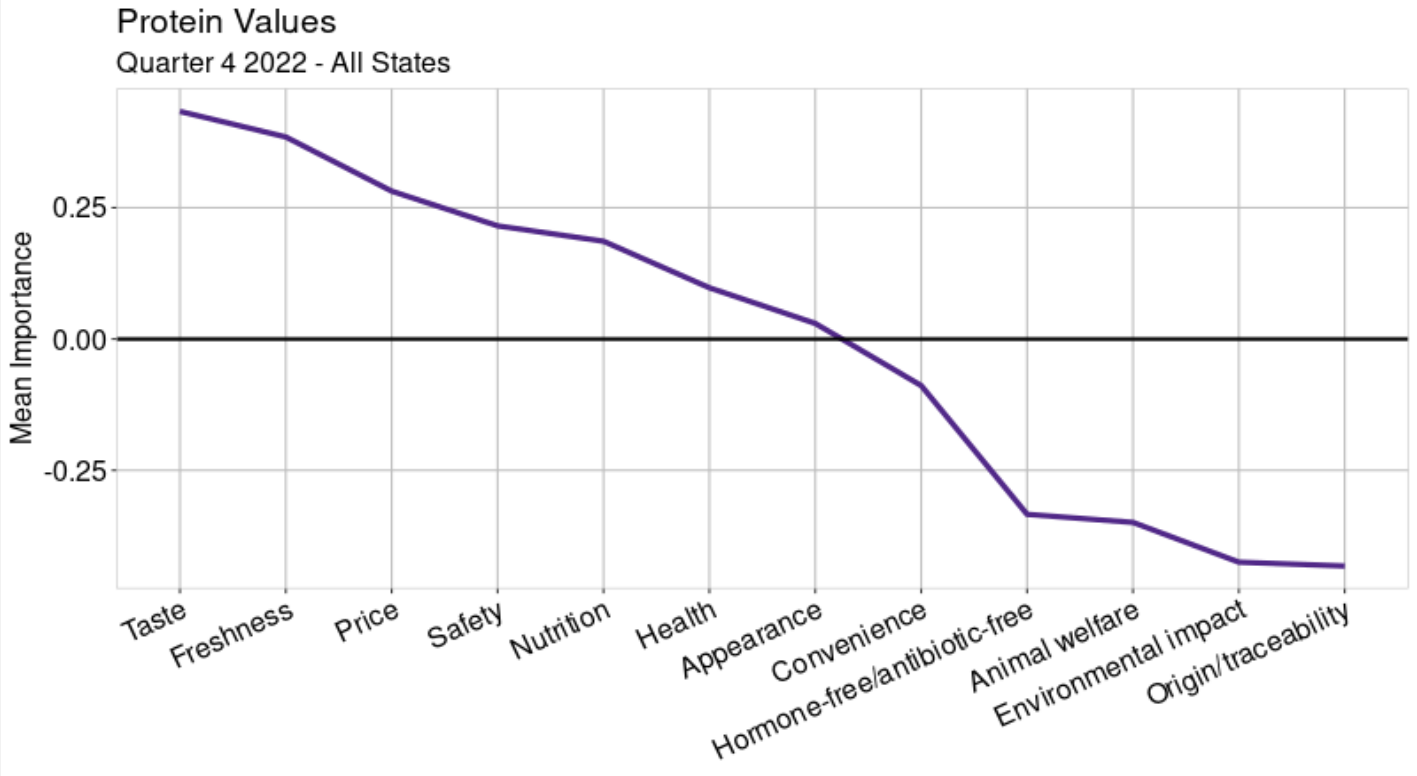

Figure 4: Protein Value Mean

protein value still takes on a negative average, suggesting that even respondents from these states place on average less importance on environmental impacts than on product price, freshness, and other traits.

At time of writing, the topic of inflation has received widespread media coverage. From U.S. Bureau of Labor Statistics (2022) estimates, the 12-month percentage changes (August 2021 to August 2022) in the Consumer Price Index for all food and for meats, poultry, fish, and eggs were, respectively, 11.4 percent and 10.6 percent. In light of increasing inflation, the MDM has asked respondents since March 2021 what they expect the following month for retail prices of bacon, pork chops, ground beef, and ribeye steak. If respondents indicate expected higher or lower prices, they are then prompted to provide a percentage expected price increase or decrease from which we calculate average expected price movements. Impacts of inflation and consumers' expectations surrounding prices of meat products have important implications for household grocery budgeting and purchasing behavior.

Nationally for Quarter 4, 2022, MDM respondents reported expecting next month's prices to increase by between 2.4 and 3 percent across all four retail meat products. A series of states, including Arizona, Hawaii, Maryland, Nevada, New York, Rhode Island, South Carolina, and Tennessee experienced relatively higher average expected price increases for at least three of the following products: bacon, pork chops, ground beef, and ribeye steak. Food retailers and restaurants in these areas may be able to capitalize on consumers' price expectations by setting prices of those products slightly beneath reported expected increases. That is, consumers may be more willing to purchase when they are provided a price below what they had expected.

4.2 Classroom Education

The dashboard's innovative approach to distribution of information can better serve agricultural economics instructors in their efforts to provide fresh, engaging content to students. An example educational point relating to economics directly is the important difference between demand and consumption. Such distinction may elude students unless presented visually. A brief discussion of the topic, and related display using the dashboard, could be immediately extended upon by visiting the MDM project methodology and viewing how the two measures are captured in their respective survey question blocks.

As a concrete example, when viewing state averages for Wisconsin in Quarter 4, 2022, we can show that respondents consumed beef in 0.7 of their prior-day meals, on average. This was followed by chicken at around 0.6 meals, as depicted in Figure 5. It is important to remember that this is a consumption measure that does not consider the price of the respective products.

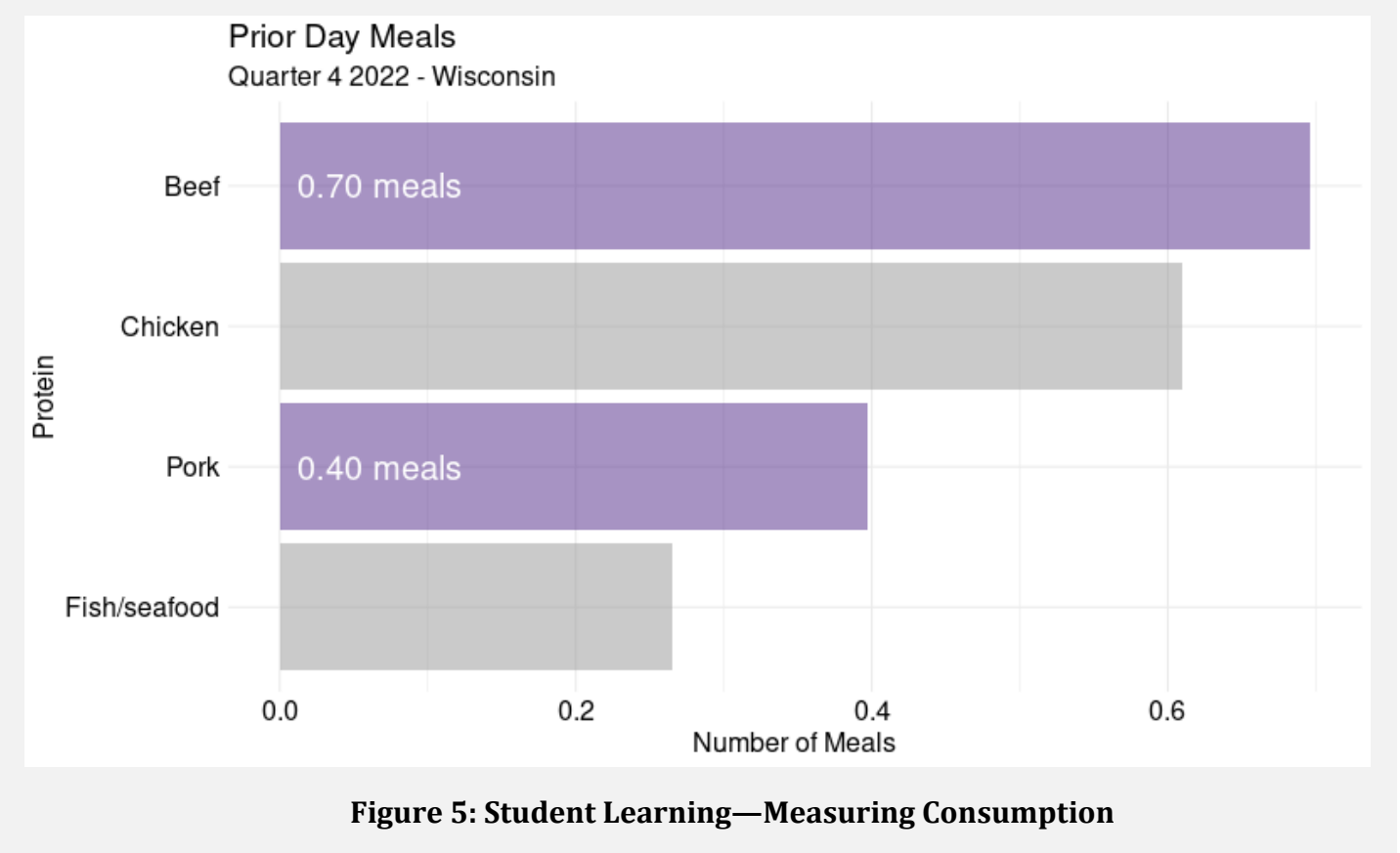

Figure 5: Student Learning—Measuring Consumption

Conversely, results from the retail-framed choice experiment depicted in Figure 6 indicate that, of the nine choice sets, Wisconsin respondents selected chicken breast 2.3 times, on average, as compared to 1.7 times for ground beef. Thus, when considering product price, we observe a different relative ranking of products. Such a depiction would be greatly beneficial for students' learning in classes such as price or demand analysis.

Another example educational point could be made on the masking of variation by using aggregated data. Consider, for example, the national average weekly household food-away-from-home expenditure of $67.16 in Quarter 4, 2022. This is found in the "State Summaries" tab by clicking "Quarter 4 2022" and "All States" in the drop-down lists. From the underlying state-level data available on the same page, we can show that weekly household expenditures on food away from home ranged from $25.87 for Idaho to $90.60 for Delaware for the same quarter. This is a clear example of aggregation

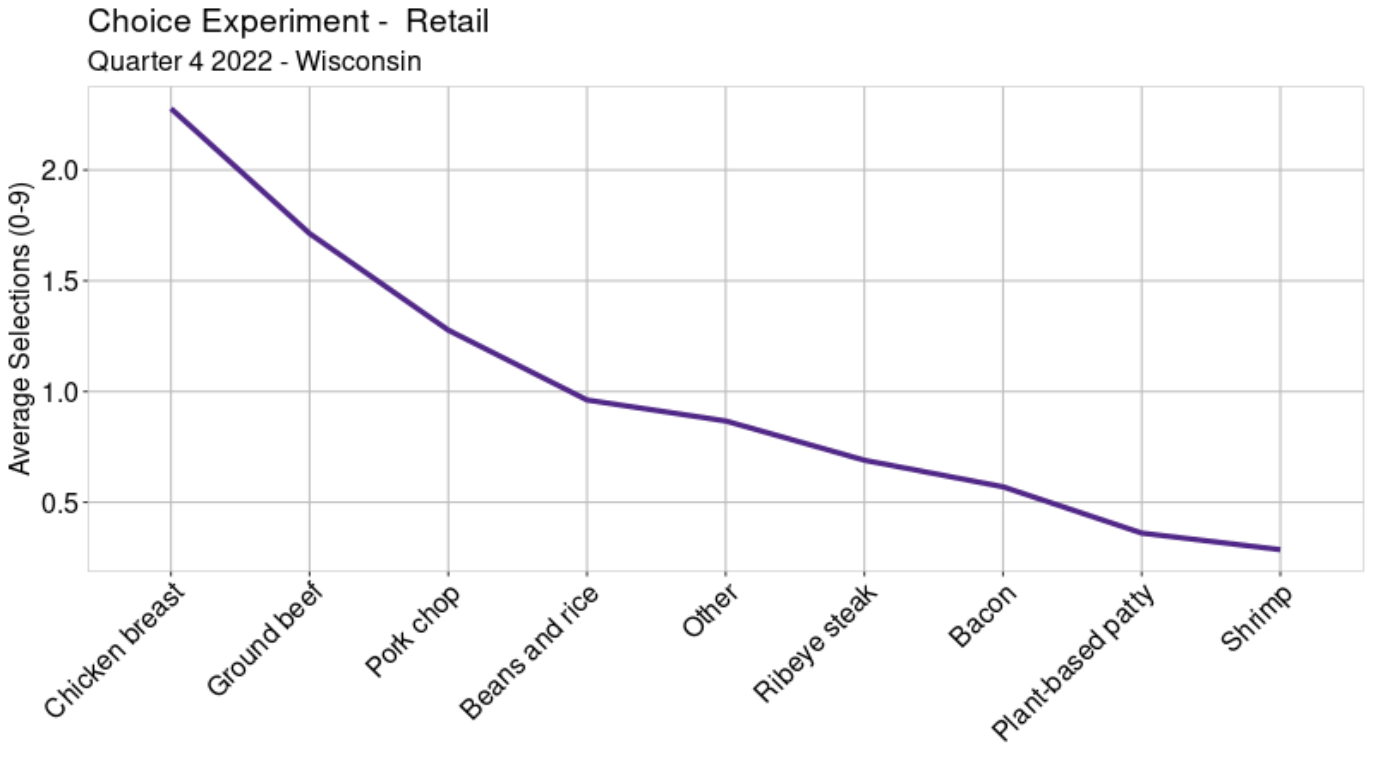

Figure 6: Student Learning—Measuring Demand

versus disaggregation and how data needs to be carefully interpreted based on the objectives of the research. Such insights are valuable for any data analytics or applied econometrics courses.

Further, utilizing the dashboard in a classroom setting may expose students for the first time to extension education and pique their interest in the profession. Specifically, the dashboard serves as an intersection of survey design methods, statistical analysis, and web application development. These are generally not covered in the classroom to the same extent as subjects like economics or animal and crop sciences. Students may not be exposed to these subjects or be unaware that opportunities exist in the agricultural industry for individuals with quantitative and technical skills. Exploiting the dashboard to attract young, technologically savvy students serves as a cost-efficient investment in the future of extension education and agriculture as a whole.

5 Usage Tracking

To assess MDM Dashboard use, the application was linked to the website traffic reporting platform Google Analytics. This allows for tracking of the number of users, page views, and a variety of user engagement measures, which can be disaggregated by time and user location. Further, in-dashboard activity can be seen in real time, allowing the creators to determine which components of the dashboard are most heavily utilized after quarterly updates or social media postings related to the MDM. It should be noted that confidentiality restrictions do not allow us to view an archive of in-dashboard activity at this time. It is our hope that, as the MDM Dashboard obtains more users, we meet the Google Analytics volume threshold for viewing historical in-dashboard activity. However, an archive of general tracking measures (e.g., number of users, number of clicks, etc.) is always available to the dashboard creators.

A trial period from mid-September 2022 to mid-January 2023 resulted in 198 new users and 50 returning users, for a crude measure of user retention of 25 percent. Though the absolute number of users was small, the rate of retention was satisfactory and confirmed the value of the dashboard as it

continues to be introduced to industry professionals. Additionally, dashboard users came from fourteen countries over the period, including the United States, Canada, and Mexico, highlighting the relevance of trends in the U.S. meat industry in global trade. Further, users spent on average 1 minute and 56 seconds per session in the dashboard and recorded roughly fifteen "events" per session. That is, once in the dashboard, users clicked on about fifteen different items on average. Our focus being on the dynamic, accessible, and time-efficient distribution of market information, this showcases users' engagement with the tool and may indicate their ability to quickly obtain needed data and insights.

6 Conclusions

The MDM Dashboard notably increases the reach and accessibility of academic research for industry professionals, and in an area that is underserved with current information distribution methods—consumer behavior in domestic meat markets. The visual map of state-level information along with detailed state summaries that are easily downloadable have a larger impact than what traditional extension channels can provide and offer improved understanding of ever-changing market trends. Additionally, utilizing such a dashboard in a classroom setting serves as a low-cost investment in the future of extension education, exposing the next generation of potential economists and educators to new, exciting research and distribution methods.

As information collection and dissemination efforts continue to evolve, and as industry stakeholders continue to demand refined data insights, we encourage the creation of similar dashboards for other applications in the agri-food industry. Such tools, beyond providing valuable market information and more informed decision-making to industry participants, may later incite industry funding support for the underlying data collection and base academic projects. This multifaceted and mutually beneficial relationship between academia and industry is in line with the land-grant mission and is particularly important when traditional sources of research funding are less available.

It is said that what you cannot measure, you cannot manage. What is less appreciated, but perhaps equally important, is that you cannot have influence and value unless you keep up with the times. Here, the measure is consumer behavior in U.S. meat markets that is evolving over time and is heterogenous across consumer groups and geographic space. The times include improved technical ability to support online dashboards, aiding in data visualization when societal interest for information seems insatiable. This article showcases the new MDM Dashboard and illustrates the associated impact it can have on education efforts. We hope this example motivates similar efforts across extension programs.

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References

AgManager.info. 2022a. *Meat Demand Monitor—Project Methodology*. AgManager.Info. https://agmanager.info/livestock-meat/meat-demand/monthly-meat-demand-monitor-survey-data/meat-demand-monitor-project

AgManager.info. 2022b. *Monthly Meat Demand Monitor [Survey Data]*. AgManager.Info. https://agmanager.info/livestock-meat/meat-demand/monthly-meat-demand-monitor-survey-data

AgManager.info. 2022c, May 18. *Hay Inventory Calculator*. AgManager.Info. https://www.agmanager.info/hay-inventory-calculator

Colorado State University. 2022. *Decision Tools*. Colorado State University Extension. https://abm.extension.colostate.edu/decision-tools/

KS Legislature (Director). 2021, March 24. *House Agriculture Committee 03/24/2021*. https://www.youtube.com/watch?v=FcktRbRbi1I

Purcell, W. 1998. "A Primer on Beef Demand." In *Staff Papers* (232526; Staff Papers). Virginia Polytechnic Institute and State University, Department of Agricultural and Applied Economics. https://ideas.repec.org/p/ags/vtaesp/232526.html

Subramaniam, A., S. Polzin, and J. Lusk. 2022. "Consumer Food Insights Dashboard." Center for Food Demand Analysis and Sustainability. https://ag.purdue.edu/cfdas/resource-library/consumer-food-insights-dashboard/

Taylor, H., G. Tonsor, J. Lusk, and T. Schroeder. 2022. "Benchmarking US Consumption and Perceptions of Beef and Plant-Based Proteins." *Applied Economic Perspectives and Policy* 45(1):22–43. https://doi.org/10.1002/aepp.13287

Tonsor, G. 2021, June. "Testimony of Glynn T. Tonsor, Ph.D. Before the United States Senate Committee on Agriculture, Nutrition, and Forestry." AgManager.Info. https://www.agmanager.info/livestock-meat/meat-demand/testimony-glynn-t-tonsor-phd-united-states-senate-committee-agriculture

Tonsor, G., and J. Lusk. 2022. "U.S. Perspective: Meat Demand Outdoes Meat Avoidance." *Meat Science* 190:108843. https://doi.org/10.1016/j.meatsci.2022.108843

Tonsor, G., J. Lusk, and S. Tonsor. 2021. "Meat Demand Monitor During COVID-19." *Animals* 11(4):1040. https://doi.org/10.3390/ani11041040

University of Missouri. 2022. *Missouri Ag Intel*. https://agintel.missouri.edu/

U.S. Bureau of Labor Statistics. 2022. *12-Month Percentage Change, Consumer Price Index, Selected Categories*. https://www.bls.gov/charts/consumer-price-index/consumer-price-index-by-category.htm

U.S. Department of Agriculture, Agricultural Marketing Service. 2023, July 28. *Estimated Weekly Meat Production under Federal Inspection*. SJ_LS712. https://www.ams.usda.gov/mnreports/sj_ls712.txt

U.S. Department of Agriculture, Economic Research Service. 2023, July 27. *Livestock and Meat Domestic Data*. https://www.ers.usda.gov/data-products/livestock-and-meat-domestic-data/

Widmar, N., J. Jung, A. Subramaniam, and J. Lusk. 2022. *#Meat*. Center for Food Demand

Analysis and Sustainability. https://ag.purdue.edu/cfdas/resource-library/meat/

Zhao, S., L. Wang, W. Hu, and Y. Zheng. 2022. "Meet the Meatless: Demand for New Generation Plant-Based Meat Alternatives." *Applied Economic Perspectives and Policy* 45(1):4–21. https://doi.org/10.1002/aepp.13232

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Research Article

Risk Management Education for Executives in the Food and Agriculture Industry

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JEL Codes: A29, D81
Keywords: Executive education, industry outreach, risk management

Abstract
Numerous universities have expanded their outreach efforts to include executive education. Offerings include a range of programs that vary in length, certification, topics, and price. Even though there are many offerings, there is a specific gap in the market for risk management executive education for the food and agriculture industry. There is also, to our knowledge, no existing research into preferences and willingness to pay for risk management executive education offerings. Understanding executives' preferences for risk management executive education programs would be helpful to academic units who wish to enter the space. We conducted an online survey of professionals in the food and agriculture industry, followed by phone or video conference interviews with professionals whose responsibilities included sending employees to executive education programming. Results indicate professionals in the food and agriculture industry highly value the content of a program and the ability to apply it to their business. They seek opportunities with highly regarded speakers with relevant real-life experience. Networking to build lasting relationships in their fields is also an important component. The price a participant is willing to pay for a two- to three-day executive education experience lands somewhere between $1,500 and $2,000.

1 Introduction

In 2022, expenditures by U.S. businesses for training employees exceeded $100 billion, with $8.2 billion of that spent on external products and services aimed at training employees (Freifeld 2022). A substantial portion of this amount was likely directed at executive education, which continues to be a growing sector of education, and is dominated by business schools and universities. Numerous universities offer executive education programs, which vary in length, certification, topics, and price (Stanton and Stanton 2017). Recently, our engagement with executives in the food and agricultural industries, many of whom participated in executive education programs, has led us to the conclusion that few executive programs specifically target risk management in the food and agricultural sectors. This realization motivated the present research because education to identify, assess, and manage financial, safety, reputational, political, compliance, and other risks is critical to both individual and business success. There is also limited research into preferences and willingness to pay for risk management executive education offerings.[1] Understanding executives' preferences for risk management executive education programs would be helpful to academic departments who wish to enter the space.

This study has two objectives. The first objective is to identify food and agriculture sector professionals' preferences regarding risk management executive education. The second is to synthesize the findings from the first objective to advise the creation of new programs in executive education in risk

[1] Some surveys of listed prices of offerings are available (e.g., Stanton and Stanton 2017). These sources, though very informative, rely on published prices and not preferences of executives.

management. Employing online surveys and video call interviews, we find that professionals in the food and agriculture industry deem the program content and list of speakers as among the most important characteristics of an executive education program. Participants further indicated that they seek opportunities with highly regarded speakers with relevant real-life experience. Networking to build lasting relationships in their fields is also an important component. The price a participant is willing to pay is between $1,500 and $2,000 for a two- or three-day executive education experience.

2 Background

Executive education describes a wide variety of non-degree programs for working professionals, with practical content that impacts their professional and personal development (Margulies and Gregg 2013). The evolution of university-provided executive education has a long history. Starting in the late 1920s, non-degree executive education programs were born out of MBA degree programs to fit the needs of older experienced managers, to give them a broad-based functional education (Crotty and Soule 1997). Universities at the forefront of this movement included Harvard and MIT. In the 1950s, executive education was a major innovation of the modern higher education industry and expanded rapidly to other universities, adding players in the market such as Northwestern and Wharton (Amdam 2020).

As decades passed, the structure of executive education programs evolved. Curricula that once highlighted lectures, case studies, and functional knowledge across industries moved toward active and applied learning that focused on realistic company issues (Jacobson et al. 2017). To be successful in today's market, executive education programs must go further than merely teaching concepts; they must empower individuals to make real-world impacts (Jacobson et al. 2017). Many programs are offered today, which differ in approach, structure, and focus depending on the target audience and its learning objectives. Programmatic approaches to executive education include executive forum and lecture series, short seminars, executive programs, certificate programs, conferences, or custom programs (Margulies and Gregg 2013). Recent research indicates that executive education must continue to evolve, especially in terms of content customization, delivery formats, and choice of topics to respond to industry leaders' needs (Tiberius, Hoffmeister, and Weyla 2021).

Risk management is an area into which executive education can potentially specialize. Risk is generally thought of as a current or future hazard having significant negative impact(s) (Bachev 2013). Risk management is the process of identification, analysis, and either the acceptance or mitigation of risk in the context of decision making (Wu, Chen, and Olson 2014). Understanding the broad topic of risk management is imperative to success in food and agriculture. Fortunately, throughout the past several decades, businesses have recognized the importance of risk management strategies in practice, and progress has been made in incorporating many philosophies and tools from various disciplines (Wu, Chen, and Olson 2014). However, in an ever-changing world, it is important for professionals to continue to increase skills and knowledge in risk management.

A common avenue professionals use to expand knowledge and skill is executive education. Agribusiness organizations have a challenge because risk management programs in the market do not focus on this industry. Current offerings either focus their efforts in risk management or target the agriculture industry, but it is our opinion that none do both. A variety of extension programs are designed to educate agricultural producers in risk management, but those programs are not targeted at current and future executives.

3 Surveys and Interviews

We used a mixed-methods approach to capture qualitative and quantitative data from executives in the food and agricultural industry regarding their preferences for executive education programs. First, we used an email invitation to an online questionnaire, which was developed and pre-tested by the authors. The contents of this questionnaire are shown in Appendix A. Second, we conducted phone and video

conference interviews to obtain detailed input from professionals who make executive and continuing education decisions on behalf of others. The script used to guide these interviews is presented in Appendix B.

An invitation to participate in a survey exploring their participation in and perceptions regarding risk management executive education was distributed via email to 727 recipients. Of these, 196 were alumni or advisory board members of Kansas State University Center for Risk Management Education and Research (CRMER); 531 were current or former Kansas State University Masters of Agribusiness (MAB) students; and the remainder were other professional contacts. The email campaign included a re-send option to non-openers three days after the initial distribution and a reminder two weeks later.[2] We collected 87 responses, with 56 of those being complete and usable. This translates to a 7.7 percent response rate. One reason for this low response rate is that we are targeting executives or those who are likely to be executives in the future. This is a very busy group of people whose time is in demand. Another possible culprit is survey fatigue as requests for online survey participation are increasingly common. This relatively low response rate raises concerns over how generalizable our findings may be. However, given the dearth of analysis in this area, we see our effort as a valid starting point for understanding executive education in the food and agriculture sector.

Two questions were asked to determine if the participant qualified for the remainder of the survey: (1) "Are you a decision maker in your company in regard to sending employees to executive education programming?" and (2) "Do you participate in executive education programming?" If the participant answered "yes" to one of those questions, they advanced to the rest of the survey. This resulted in 33 complete, qualified responses. Qualifying respondents were then asked about frequency, price expectations, past price experience, company budget, and company goals related to executive education programming.

The second section of the questionnaire asked questions specifically about risk management executive education. The first few questions were aimed at the demand for risk management executive education. The final questions collected information around details taken into consideration when choosing to attend an executive education program. Participants were then given an open text box to share any other thoughts, opinions, or insights they felt were important for the researcher to know.

After the online questionnaire results were collected, an email was sent to those who identified themselves as decision makers in sending individuals to executive education programs. These decision makers were invited to participate in a 30-minute phone or video conference interview. The purpose of the interview was to dig deeper into what qualities they value in an executive education program and, specifically, what they would expect from opportunities for executive education on risk management. Ten interviews were conducted, seven via video conference and three via phone call.[3] The average length of time for the interviews was 31 minutes. Interviewees were asked a series of twelve open-ended questions[4] focused on which qualities of a program make it valuable to a decision maker and what comprises the ideal risk management executive education program. Respondents were asked about venue, length of program, structure of program, time of year for meeting, and other practical aspects. Last, interviewees were asked what someone should know when building a high-quality risk management program for executive education.

4 Results

The 33 qualified responses came from individuals working in a variety of jobs and industries. Table 1 shows the distribution of respondents across industries. Eleven were identified as participants of

[2] The Institutional Review Board of Kansas State University determined this project (Proposal Number: IRB-10611) to be exempt from further review under 45 CFR §104, paragraph d, category: 2, subsection: ii.
[3] Calls were transcribed electronically, and transcripts were used when needed.
[4] See Appendix B.

Table 1: Industries in Which Respondents Work	
Industry	**Number of Respondents**
Production Agriculture	7
Agribusiness	7
Agricultural Banking/Lending	3
Finance/Financial Services	6
Investment Management	2
Consulting	2
Energy	2
Agricultural Education	1
Agricultural Equipment	1
Logistics	1

Note: Agribusiness was used to denote firms that further process, transport, or market commodities or food.

executive education programming, 5 were identified as decision makers in sending others to executive education programs, and 17 were identified as both (Table 2).

Table 2: Participants vs. Decision Makers		
Role of Respondent	**Number of Responses**	**Percent of Total**
Participants	11	33%
Decision Makers	5	15%
Both	17	52%

Forty-eight percent of respondents reported that they seek out executive education programs one to two times annually, and 27 percent seek the programs less than once annually (Figure 1). This number emphasizes the importance of ensuring a new program on the market meets the needs and preferences of industry professionals. There are few opportunities to capture their attention. Therefore, a new program must be well-marketed, high quality, and fit the learning objectives that business professionals are seeking.

To better understand what price the industry is willing to pay for executive education, the survey asked three questions surrounding expectations, previous experiences, and budget. When asked what price the respondent would expect to pay for a registration fee for a three-day executive education program, including meals, networking events, and opportunities to interact with reputable speakers, the average price reported was $1,735 (Table 3). As a comparison, the average of the most recent prices the respondents actually paid to send themselves or an employee to an executive education event was $1,824 (Table 3).

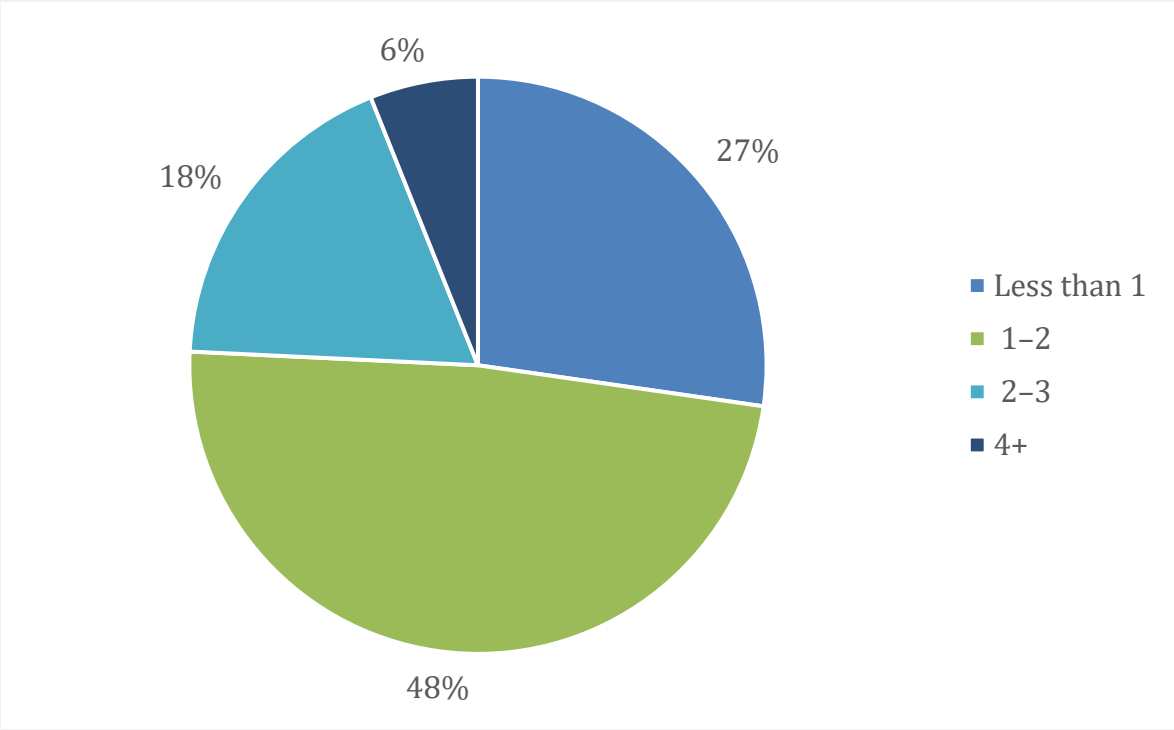

Figure 1: Annual Frequency Executive Education Is Sought Out

Table 3: Price Expectation vs. Previous Price Paid

Summary Statistic	Expectation (n = 33)	Previous Price Paid (n = 24)
Minimum	$315	$65
Maximum	$3,494	$10,000
Median	$1,506	$1,045
Average	$1,735	$1,824

Note: Eight participants did not list a previous price paid, and one listed a price of $0 for a free event. We did not include the observation of $0 in the calculation of summary statistics.

Answers to "What is your team's annual budget for executive education? And how many employees is that budget for?" varied widely. Only 10 of 33 respondents were able to provide an estimate, and seven of those were also able to provide a team number associated with the annual budget. The budget values ranged from $500 to $100,000. Based on responses with both a budget amount and number of team members, average annual budget per teammate was $2,032. Ten people reported their team did not have a defined budget but made case-by-case decisions based on quality of the program. Six respondents stated they did not know if there was an education budget or what their team's budget was. Seven survey participants answered "NA" to the question. This response could mean there was either no defined budget, or they did not know what their team's budget was.

The remainder of the survey asked questions specific to risk management executive education. Seventy-two percent of survey participants agreed to some degree that there was a need for risk management executive education in their organization (Figure 2). When asked if there are enough high-quality opportunities in the current market, 27 percent disagreed to some degree (Figure 3). These results demonstrate that some agribusiness decision makers see a need for executive education on risk management.

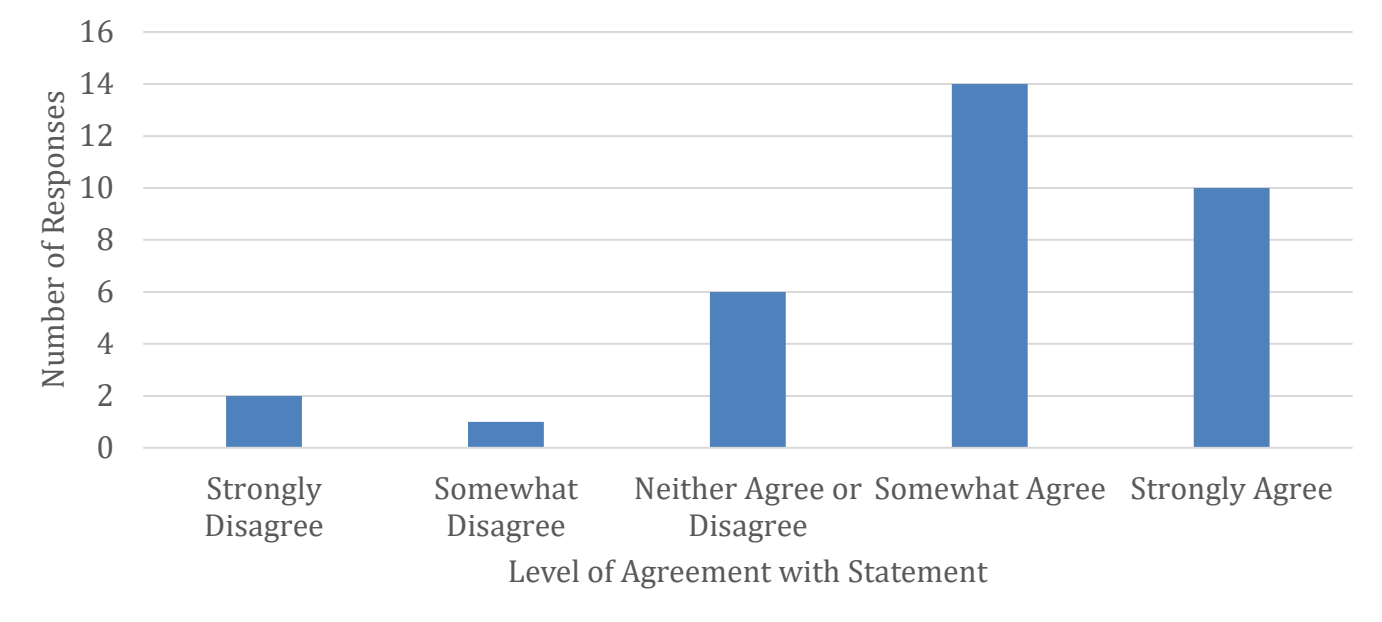

Figure 2: There Is a Need for Risk Management Executive Education in My Organization

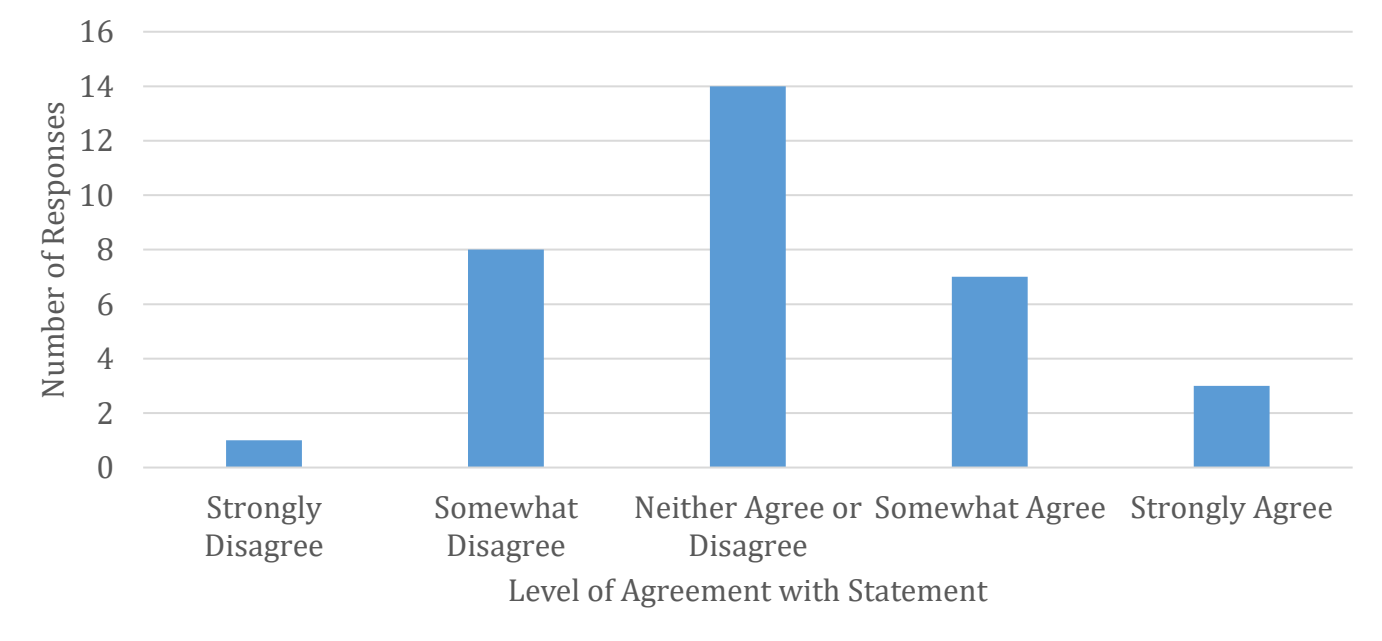

Figure 3: A Sufficient Number of High-Quality Opportunities for External Risk Management Education Exist in the Current Marketplace

The survey results showed most participants agreed that risk management executive education should happen early to mid-career (Figure 4). This indicates that experienced professionals, with potential to continue to move upward in the company, need opportunities to increase technical knowledge, as well as develop leadership and critical thinking skills.

In terms of how risk management executive education is prioritized, 45 percent reported their organization recommends risk management training, and 42 percent reported their organization neither requires nor recommends risk management training (Table 4). This could suggest that those who recommend training understand that risk management is an important concept to comprehend, but

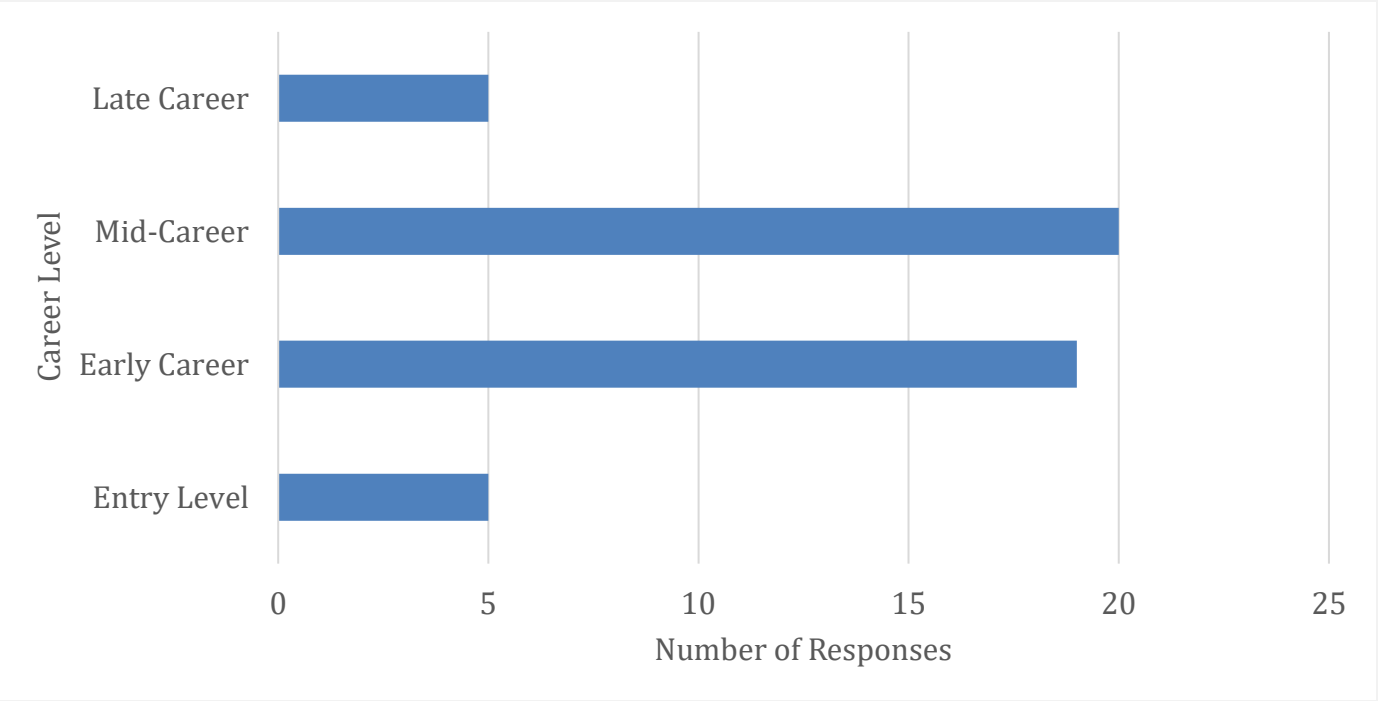

Figure 4: What Is the Typical Time in a Career Path Risk Management Executive Education Would Take Place?

Table 4: Do Companies Require or Recommend Risk Management Training?

	Percent of Total
Require	12%
Recommend	45%
Neither	42%

perhaps they cannot require training because sufficient opportunities in the market are not available.

We asked how much advance notice an employee needed to decide and plan to attend a program. Sixty-one percent stated they needed three to six months, and 27 percent needed less than three months (Figure 5). Understanding the advance notice that participants need is critical in developing a proper marketing plan for an executive education program. If a participant needs three to six months to decide, all the marketing materials including the speaker lineup and agenda must be finalized and distributed no less than six months before the program takes place. Arranging a venue, setting a schedule of events, putting together a slate of sessions, and booking speakers takes considerable time. Therefore, planning should start at least one year before the training is to occur.

When asked how many in-person, two- to three-day programs would be optimal to achieve a risk management certificate, 30 percent indicated three programs would be appropriate, and 36 percent did not feel a certificate was necessary. This result suggests that a certificate option would be a welcome addition to an executive education program. However, certification would not likely be the deciding factor of whether to attend.

Last, the survey participants were asked to rank the importance of six different program characteristics from most important (1) to least important (6). These characteristics included networking, location, reputation of speakers, time of year, cost, and ability to achieve a certificate. Table 5 reports an average of the rankings and frequency of a choice chosen as most important. Reputation of speakers was most important to the group, followed by networking, then cost. Location, time of year,

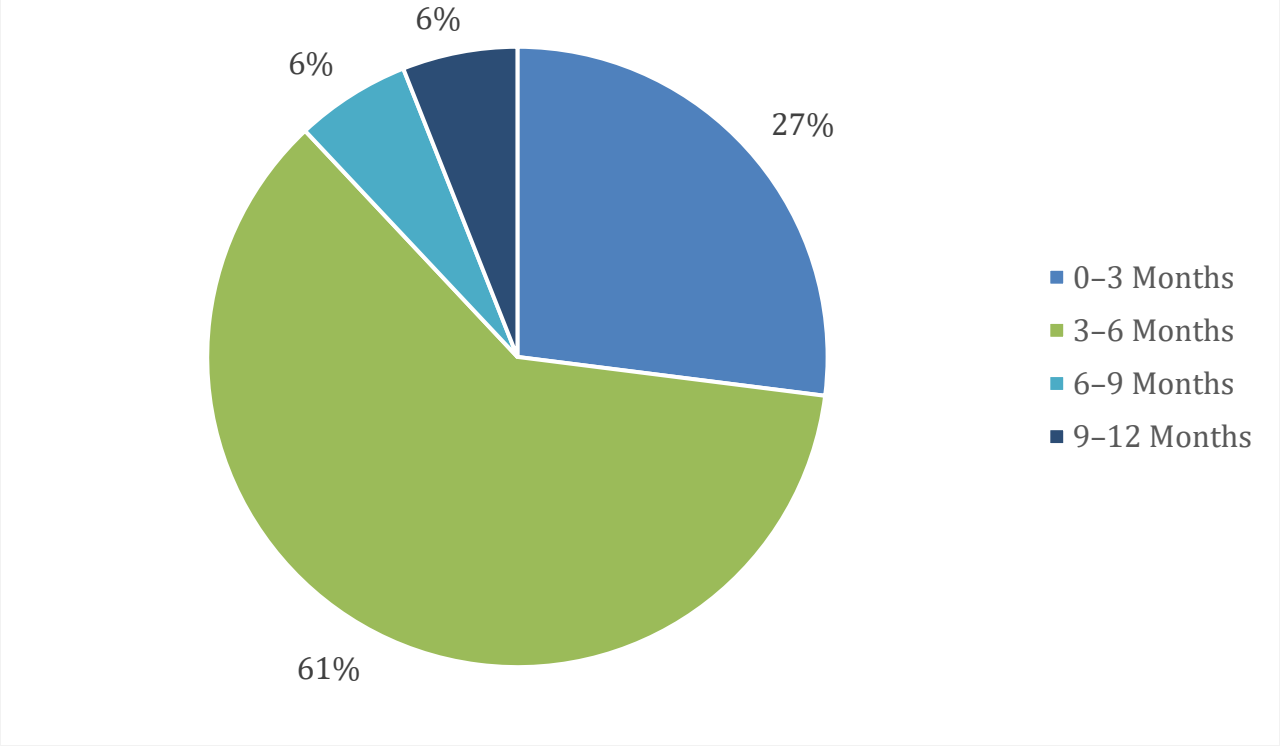

Figure 5: Advance Notice Needed

Table 5: Importance of Executive Education Program Characteristics

Program Characteristic	Average Importance Ranking	Frequency of #1 Rankings
Reputation of Speakers/Program	2.00	17
Networking	2.88	7
Cost	3.36	2
Location	3.91	2
Time of Year	3.94	2
Certification	4.91	2

Note: Respondents were asked to rank the six characteristics in order of importance, 1 = most important and 5 = least important.

and certification were the least important characteristics. Understanding the significance of each component of potential executive education programming is vital to be strategic in the allocation of resources when building a new program.

Interviews of ten executive education decision makers made it possible to gather more detail surrounding needs and preferences. Interviewees had many thoughts on what qualities of a program make it valuable to them as decision makers, with three main themes rising to the top. The first was relevant content, aligned with the goals of their organizations. Decision makers want to ensure they are attending and sending employees to programs with curriculum that will provide applicable knowledge. They want attendees to have the opportunity to both broaden their horizons, as well as become more competent in their professions. Next, interviewees wanted to see respected, experienced speakers on the agenda. Valued executive education programs put well-known speakers, with credibility in their industry, in front of participants. Last, networking surfaced as an important component. Professionals find a balance between educational time and the opportunity to meet new people to build lasting relationships in the industry, is essential.

Specific topics desired in a risk management executive education program varied widely within

interview responses, but there were general categories in common. Interviewees felt it was important to educate participants on the foundational elements such as market volatility, diversifying risk, and industry best practices. Many also brought up education on risk management outside of a participant's normal scope of view. Stated concepts included human development and recruitment of talent, embracing new challenges in the workplace, and management of risks associated with current events such as a global pandemic. Finally, numerous answers emphasized the importance of incorporating topics that are forward looking. Examples cited include environmental sustainability, cryptocurrency, and inflation. One interviewee stated it simply, "Where are we headed, what are the risks, and what tools will mitigate those risks?"

In terms of speakers desired, the response was nearly unanimous across the ten conversations. All appreciated and saw value in learning from someone in academia. However, the most important quality they look for in a lineup of speakers is real life experience. Business professionals value being taught by someone who has been in their shoes, and who can supplement a technical lesson with anecdotes and examples.

Next, the interview explored opinions regarding timing elements. Most people agreed that a two-day or three-day program is ideal. Many added, two is not enough, three is too many, suggesting a two-and-a-half-day program is best. Preferred days of the week varied. About half favored the beginning of the week, either Sunday through Tuesday, or Monday through Wednesday. Two preferred mid-week, or anything that did not overlap the weekend, and four did not have a preference. Finally, ideal time of year was discussed. Responses to this piece were even more varied than responses to the previous question. Many noted that all times of year are busy; however, if you provide a high-quality program, people will attend anyway. A few recommended the spring or fall, and one suggested avoiding fiscal year-end time periods, which occur typically either in December through January or June through July. Many noted that weather and location should be taken into consideration, adding that attendees will not be interested in coming to Kansas in January.

The interviewees then discussed who they think of when they think about providers of quality, risk management executive education. The most popular answer given was land-grant universities. Other responses included CME Group, Informa, and StoneX. Many took the chance to reiterate that they prefer a program with both an academic and an industry experience component. This suggests there is an opportunity for public and private partnerships to provide executive education.

Interviewees were asked, "What makes a risk management executive education program most valuable to the participant?" This question received the most consistent response of the entire interview. Everyone stated that "take-home" knowledge is the best thing a program can provide to the participant. The most used terms in these answers included *inspirational, relevant*, *tangible*, and *actionable* when describing content. A successful program will inspire participants to think of new, different, and better ways to look at and think about the work they do.

Interviewees then indicated if they preferred an off-site program that they traveled to attend, or an in-house program, bringing in external consultants to their company. A few explained that they appreciated both structures. However, the majority stated the off-site structure was more beneficial. Getting employees out of their office and disengaged from their day-to-day environment, would result in a higher level of focus and participation, and higher comprehension levels.

Those interviewed then discussed their preference among a list of connected, but standalone topics, or a coordinated track of courses to achieve a certificate. The popular opinion was that a certificate is not necessary. This allows the program to keep topics current, up-to-date, and fluid as the needs of the industry change. As one interviewee said, "Content is much more important than a certificate."

Interview participants were asked about programs they had attended previously and what made the programs good or bad. Most of the good components in these answers were discussed in previous questions. The best programs were relevant, and content was to the point. Programs provided speakers

of high quality and integrity, activities and discussion to engage participants, and quality networking opportunities with a diverse crowd. The biggest complaints included, programs not engaging the group, providing exclusively lecture style learning, and presenting irrelevant or generic content. Interviewees were also asked where they heard of the programs they have participated in. Most agreed that word of mouth is the best marketing tool, which can be difficult for a new program to utilize. Other methods included email solicitation, dispersing information through industry associations, and social media, specifically LinkedIn.

Finally, each interviewee was asked what else they would want someone to know when creating a risk management executive education program. Each participant provided diverse, insightful commentary. Ideas included considering how adults learn and accounting for that when building the learning environment. The importance of interaction, discussion, and engagement throughout the course was echoed here as well. Multiple answers stressed knowing and understanding your audience. Interview participants encouraged partnering with different departments across campus, as well as other organizations with experience in the industry. For content, one participant urged program developers to anticipate what will be relevant in the next five years, and another emphasized building the program with longevity in mind. Several interviewees confirmed that there is need for this type of programming in the market, and they look forward to Kansas State University entering the market.

5 Suggestions for Building Successful Risk Management Executive Education Programs

The data collected throughout both the questionnaire and interview process demonstrates industry professionals' opinions regarding a risk management executive education program. The research suggests an annual offering, a two-and-a-half-day program, during the beginning part of the week, in March or October. The price for the program should not exceed $2,000, and should include parking, coffee, water, and light snacks during break times, as well as lunch each day. A networking event should be included. We would advise networking events such as a social hour with a cash bar to give the participants an opportunity to mingle and get better acquainted. The social event could culminate with dinner, featuring a keynote speaker who would address the group and discuss a current events topic.

The target audience includes early to mid-career agribusiness professionals, perhaps five to ten years post-college, who show leadership potential, and are advancing in their careers. They want to understand risk management on a deeper level, as well as stay current on future issues the food and agricultural industry will face. Given these findings, we suggest content for the program should include an equal combination of fundamental risk management concepts and emerging topics that successful players in the industry need to understand with clearly stated learning objectives. Our experience indicates the content should be delivered in an interactive manner. Tools to achieve this could include simulations, use of a case study, small group discussions, and requests for participants to share anecdotes. In cases where lecture-style sessions are needed, discussion questions should be prepared in advance to stimulate interaction and engagement.

As both the questionnaire and interview research showed, speakers are a highly important component. Though there is no exact formula to follow, we suggest a ratio of academic professors to experienced industry professionals should be at minimum 40/60, always leaning more heavily toward industry professionals. Speakers should be very well known and highly regarded throughout the industry. Biographies should be included in both marketing and workshop materials to create visibility. In the early stages of program creation, the largest amounts of time and financial resources should be allocated to developing the content and securing speakers.

Results show that several months advance notice is needed for most executives. We believe a focused marketing plan to advertise early will be critical to a new program's success. A first step could be to personally inform relevant contacts and ask them to help spread the word. Advertisements should

be submitted to as many university publications as possible. Email campaigns should be distributed to alumni. Advertisements should be placed in food and ag e-newsletters such as "Morning Ag Clips," "The Scoop," and "Agri-Pulse." A comprehensive list of industry associations should be created and then called upon to help distribute the information as well. Finally, social media, especially LinkedIn, should be used to distribute marketing materials. For the timing, word of mouth marketing should begin as soon as possible. Formal marketing should be deployed no later than six months prior to the registration closing date and earlier would be better. Properly marketing the program will be costly in terms of time but will be vital for success.

6 Conclusions

The objective of this study was to identify components of a risk management executive education program that professionals in the food and agriculture industry will value, and the price they are willing to pay for the opportunity. The results of this research suggest that there is an opportunity for land-grant universities to provide risk management executive education targeted to the food and agriculture industry.

Professionals in the food and agriculture industry value the content of a program and the ability to apply it to their business. They seek opportunities with highly regarded speakers who have real-life experiences to teach from. Networking, meeting new people, and building lasting relationships across the industry is also an important component. The price a participant is willing to pay for a two- to three-day executive education opportunity is somewhere between $1,500 and $2,000. The information developed from this research offers guidance for beginning or improving a risk management executive education program.

The biggest limitation of this research is the small sample size of questionnaire and interview responses received. Future research can address this limitation by collecting more data and increasing the sample size. Additionally, there could be value in segmenting out different sectors of the food and agriculture industry and analyzing the responses independently.

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Appendix A: Online Qualtrics Survey

Below is the entire online survey as entered into Qualtrics, including the introductory instructions. We have left what-if instructions to make the survey progression clear. These are italicized and were not visible to participants. In instances where explanations of questions are needed, we also provide these in italics and note that participants did not see this text. In the case of short answer questions, we leave a blank, and for multiple choice questions, we include all choices which were available.

In this survey we use the term "executive education." When we refer to executive education programming, we mean a seminar or workshop set up for employees from multiple companies to receive training to enhance skills, as well as network within the industry.

We also ask that you answer these questions based on your normal behavior, without COVID-19 pandemic travel and social distancing restrictions in mind.

Q1 Name

Q2 What industry do you work in?

Q3 What company do you work for?

Q4 What is your job title?

Q5 Are you a decision maker in your company in regard to sending employees to executive education programming?

- o Yes
- o No

Skip To: Q7 if Yes
Skip To: Q6 if No

Q6 Do you participate in executive education programming?

- o Yes
- o No

Skip To: Q8 if Do you participate in executive education programming? = Yes
Skip To: End of Survey if Do you participate in executive education programming? = No

Q7 Do you participate in executive education programming?

- o Yes
- o No

Q8 How frequently do members of your team seek out executive education programs?

- o Less than once per year
- o 1–2 times per year
- o 2–3 times per year
- o 4+ times per year
- o Other_____

Q9 How much would you expect to pay in a registration fee for a three-day executive education program that includes meals, networking events, and opportunities to interact with well-known speakers? *(This question was answered using a slider bar format.)*
Registration Fee in USD ($)
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000

Q10 How much did you pay (prior to the COVID-19 pandemic) for the last executive education program you attended or sent someone to? *(This question was answered using a slider bar format.)*
Registration Fee in USD ($)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Not Applicable

Q11 Briefly describe the program.

Q12 What is your team's annual budget for executive education? And how many employees is that budget for?

The remainder of the survey will ask questions specifically about Risk Management Executive Education.

Q13 Please state your agreement with the following statements.
There is need for external Risk Management Executive Education in my organization.
o Strongly Disagree (1)
o Somewhat Disagree (2)
o Neither Agree or Disagree (3)
o Somewhat Agree (4)
o Strongly Agree (5)

A sufficient amount of high-quality opportunities for external Risk Management Executive Education exist in the current marketplace.

- o Strongly Disagree (1)
- o Somewhat Disagree (2)
- o Neither Agree or Disagree (3)
- o Somewhat Agree (4)
- o Strongly Agree (5)

Q14 How many employees in your company would be candidates for a Risk Management Executive Education program?

Q15 What is the typical time in a career path Risk Management Executive Education would take place? Select all that apply.

- o Entry level
- o Early Career
- o Mid-Career
- o Late Career (re-tooling seasoned employees)
- o Other_____

Q16 Do you require or recommend risk management training?

- o Recommend
- o Require
- o Neither

Q17 How much advance notice do you need about an executive education program to make a decision and plan to attend?

- o 0–3 months
- o 3–6 months
- o 6–9 months
- o 9–12 months
- o More than 12 months

Q18 How many in-person, two- to three-day programs would be optimal to achieve a Risk Management Executive Education Certificate?

- o 2
- o 3
- o 4
- o 5
- o Other_____
- o A certificate is not something I feel is necessary.

Q19 Rank the following risk management program characteristics in order of most important (1) to least important (6) in terms of choosing a Risk Management Executive Education program.

- _____ Quality networking opportunity with other participants
- _____ Location
- _____ Reputation of speakers/program
- _____ Time of year based on seasonality of industry/work
- _____ Cost
- _____ Accredited certification or continuing education credit

Q20 Are there other thoughts or opinions you would like to share related to choosing Risk Management Executive Education programs or insights you have gained from past experience with Risk Management Executive Education programs?

Appendix B: Interview Guide

Interviews with agribusiness executives were conducted by phone or video conference. Each interview was unique in terms of exact progression of questions, time spent on each topic, and total duration. The following script was used to guide the interviews and provide consistency regarding information gathered.

1. What qualities of a program make it valuable to you?
2. What topics would you like to see in a Risk Management Executive Education program?
3. What does the ideal Risk Management Executive Education program look like?
    a. Speakers (background, training, experience)
    b. Days of week
    c. Number of days
    d. Time of year (best and worst)
    e. Other things you look for?
4. When you think of quality Risk Management Executive Education, who is involved in providing it?
5. What makes a Risk Management Executive Education program most valuable to the participant?
6. In general, do you prefer an off-site or an in-house program with external consultants coming in?
    a. Elaborate on the strengths/weaknesses of each and why you favor one
7. Which do you prefer:
    a. A list of connected but stand-alone topics to choose from
    b. A coordinated track of sessions or courses to achieve a badge/certificate in a broader area of risk management (e.g., certification in hedging with futures, certification in Enterprise Risk Management, certification in investment analysis)
    c. Elaborate on why that is your choice
8. In the executive education programs that you or your employees have participated in, what program qualities or activities made them good/bad?
9. How did you learn of previous programs that you or your employees have participated in?
10. What else do you want a person looking to build a quality Risk Management Executive Education program to know?

References

Amdam, R.P. 2020. "Creating the New Executive: Postwar Executive Education and Socialization into the Managerial Elite." *Management & Organizational History* 15(2):106–122.

Bachev, H. 2013. "Risk Management in the Agri-food Sector." *Contemporary Economics* 7(1):4663.

Crotty, P.T., and A.J. Soule. 1997. "Executive Education: Yesterday and Today, with a Look at Tomorrow." *Journal of Management Development* 16(1):4–21.

Freifeld, L. 2022. "2022 Training Industry Report." Training. Available at https://trainingmag.com/2022-training-industry-report/.

Jacobson, D., R. Chapman, C. Ye, and J. Van Os. 2017. "A Project-Based Approach to Executive Education." *Decision Sciences Journal of Innovative Education* 15(1):42–61.

Margulies, N., and J.R. Gregg. 2013. "Strategic Planning for University-Based Executive Education Programs: Success Factorsand Design Alternatives." *Journal of Execuitve Education* 1(1):1–11.

Stanton, W.W., and A.D. Stanton. 2017. "Traditional and Online Learning in Executive Education: How Both Will Survive and Thrive." *Decision Sciences Journal of Innovative Education* 15(1):8–24.

Tiberius, V., L. Hoffmeister, and M. Weyla. 2021. "Prospective Shifts in Executive Education: An International Delphi Study." *International Journal of Management Education* 19(3):100514.

Wu, D.D., S.-H. Chen, and D.L. Olson. 2014. "Business Intelligence in Risk Management: Some Recent Progresses." *Information Sciences* 256:1–7.

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Teaching and Educational Methods

Expanding Beyond Case Studies in Postgraduate Agribusiness Teaching to Enhance Experiential Benefits and Student/Teacher Outcomes

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Abstract
Experiential teaching of postgraduate agribusiness requires both engagement with course material in the classroom and practical experiences from leading agribusiness companies. Many courses rely on case studies to generate such examples. However, we argue that a wider range of industry experiences may better enable students to learn how agribusinesses innovate, overcome industry/policy challenges, and capitalize on opportunities. We illustrate two examples of wider industry experiences from the Master of Global Food and Agricultural Business at the University of Adelaide, including (i) study tours to local agribusiness companies and (ii) agribusiness internship opportunities. The study tours allow senior company managers to present their business strategy, challenges, and opportunities to students before interactive discussions, while access to competitive industry internships with 52 partner companies (between 2014 and 2022) allows direct interaction on multiple levels and research of a relevant industry topic. We assess how expanded examples of experiential learning beyond case studies adds value to agribusiness teaching with insights for other teachers and program managers.

1 Introduction

Experiential learning is a common pedagogical approach in andragogy linked with business and entrepreneurial programs (Bell and Bell 2020). A key example is the Harvard Business School, which has adopted experiential learning using case studies for more than 100 years to create and deliver interactive classroom experiences with reflective learning objectives (DeLacey and Leonard 2002). Adult students engage with industry case study materials to learn how companies innovate, overcome industry and policy challenges, and capitalize on opportunities. Experiential learning thus enables students to see, touch, and apply topics related to their own workplace or employment aspirations through actual industry practitioners working on real business innovation or development issues. This applies equally to agribusiness teaching programs, and evaluations of the effectiveness of those programs (Cooper, Bottomley, and Gordon 2004).

Effective experiential learning stems from providing students with the capacity to overcome gaps between what they know and what they can do, both personally and professionally (McHann and Frost 2010). In the modern agribusiness sector, employers from companies, government, and non-governmental organizations (NGOs) increasingly value ethical team members and insightful or socially responsible managers (Chong 2020). Therefore, socially responsible managers' education may benefit from wider pedagogical engagement with ideas, techniques, and perspectives from other disciplines to expand student knowledge and appreciation for alternative thinking, topics, methods, and solutions (Bagley et al. 2020). Previous examples include teaching case studies where students use the information learned to guide discussion on how businesses deal with political, ethical, and ecological issues in the environment in which they operate. Recent expanded experiential learning opportunities

have incorporated a wider range of materials beyond case studies to actively engage with topics of interest, student-reflection on what can be done and why, and applying that knowledge or information to complement traditional/theoretical learning approaches (Joshi et al. 2005). Higher-level agribusiness educators can similarly apply experiential approaches to reflect on program outcomes and any improvement needs for effective agribusiness education (Cooper et al. 2004). However, in many Australian Business Schools, the approach to education may remain more theoretical than experiential (McHann and Frost 2010). This may also apply to program or course evaluation, reflection, and change.

It is important that teachers and managers of agribusiness programs apply similar experiential techniques (e.g., case studies, personal interactions, seminars with business leaders, etc.) to identify what is working and what is not with respect to course content and teaching techniques. Yet frameworks for experiential course reflection and improvement remain limited in the literature, together with empirical testing. To overcome this limitation, Bell and Bell (2020) have developed a novel framework for experiential learning based on three common theories from experiential pedagogy. We adapt and apply this framework in the Master of Global Food and Agricultural Business (MGFAB) program to assess two teaching activities that involve wider industry engagement: (i) study tours to local agribusiness companies; and (ii) agribusiness internship opportunities. Our purpose is to reflect upon and connect the Bell and Bell (2020) framework to these two examples of experiential learning to go beyond case study approaches. Assessment of the experiential value of these approaches for teaching agribusiness at the postgraduate level is undertaken through examining critical links to higher course learning objectives, student feedback responses, and ultimate assessment outcomes to provide suggestions on how these strategies can be incorporated into other agribusiness learning and teaching programs.

To achieve this purpose, we begin our paper with a brief overview of experiential theory, the Bell and Bell (2020) framework, and how this structures our analysis. Next, we present the two expanded experiential learning activities, starting with the study tours, followed by the internships. While presenting these expanded experiences, we assess them against the Bell and Bell (2020) framework, before finally discussing insights and implications.

2 Experiential Learning Theory and Evaluation Framework

A foundation for experiential learning theory may be traced back to Kolb (1984). Generally, students create the knowledge needed to assess a topic or develop a solution by transforming the experience of others to help grasp abstract concepts through the active application of concrete examples. Students' engagement with active experiential learning is optimized by following sequential steps: experiencing, reflecting, generalizing, and applying knowledge (Smart and Csapo 2007). For effective experiential learning, students must pass through the entire set of steps which involve opposing experiences (McCarthy 2010); that is, achieving a balance between opposing forces of (i) experience/conceptualization and (ii) reflecting/acting (Kolb and Kolb 2005).

For a recent adaptation of the experiential learning cycle, see Figure 1. This cycle shows that first learners do (they undertake experiential activities) where, at this stage, learners engage in concrete situations when they experience or perform in activities; then they reflect, part of this process includes sharing their results, actions, and observations with others publicly. This can be done via group discussion, oral presentations, and other means, and allows a process of discussion where learners look at the experience and analyze and reflect on it. Then they apply by connecting the experience with real-world examples to generalize the concepts taught as an abstraction from that experience that should firm the learning in their minds. This allows learners to apply their previous experiences and any skills learned to new situations and applications.

Experiential learning is not without its critics (Kayes 2002), and it does not take away opportunities to learn from course and teaching experiences. For example, experiential learning may

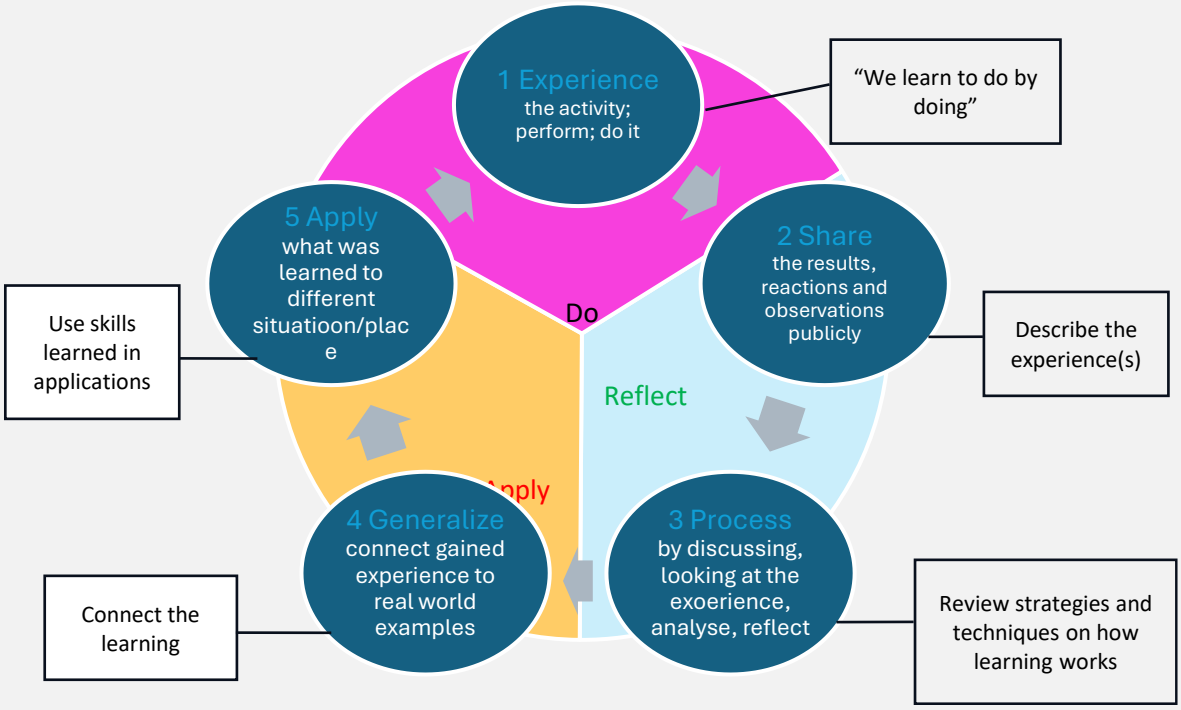

Figure 1: Experiential Learning Model Example.

Source: Reproduced with permission from Humber College (2014)

require strong guidance from educators based on personal expertise and experience, which may disadvantage novice staff (Kirschner, Sweller, and Clark 2006). Yet recent disruptive events such as the COVID-19 pandemic have also enabled the development and exploration of digital technology solutions for storytelling, pitching, business planning, and experiential material expansion (Secundo et al. 2021). These examples align closely to calls for increased emphasis on constructivist teaching approaches involving student engagement in active learning from real-world examples, student development of independent thinking based on a wide array of perspectives and approaches, and student framing of their own questions (Mathews 2007). In recent years, these recommendations have been linked with incorporating a wide range of disciplinary views focused on action-oriented experiential learning, problem-solving, and project-based materials for students (Hägg and Gabrielsson 2020). Such changes naturally involve a role for both students and teachers.

In response, Bell and Bell (2020) developed a comprehensive framework underpinning the teaching and learning process. The final framework is based on Kolb's (1984) experiential learning theory, that highlights the opposing experiences discussed above. It is also based on recent advice offered for improvements (Kolb, Boyatzis, and Mainemelis 2014), together with lessons from Schön's (1983) reflection on action concepts and Mezirow's (1997) theory of transformative learning. This combination of theories is argued by some researchers to more closely align educational theory to pedagogical practice (Fayolle, Verzat, and Wapshott 2016), enabling students to participate more actively in processes rather than passively reading or hearing about them (Bell and Bell 2020). Finally, there is increased scope for agribusiness educators and program managers to benefit from this improved theory-pedagogy link to identify potential program, course, syllabus, and teaching improvements using the framework (see Table 1). As shown, the assessment involves both the role of the educator and the student across the program experiential material at (i) early stages (e.g.,

Table 1: Adapted Framework of Teacher/Student Roles in Experiential Learning Processes

	Pre-experience	During the Experience	Post Experience
Role of the Educator	Ensure learners have the required critical thinking skills, which underpins the experience.	Develop a low-risk environment for learners to make mistakes and learn.	Support post experiential learning reflection and feedback (scaffolded as required).
	Ensure learners are willing and able to participate based on previous experienced and cultural and pedagogic backgrounds.	Ensure the experience is as authentic as possible.	Encourage control in critical reflection.
	Ensure constructive alignment between the learning outcomes, taught content, and assessment.	Scaffolding[1] and support as required on a need basis.	Link the experience to real-world practice.
	Ensure learners have adequate understanding of the learning and assessment process.	Facilitation of learning through mentoring, guidance, and provision of feedback.	Assess the learning from the experience.
		Support effective group dynamics and engagement.	
		Support reflection in action.	
Role of the Learner	Develop underpinning knowledge.	Active participation and experimentation.	Willingness to critically reflect.
	Prepared and committed to the process.	Willingness to look to the educator for guidance and support when required.	Engages in reflection.
		Engage with group work.	Openness to link abstract experiences with the real world.
		Willingness to reflect on action.	

Source: Bell and Bell (2020)

introduction to and reflecting on agribusiness theory and concepts), (ii) advanced stages of information processing, generalization, and application (e.g., connecting theory and concepts to the topic and applying their learning), and (iii) post-experience to reflect and assess the value and outcomes of the program or learning module.

As this framework is novel, and hence has enjoyed limited empirical testing and support, we use this as an opportunity to apply it to an agribusiness experiential program to help assess extended learning engagement teaching options, find evidence of success or effective experiential learning, and indicate opportunities for agribusiness materials, teaching, and/or experience improvements. In the next section, we outline the relevant agribusiness program and the evaluated study tour course and internship. Expected benefits of this research include a structured assessment of the role of the educator in applying the principles of experiential learning and the critical role of student feedback for improvements.

[1] In this context, scaffolding refers to progressively move students toward a stronger understanding of concepts.

3 Agribusiness Program Overview

The MGFAB and the Master of Agribusiness (MAB) programs include core and core elective courses offered specifically in agribusiness, and general elective courses from other disciplines including international trade, finance, wine business management and operations, general economics, and other disciplines. The postgraduate program is taught in an intensive format in trimesters, where some courses are available in two or three trimesters to offer flexibility for students studying full- or part-time. The teaching activities for the program were designed by educators with extensive agribusiness industry knowledge, contacts, and comprehension. This has enabled a careful linking of materials to the principles of active learning (Meyers and Jones 1993).[2]

Industry input to the program structure and content is provided by the University Agribusiness Advisory Board (AAB). The board, which meets three times a year, contains senior managers of agribusinesses in Australia. The overarching aim of the AAB is to provide high-level strategic and practical advice on research and teaching within the university and a key reference point for course offerings and student engagement, particularly relating to networking, internships, scholarships, case studies, and career opportunities.

4 Experiential Learning Activities

Within the program, a range of experiential material allows students to engage closely with senior company managers, where those managers present their business strategy ideas, challenges, and opportunities before allowing interactive discussions and questions from students. Assessments include individual/group presentations summarizing lessons learned and written individual/group assignments focused on business strategies addressing the identified challenges and opportunities. At the advanced stages of both programs, a capstone research project that students undertake during their second year is required. By the end of their program, students present their research to other students and academic/industry staff to receive feedback before submitting an 8,000-word research paper. This may be achieved in concert with an industry partner, with topics based on a real-world problem.

The main objective of the program is for students to engage with and use activities, such as study tours and internships, to gain experience by reflecting on, and applying the business and economic theory they are learning. It also enables students to match increased industry knowledge with experience to address real-world problems and, more generally, to improve the students' networks and employability. At the other end of program participation, agribusiness companies can benefit from a fresh set of eyes on their business and use students' experiences (and sometimes challenging questions) to reflect on their own business strategies.

The remainder of this section presents more detail on two experiential learning activities: study tours and internships. These are the Experience and Insights in Agri-food Systems course (study tours) and the industry internships. In this section, we link these learning activities with the Bell and Bell (2020) theoretical framework, highlighting the "pre-experience" ("do"), "during-experience" ("apply"), and "post-experience" ("reflect") aspects of Kolb's (1984) learning model, where relevant. We focus on the roles of the educator listed in Table 1, to assess the experiential learning approach of the study tour and the internships. We use qualitative data from program documents and students' feedback, as well as quantitative and qualitative data to reflect on the effectiveness of our experiential learning approach.

4.1 Experience and Insights in Agri-Food Systems Course

The basis for our analysis is the course AGRIBUS7059: *Experience and Insights in Agri-Food Systems* (study tours). This course has been taught since 2015 twice a year (trimester one and trimester three)

[2] Experiential learning is a form of active learning. Overall, the program aims at applying active learning principles, and includes experiential learning activities in learning and teaching.

with a maximum of 20 students in each study tour made up of 15 postgraduate students and five undergraduate students since 2020.[3] The course leverages the programs' close relations with agribusinesses in South Australia, alumni networks, and relations with the Agribusiness Advisory Board composed of CEOs and managers of different agribusiness companies, growers, and agribusiness associations in the state. The course is targeted at students who want to gain practical experience with leading South Australian agribusiness companies.

A list of some of the agribusinesses visited is presented in Table 2, and a detailed program for the course for September 2022 is provided in the tables in Appendix. From Table 2, it is evident that companies vary in the type of product produced and orientation with respect to different markets and clients. There are companies of different sizes, from local artisan cheese producers and local breweries to international corporations producing wine for local and international markets, commercial family farm operations, larger scale produce operations, locally owned retailers, and national supermarket chains.

Table 2: South Australian Companies Visited AGRIBUS7059 Experiences and Insights in Agri-food Systems Course in September 2022 (Study Tours).

Companies Visited	Who They Are	Reason to Visit
Government		
Department of Primary Industries and Regions South Australia (PIRSA)	Economic development agency responsible for the prosperity of primary industries in South Australia.	Introduction on the South Australian food industry and role of government, including data collection for the industry scorecard and policy setting.
Regional Development Australia (RDA)	Peak body responsible for the development of regions in Australia through engagement with local industry and all three levels of government.	Introduction to regions like the Barossa. Role of RDA and regional development boards and contribution to community impacts. Links to economic development, investment, and agritourism.
Supermarket/Food Retail		
Drakes Supermarkets	Largest independent retailer in Australia with 60 stores across South Australia and Queensland.	Introduction to Drakes Supermarkets. "State of the Art" Meat Processing Facility (MPF), robotic dry goods distribution center, and the fresh produce operations.
Retail stores of Coles Woolworths and Foodland Supermarkets in Rundle Mall	Coles and Woolworths are leading Australia retailers, and Foodland is a leading independent South Australian retailer.	Understand the retail categories and identify products of participating companies on shelf and check competing products.
Produce and Processor-Based Company Examples		
SA Produce Markets Limited	Wholesaler market connecting growers to small retail and food service businesses.	Understand the transformation of traditional fruit and vegetable wholesale markets and the impact of larger supermarket distribution centers. Comparisons to the students' home countries.

[3] When student numbers were lower during COVID-19, the decision was made to allow five undergraduate students into the course. This has worked well, with high demand and positive feedback from both students and companies, highlighting that this approach can provide positive results for both postgraduate and undergraduate students.

Table 2 Continued…

Companies Visited	Who They Are	Reason to Visit
Produce and Processor-Based Company Examples		
Gully Gardens	One of the last surviving traditional dried fruit family operations.	Industry transformation. Succession planning. How they have transformed their business from a raw material supplier to market value-added products directly to consumers through agritourism and online sales.
Monika's Organics	Farm producing certified organic fruits and vegetables for wholesale in South Australia.	Introduction to organic farming and marketing of fresh produce. Learn about certified organic practices and the challenges of competition/dealing with some of Australia's toughest retailers.
P`Petual	One of the largest protected cropping facilities in Australia. Produce can be found all year round at supermarkets and greengrocers.	Protected cropping innovation and systems are taken to a large scale. Specialization and consolidation of distribution/sales channels. Maintaining market competitiveness.
SA Mushrooms	Largest privately owned mushroom farm in South Australia. Primary supplier of mushrooms to major supermarkets, greengrocers, and produce markets in the state.	Learn about the mushroom growing process, fresh product distribution, sales, and category growth.
Costas	Sustainable commercial produce farming. One of the largest publicly listed horticultural enterprises in Australia.	Quality and handling of produce for retail clients with an eye on changing consumer demand. Technology-driven productivity and efficiency along the market channel.
The Barossa Valley Cheese Company	Artisan cheese producer, sourcing milk locally. Production and retail, tastings, and tours.	Innovation in cheese production and marketing.
The Barossa Valley Chocolate Company	Regional branding. Agritourism.	Point of difference marketing strategy diverting from cellar door wineries in the region. Targeting families visiting the region for a day trip.
Jacobs Creek	Winery. Production, processing, retailing, tasting, touring, and wine cellar.	Global wine liquor brand with a multinational corporation vision. Leveraging local regional provenance with tourists.
The Dairyman	Traditional mixed farm, production, processing, and retail. Accommodation and farming experiences.	Visit farm and learn about dairy, pork, and mushrooms. Business activities include production, retail, agritourism, and selling into high-end restaurants based on traditional production methods and provenance.
Prancing Pony Brewery	Craft brewery using traditional recipes in the Adelaide Hills, beer brewing, restaurant, and tourism with brewery tours and tastings. Beer sold in Adelaide Hills and Adelaide locations and a few retailers.	Tour of brewing and bottling operations. Description of the changing beer category and the role of smaller craft breweries.

Table 2 Continued…

Companies Visited	Who They Are	Reason to Visit
Produce and Processor-Based Company Examples		
Bickford's Australia	Premium cordials and other beverages such as juices, waters, and syrups.	Fast-moving consumer goods (beverages). Brand and packaging strategies. Best practice product development/innovation models. Leveraging heritage. Product segmentation. Labor productivity/advanced automation.
Ashton Valley Fresh & Ceravolo Orchards	Integrated business, fruit production in orchard, and production and processing of premium fruit juice.	Value-adding and innovation/diversification. Partnerships with juice and cider entrepreneurs. Succession management. Regional tourism and exports.

Source: University of Adelaide internship records

This course is conducted over one full week, two times per year. One reason for this is to allow students to immerse themselves in the experience and be able to compare business strategies while they are fully engaged over the five days. Consequently, the advice to students is to completely clear their schedule for the week, while the program coordinator ensures there are no clashes with other program core courses or key electives. On the first day, students are introduced to the themes and the course-structure/expectations. The following three days are spent in the field visiting, and interacting with, local agribusiness companies, including presentations from senior company staff. Since the course is taught twice a year, some companies come in and out of the program depending on availability. The final day of the course includes students' presentations and the introduction of a written assignment (see the tables in the appendix for an example of the itinerary in 2022).

During the visits, students spend two hours with each company, where talks are conducted by senior company staff, including the owner, Managing Director, CEO, Marketing or Production Manager, or a combination of these roles. The primary objective is to ensure that the experience is as authentic as possible (Bell and Bell 2020). Throughout the week, course coordinators offer guidance and answer questions, but the main presentations are predominantly delivered by the companies. Academic staff provide the companies with a summary of the course and learning outcomes, offering context on the covered topics and likely questions to be asked.

In addition to a range of different types of business organizations, the visits also include an overview from the predominant government agency, Primary Industries and Regions South Australia (PIRSA), who provide a summary of the food industry by sector and region. PIRSA also discuss how they collect data through their state economic scorecard initiative and how they use and share this information with industry to set relevant government policy. Regional Development Australia (RDA), a key agribusiness resource in the state, are also asked to describe how their organization operates using the economic importance of the Barossa region as an example of involving all levels of government when setting the development strategy of a region. This type of experience allows students to learn about the role of multiple stakeholders in regional development and strategies for branding, provenance, and presence in international markets. They also learn about the different economies of scope that these businesses may benefit from such as becoming producers, processors, retailers, and agritourism operators.

4.1.1 The Course as Experiential Learning

Learners interested in the course have access to the course outline (syllabus) before enrollment, allowing access to information on course learning outcomes (CLOs), course content, and assessment. The formal CLOs include:

1. Identify and interpret the nature of business challenges and opportunities.
2. Communicate research findings in a professionally relevant manner (written and oral).
3. Differentiate the characteristics of different business strategies and the variability associated with agribusiness value chains.[4]

These have been mapped to the learning and teaching activities and to the assessment tasks students undertake during and after the course: Engagement by asking relevant questions during visits (CLO1); group presentations that reflect on the experience (CLO2); and a written assignment about the challenges and opportunities faced by visited companies (CLO2 and CLO3). These will be returned to later in detail as we reflect on the course activities.

The course does not stand alone and assumes that students have taken core courses in global food and agricultural markets, policy analysis, and value chains, allowing them to better understand how to apply theory concepts from those experiences during the visits (*pre-experience*). The program director works together with student support to ensure study plans, including the experience course, taking this assumption into consideration. Our experience is that when students follow this advice, they are better able to take advantage of the course material and experiences than those who do not.

At the early stages of the experiential process (*pre-experience*), students are also introduced to key concepts and background material to prepare for the visits to different agribusinesses. Students are introduced to the concepts of value chain, and the pre-reading includes industry and company reports allowing students to become familiar with the industry context and some background of the companies they will visit. Students are also advised to visit the companies' websites before the visits to make the most out of their time with senior managers and other staff. Overall, the course aims to provide an understanding of value chains, industry networks focusing on end consumers and market requirements, innovation, business to business collaborations, market competition, and an overview of the South Australian food industry. The timing of the course within the program, the concepts taught early in the course, and the background reading all ensure students have the required critical thinking skills underpinning the study tours course.

Before the course starts, and as part of the pre-experience stage of learning, each of the students attending is required to provide a 200-word summary of their previous experience and future career aspirations. This gives the two course coordinators an opportunity to better understand each of the students on the tour and which aspects of the site visits might be the most beneficial to them, ensuring that students are willing and able to participate based on their previous experience, as well as cultural and pedagogical background. Students are also provided a list of "what to look for" during the visits (see bottom of the tables in the Appendix). These points and the assessment tasks are discussed at the beginning of the course. The activities are designed to ensure adequate understanding of the learning and assessment process.

Ahead of the visits to companies (*during the experience*), students are informed that they need to do background reading (including strategic plans and value chain reports for the food industry in South Australia) to prepare for the visits and understand the expectations of their behavior and conduct while on each of the site visits. Companies, particularly those being included on the tours for the first time, are

[4] For the undergraduate students, the first two CLOs are the same, but the third CLO is "Recognise and articulate the characteristics of different business strategies and the variability associated with agribusiness value chains."

given background on our master's program, the types of students who will be on the tour, the broad course learning outcomes, and the types of questions the students are likely to ask. The course aims to provide an environment where students feel safe to ask questions and participate in visits, and emphasizes prior preparation to provide a sense of confidence. This is a good strategy with students for whom English is a second language and with different cultural backgrounds that may affect students' engagement during visits. Limiting the size of the class to 20 also enables the two course coordinators to support individual students who may need more explanation to grasp the concepts being presented.

At an advanced stage of information processing, generalization, and application (*during the experience*), the course encourages active participation by students during the visits to address each of the three CLOs. On the study tours, a variety of local agribusiness companies' senior managers present their business strategy, challenges, and opportunities before allowing interactive discussion and questions from the students. Students are instructed to reflect on the companies' position in the industry, within the value chain, their values and culture, market orientation, business challenges, and opportunities to evaluate and compare business strategies (CLO1), ensuring the experience is as authentic as possible. Students are also asked to "*Reflect*" on what they think are the companies' reasons for success. In doing so, students are encouraged to use the concepts learned in the course and reflect on the *pre-experience* material (CLO1) supporting our objective of teaching reflection in action. Class participation emphasizes the quality and relevance of student engagement, rather than how often they engage with the companies' managers and personnel during the visits, facilitating learning through mentoring, guidance, and feedback.

Students are then assigned to groups of five for a presentation to encourage interaction and discussion during the whole course. Evaluation of the presentation is a combination of individual and team grades to encourage participation and teamwork within the group, but also to reward individual achievement. Group membership is assigned by the course coordinator to ensure a mixture of experience, backgrounds, culture, and gender to mimic situations students may be faced with during their future careers. The group presentation supports effective group dynamics and engagement.

At the post-experience stage, students apply their knowledge by connecting their experiences with agribusiness companies during the study tour course. This is achieved through reflection in a group presentation and problem-solving in a written assignment.[5] Assessment includes a collaborative presentation on the last day of the course where students reflect on their experience and receive feedback (CLO2) that supports experiential learning reflection. They work on an individual written assignment that needs to be submitted approximately one month after the visits take place (CLO2 and CLO3). The written assignment consists of questions relating to the student's observations around the challenges and opportunities facing these businesses (CLO1), encouraging critical reflection. Students also analyze the value chain and industry networks of the companies visited, exploring the business strategies utilized by senior management. They delve into how these companies differentiate themselves from competitors and examine their approaches to engaging with and marketing to consumers (CLO3), connecting the experience gained during visits to real-world businesses. The post-experience exercise (assessing the learning from the experience) has demonstrated that students who put more effort into the course, both pre-experience preparation and engagement during the experience, are far more likely to demonstrate a better understanding and application of the concepts and course learning outcomes.

4.1.2 Students' Feedback

The following student feedback corresponds to the anonymous responses to the Student Experiences of Learning and Teaching (SELT) surveys, which correspond to the students' evaluations of the courses collected by the university at the end of every course. These results for AGRIBUS7059 are limited for a

[5] The differences in the CLOs for undergraduate and postgraduate students implies that the requirements for the written assignment differ for undergraduate and postgraduate students.

few reasons: (i) due to changes in the questionnaire that make comparisons difficult before 2018, (ii) information not being available due to COVID-19 in 2020, and (iii) class sizes that fall below 10 in number, which are not reported. The results presented below correspond to aggregates and anonymous comments, which have been approved for release. Students' feedback also allows us to reflect on the Bell and Bell (2020) framework as illustrated in Table 1.

On average, students' responses are very close to "strongly agree" to the questions: "The course helps me understand key concepts" and "The course is intellectually stimulating" (Table 3), suggesting that the course helps students develop underpinning knowledge. The comments below also confirm that students are interested in visiting a variety of agribusinesses and are keen to interact with business managers and owners. The course coordinators look for a variety of companies (e.g., different products or services in different sectors, different parts of the value chain, different sizes, and different market focus), allowing students to compare these companies during the study tour (i.e., they are different), but also explore some of the similarities that make them successful. Examples of student feedback of what is valued in the course highlight these points:

> *"The variety of businesses and access to business owners throughout the week to understand their challenges and how they think through problems."* [Student, Trimester 1, 2021]

Table 3: Student Experiences of Learning and Teaching for the Experiences and Insights in Agribusiness Course (AGRIBUS7059) (N = 29).

	Student Evaluation Criteria	Trimester 1 2021	Trimester 1 2022	Trimester 3 2022
1	This course helps me to build my understanding of key concepts.	6.9	6.8	6.4
2	Overall, this course is intellectually stimulating.	6.8	6.8	6.6
3	This course includes digital activities and resources that help me learn.	6.4	6	6.2
4	In this course I receive useful and timely feedback on my work.	6.4	6.5	5.9
5	The assessment tasks in this course help me learn.	6.7	6.5	6
6	In this course diverse perspectives are valued, and difference is accommodated.	6.7	6.7	6.6
7	This course is well organized.	6.7	6.9	6.3
8	How much effort have you put into this course?	6.4	6.5	5.9
9	Overall, I am satisfied with the quality of this course.	6.9	6.6	6.1

Source: Students' Experiences of Learning and Teaching Results 2021–2022 for AGRIBUS7059.
Note: Each response corresponds to a Likert scale from 1 to 7, where it is indicated that 7 = strongly agree, 4 = undecided, and 1 = strongly disagree.
Trimester 1, 2021, response rate 9 out of 12; Trimester 1, 2022, response rate 11 out of 14; and Trimester 3, 2022, response rate 9 out of 9.

> *"Visiting and interacting different companies, knowing their strategies of building business, and challenges they are facing."* [Student, Trimester 1, 2022]

> *"Because of the diversification of visited businesses, this course has the space for each student's interest."* [Student, Trimester 3, 2022]

Although students' evaluations take place after the course ends, some students' comments speak to their active participation in the course where they can reflect on *(during the learning)* experience(s) that they do not find elsewhere during their program. This suggests that the experience was considered authentic as per the following examples:

> *"Opportunity to get behind the scenes in businesses that we would not normally get access to."* [Student, Trimester 1, 2022]

> *"I'm an international student who just came to Adelaide few months ago. This course gives me a great chance to quickly understand the real Agricultural Business concept in South Australia. This helps me to widen knowledge and obtain so much information to compare and consider applying when I go back to my country."* [Student, Trimester 3, 2022]

> *"On-site visits were immensely educational and eye-opening."* [Student, Trimester 3, 2022]

> *"The course provided students with practical experiences and insights about how South Australia's food and agricultural industry operate. The course is very interesting and very different from other courses because students have opportunities to visit different businesses in South Australia. Based on my observations during the trip, I can see how they are doing, how they are operating the businesses, and how they are making plans and expanding their business size. These understandings and insights are very interesting and useful and more supportive for me before I do my research project next trimester."* [Student, Trimester 3, 2022]

Further, opportunities to link course experiences with future career opportunities, how to apply course theory and learnings, and better understand how agribusinesses adapt based on their experience, allow students to appreciate real-world applications:

> *"I thought the exposure to a broad range of agribusinesses was of high value to the outcomes of the course. I think the diversity of visits gave those doing the course a great idea of how many careers and opportunities exist in the agribusiness sector. It's one of the things that I did miss in undergrad and much of my master's degree, real-life exposure, and I like that I was able to apply some of the things I've learnt in the classroom to many of the visits. Of the week the visits I found most beneficial, giving us greater insights into their business were, Ceravolo Orchards, P'Petual, Drakes, Yalumba, and SA Mushrooms. Not to say the others didn't just that these were a few of the visits that were extremely valuable in my opinion."* [Student, Trimester 1, 2022]

Finally, the responses leaning toward "strongly agree" and "agree" to the statements: (i) "In this course, I receive useful and timely feedback on my work" and (ii) "The assessment tasks in this course help me learn" (Table 3) suggest that students engaged with reflection. Responses to "How much effort

have you put into this course" may also be used to assess student willingness to reflect critically on their work during the course through a process of self-evaluation.

The feedback presented in this section suggests that the course approach using the principles of experiential learning allows students to apply what they have learned in the program, relate the content to the visits and their own experiences in their jobs and their home countries, on their research project, and on the direction that they would like to take once they finish their master's degree.

4.1.3 Companies Feedback

Course coordinators engage with companies before and after the study tours. This is normally by phone or by email and includes an additional thank you for their time and willingness to be part of the program as well as any general feedback or additional questions from the students. We asked the companies about their experience and whether they are willing to be part of future study tours and internships. The responses are only anecdotal, but they have been very positive, which is highlighted by the company's continual involvement in these activities.

4.2 Internships with Agribusinesses

Although the internships themselves are not part of a specific course, they are conducted under the research methods courses (AGRIBUS7061 and AGRIBUS7062). Students undertake a research project linked to the internship. Students received guidance and feedback from course coordinators in the research course and from their supervisors at the university and at the companies. The CLOs to be achieved by students during their research project, as part of the agribusiness internship, are:

1. Apply an advanced knowledge of research design options, methodologies, and analysis methods (both qualitative and quantitative).
2. Distill a broad business problem or research topic into a succinct set of research objectives and questions.
3. Create a research proposal and a plan for implementation.
4. Recognize the importance of ethics as it relates to undertaking research and its implications for a range of different stakeholders.
5. Identify literature relevant to the subject of investigation.
6. Source, interpret, evaluate, and analyze primary and/or secondary data.
7. Draw and justify conclusions from this analysis.
8. Present research findings and conclusions in an academically appropriate manner.

Assessment includes a research proposal (CLO1, CLO2, and CLO3), an oral presentation (CLO8), a research paper (CLO5, CLO6, CLO7, and CLO8), and engagement with supervisors. At the beginning of the research courses, the expectations about the agribusiness internships and the assessment tasks are discussed with students, including conducting research in agribusiness settings and writing of reports for the companies. These pre-experience activities ensure students understand the learning and assessment process.

The internships within the MGFAB and the MAB have been offered since 2014, with a total of 52 internships offered between 2014 and 2022. Participating companies include agribusinesses, NGOs, and governmental organizations. The internships are offered to students earlier in the second year of their master's as part of their capstone research project. Once the list of possible internships is finalized for the year, a session takes place with students starting their research project. Sometimes one organization has offered more than one internship. The list of all the internships offered per year, including the companies and students' projects, can be found in Table A6. Students conduct the internships in the second year of their master's program, since they are expected to apply the concepts learned in their courses. By the

second year of their degree, students are expected to have taken the core courses and some elective courses and have acquired experience in academic writing. This is part of the *pre-experience* stage where students have acquired the critical thinking and skills required to undertake the internship.

The process of the internships starts with approaching companies for their interest in having students work on projects. The process is similar to a job application where the students apply and the company decides who is most suitable. Once the company and student are paired up, academic supervisors are assigned according to the research topic. Students sign formal internship agreements with the companies to allow the exchange of any confidential information required for the research project. At this stage of the *pre-experience* process, the course coordinators ensure that students are willing and able to participate and that students are paired with companies based on their backgrounds and alignment of interests.

Once this process is finalized, students perform a series of activities for the company (*during the experience they "do"*), such as solving a problem or analyzing an issue of interest. These activities include familiarizing themselves with the company, the market, the product they sell, and collecting or analyzing data. Some internships may involve a significant time spent on site, while others may be desktop-based, depending on the company and the research topic. All internships involve regular contact between the student, company, and academic supervisor. These activities and interactions ensure that the experience is as authentic as possible.

Students are then expected to reflect on their experience in different ways during their internship. These include regular discussions with both their academic supervisor and with their supervisor at the company or organization, clarifying the requirements and expectations from both the companies and for their degree. It is common to have the senior manager or person in charge of the internship join meetings between students and supervisors to provide feedback. These meetings usually take place on a fortnightly basis right through the internship and are used to guide the student, ensuring they are on track, and that the objectives of the internship are met while complying with the requirements of the master's program. Therefore, *during the experience,* these interactions aim at developing a risk-free environment for students to make mistakes and learn, and support learning through mentoring, guidance, and the provision of feedback.

As part of their reflection process, students do a 10-minute presentation of their progress to the research project course coordinator, their supervisors, other academics, other students, and the senior manager or person in charge of the internship, all of whom are invited to the session. These presentations are conducted in panels scheduled for two days or more, depending on how many students are finalizing their research project papers. The presentations provide an opportunity for the students to present their work to others who are unfamiliar with their research and receive feedback from academics, students—and from any companies involved—before the written final report assignment is due. The presentations support post-experiential learning reflection and feedback. For all students in the master's program, this is a great opportunity to practice professional communication skills.

Thus, over the period of about eight months, students develop a research proposal, review literature, and identify a theory basis to structure their work on the project for the internship. This also includes a reflection about the research process, including challenges they encountered, their expectations compared to the experience, and any highlights as part of the assessment of learning from the experience. The objective is for students to apply what they have learned during their master's program to solve a problem. The major output of the internship is a written report to the company that includes an analysis or a potential solution to a problem or opportunity they are facing, and a research paper that complies with the research component required in their program, encouraging control over critical reflection. The papers are limited to 8,000 words in total, written in a format that suits the company, but the underlying content needs to satisfy the academic rigor expected from the research project course. The final paper and the process leading to it help students with linking their experiences to real-world practice.

An additional objective of the internships and the capstone research projects is to allow students to use them as a stepping stone to their future careers (to link the experience to real-world practice). This provides them with work experience and networking opportunities, as well as a chance to apply what they have learned in their program to solve problems in a real-world environment. This has been demonstrated to be of value not only for students, but for the companies, by providing a research output that the companies can use to show experience with solving issues or opportunities the companies are facing. A summary of the educator's role in experiential learning (Bell and Bell 2020) applied to the study tour and the internship is provided in Table A7.

4.2.1 Examples of Internships

To further illustrate the points made in section 4.2, we present some examples of internships and their outcomes (see Table 4). These include internships with different types of organizations: one NGO, Conservation International, and three private agri-food businesses: Smart Group, Laucke Flour Mills, and Mexican Express (Mexex). These further illustrate some aspects of the Bell and Bell (2020) framework provided in Table 1.

Example 1: **Conservation International**

Conservation International (CI) is an international NGO working on natural resource conservation. CI implemented development interventions to promote fisheries management practices and livelihood alternatives to floating village dwellers in the Tonle Sap Lake in Cambodia. The interventions included the formation of community groups to help regulate fisheries, the promotion of saving groups to help manage household resources, and business initiatives such as training in improved fish drying practices. Two students worked on the analysis of the saving groups, one student analyzed community fisheries management, and a fourth student analyzed the uptake of fish processing practices, ensuring the experience was as authentic as possible (*during the experience*). During these internships, the manager for CI Cambodia Freshwater met with students over the course of the internships and provided valuable feedback and insights facilitating learning through mentoring, guidance, and the provision of feedback (*during the experience*). For students, it offered a learning opportunity about writing reports for an organization interested in development outcomes, while applying the concepts learned in their program. Some of these students are currently working back in their home countries with international development organizations and have conducted work evaluating interventions by NGOs, linking the learning experience with real-world practice (*post experience*) in a very real sense.

Example 2: Smart Group Farms

The CEO of Smart Group Farms is the Chairman of the Agribusiness Advisory Board, who has often provided mentoring to students undertaking internships at their organization (during the experience, facilitating learning through mentoring, guidance, and feedback). There have been four internships with his business on various topics, including assessing new product and investment opportunities, understanding potential new export markets, developing the company's online engagement strategies, and how the business could better engage with different government departments (during the experience, ensuring the experience is as authentic as possible). The CEO was very engaged with the students and spent considerable time during the farm visit to ensure students understood the business structures and were able to discuss/refine the research outcomes and recommendations.

Example 3: Lauke Flour Mills and Mexex

Another example that takes this value even further is the internships with Laucke Flour Mills and Mexex. Two students were involved in the Mexex internships. The company was looking to expand, one project looked at the market opportunities through a market selection framework, while the other project looked at the

constraints for the supply of raw materials to their factory and whether contract farming was a viable solution for their existing business model. The Laucke internship aimed to exploit the company's strengths by exploring

Table 4: Examples of Research Internships.

Industry Partner	Master Program (MGFAB or MAB)	Research Topic	Year
Conservation International (CI)	MGFAB	Tonle Sap Lake Savings Groups	2020
	MGFAB	Tonle Sap Lake Fisheries	2020
	MGFAB	Tonle Sap Lake Evaluation of Fish Processing Practices	2021
Smart Group	MGFAB	Exploring Efficient Pathways to Asia and Product Attributes for Oaten Hay	2015
	MGFAB	Use of Internet as an Effective Tool for the Marketing and Promotion of Farm Produce	2015
	MGFAB	Finding Funds, Grants, and Concessions Available to Australian Farmers	2017
	MGFAB	Smart Farms Nut Sector Expansion Assessment	2019
Laucke Flour Mills	MGFAB	Challenges for Laucke to Continue to Expand in China	2015
	MGFAB	Discover and Develop Certified Safe Food Australia Products' Commercial Value to Chinese Consumers	2018
Mexican Express (Mexex)	MGFAB	Current Landscape of Contract Farming in Australia: The Role of an Agribusiness Firm	2021
	MGFAB	International Market Selection Framework: An Australian Perspective	2021

Note: Most of the companies in this table are still offering internships in 2023.
MGFAB = Master of Global Food and Agricultural Business. MAB = Master of Agribusiness. Internships are done within the master's capstone research project of both of these programs.

how a certified safe food program could open opportunities into the Chinese market. Two of the students involved in these internships were valued so much by the companies that they chose to employ them full-time after they graduated from the master's program. Therefore, the experience of applying what they have learned, reflecting on it, producing a professional report, and the training received via the interaction with the companies was extremely valuable to both the student and the companies involved (post-experience linking the experience with real-world practice).

5 Discussion and Conclusion

In this paper, we present a reflection on our teaching approaches using the lens of experiential learning theory and an application of the Bell and Bell (2020) framework, which is appropriate for assessing the benefits of approaches other than case studies for teaching agribusiness programs and for designing and

implementing experiential learning activities. We find evidence suggesting that educators adhere to most of the roles suggested in Bell and Bell (2020).

Our assessment also illustrates how study tours and internships can improve the way we teach agribusiness for postgraduate students through building the knowledge base, providing unique and authentic opportunities for students to apply and reflect on that knowledge base, and designing assessment tasks that link these two together to meet the course learning outcomes. This is particularly relevant in a field where students can be involved in solving real-world problems. In turn, these activities enhance students' learning and teaching experience by providing unique opportunities for application and reflection, for contextualization, for interactions with managers, and the chance to apply what they have learned within the courses and their future careers. In this sense, the study tours are a good introduction for the students on understanding companies more, and the internships offer an opportunity to dive deeper into a particular challenge or opportunity and engage actively with the company to find a researchable solution.

However, our assessment via the Bell and Bell (2020) framework also shows that to apply experiential learning in agribusiness effectively, some challenges need to be considered. First, setting and aligning of expectations between educators, learners, and companies participating in the learning experience is key. For example, in the case of the internships it is important to clarify to companies the requirements of the academic program, the set timeframe of the courses, and the assessment tasks required within the academic program. Similarly, the students need to be aware of the complexity of delivering a research project for an academic and a private sector audience, including the extra time needed to engage with the company, understand the business, and be aware of the confidentiality needed when dealing with sensitive company information. In the same way, students also need to be aware of the intellectual property and confidentiality of the information being presented to them during the study tour, what they can and cannot share, and the type of questions that the companies may not be willing to answer during the visits.

Importantly, offering a course such as the study tour and internship opportunities to students that are specific to the agribusiness program requires academics with the knowledge, experience, and networks to develop these approaches. These types of course experiences are hard to develop and are not easily repeated from one teaching period to the next, so academics need time and incentives to conduct these activities. Furthermore, it requires the institutional support from schools, departments, and university administrators to organize the study tours and to facilitate covering the costs associated with their delivery. This is not always practical for many institutions—but it does have significant benefits for all involved.

Yet experiential learning activities beyond standard written case studies, such as those described in this paper, can be incorporated into learning and teaching in different ways. Further examples include integrating and supporting experiential lessons via invited external speakers who may share their experience and encourage student discussion of the lessons learned in the lecture sessions. Supporting this, recording industry leaders' experiences through video reduces the number of times they need to repeat themselves and captures content in a form that can be used in different agribusiness courses across the programs. By getting the case study videos timestamped around the questions being asked, course coordinators can direct students straight to the parts of the video that are most relevant to the theory being taught in each of the other courses.

Furthermore, the study tour course and internships can be adjusted to provide experiential learning experiences to both undergraduate and postgraduate students. These require adjusting course learning outcomes and assessment to cater for these different academic levels. Internships, invited speakers, and video recordings can be incorporated to undergraduate teaching. Course coordinators may need to adjust how these are used depending on the student audience (undergraduate, postgraduate, or combined).

Finally, we believe that more research is required to further understand the effectiveness of experiential learning approaches like the ones presented in this paper. For instance, collecting additional

student and company feedback not only about the study tours but also more detailed feedback about the internships would help in shaping future experiential activities. A deeper understanding of student and company needs and expectations may help to improve the additional skills required by students, together with the preparations companies might make before accepting the responsibility of an internship. Also, further exploration is required to better understand students' willingness to participate in these approaches to learning and teaching in agribusiness and their subsequent perceptions about its benefits. Moreover, understanding the effectiveness of these experiential learning approaches (internships, study tours) at the undergraduate level is required to improve teaching and student outcomes in agribusiness programs.

Overall, we conclude that experiential learning is required for agribusiness programs at the postgraduate level. More studies of this type could help better understand the different approaches and the potential benefits to students, industry, and universities.

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Appendix: Experiences and Insights in Agrifood Systems AGRIBUS 7059 19–23 September 2022

Table A1: Day 1 Monday 19 September 2022.

Time	Activity	Instruction	Special notes	Research
8.30 am	Introduction to program managing COVID-19 and overview of the course, bus timetable, dress requirements, structure, pre-reading, etc.	Students need to engage, ask questions, and be on time.	Allocate student groups into smaller groups with a mixture of backgrounds and experience. Wear name tags and vest as instructed.	
9.30 am	PIRSA presentation, SA Industry scorecard.	Pema Wangchuk Scorecard Analyst & Martin Carter PIRSA	Introduction on the South Australian food industry and role of government.	Measuring industry sector value chains.
10.15 am	Group photo session.	Craig Johns & Theo Simos		
10.35 am	Bus departs 10 Pulteney St. 20 min/8 km.			
11.00 am–12.30 pm	Drakes Supermarkets "State of the Art" *Meat* Processing Facility (MPF). 5 Alfred Ave, Beverley SA 5009.	Meet Daryl Rosevear & Jason Smith Tour of meat portioning, packaging & distribution and logistics.	Introduction to Drakes Supermarkets with questions and answer session. Tim Cartwright GM Fresh Foods. Split into 2 groups for the tour (Groups 1 & 3 and 2 & 4).	
12.30 pm	Destination Adelaide Hills region 51 min/40 km	Lunch on the bus.		
1.30 pm	Prancing Pony Brewery 42 Mt Barker Road Totness 5250 SA.	Corinna Steeb (Co-Founders & CEO)	Break into groups for tour of brewing and bottling operations. Group together for final question & answer session in main restaurant.	
3.15 pm	Depart for Adelaide 34 km/35 min.			
	Briefing exercise Theo Simos	Handout group documentation.		
4.00 pm	Retail market intelligence exercise, walk to Rundle Mall, and visit Coles Woolworths and Foodland supermarkets.	Split into groups; retail category identification; and locate and familiarize fresh produce exercise.	Identify products of participating companies on shelf and check competing products.	Program to be handed out on the day and handed in on Tuesday morning.
5.30 pm	End of day 1 program.			

Table A2: Day 2 Tuesday 20 September 2022.

Time	Activity	Instruction	Special notes	Research
6.00 am	Pick up at Nexus Building 10 Pulteney St Travel to Barossa Valley (80 min/90 km).	Be on time or miss the bus.		
7.30 am	Arrive in Angaston Refreshment stop at Wanera Wine Bar 65 Murray Street Angaston Place food orders on arrival.	Welcome & Regional Overview by Mark McNamara, Regional Development Australia, Representing Barossa Gawler Light Adelaide Plains region https://barossa.org.au/	Role and importance of regions and strong vibrant communities in rural South Australia.	Introduction to Barossa region. Role of RDA and regional development boards and contribution to community impacts. Links to economic development, investment & agritourism.
9.30 am	Depart for Gully Gardens on the outskirts of Angaston. Location 175 Gawler Park Road, Angaston (2.6 km/5 min).	One of the last traditional dried fruit growing families. Producing and marketing directly from the farm.	Break into 2 groups for a tour of farm operations. Return for refreshments and questions.	Industry transformation & revival. Specialize in dried fruit, with a small visitor shop and orchards on the surrounding property. Angaston once had a strong stone fruit growing industry but now only a small number of orchards remain.
10.45 am	Depart Gully Gardens (2.6 km/5 min).	Arrive in Angaston Refreshment stop.		
11.00 am	The Barossa Valley Cheese Company 67 Murray St Angaston.	Victoria McClurg (Founder/MD) office	Artisan cheese producer.	Innovation in cheese production and marketing.
12	Refreshment break Angaston.			
1.15 pm	Depart for Rowland Flat (18 km/20 min).			
2.00 pm	Jacobs Creek Visitor Centre Rowland Flat (15 min/10 km).	James Keane A subsidiary of the Pernod Ricard Group.		Global wine liquor brand with a multinational corporation vision Leveraging local regional provenance with tourists.
3.00 pm	Depart Winery for Lyndoch.			
3.15 pm	The Dairyman 346 Tweedies Gully Road Lyndoch South Australia, 5351t.	Host Owner, Michael Wohlstadt	Traditional mixed farm offering limited accommodation and farming experiences.	Barossa Trust Mark Dairy (butter and cream), pork (heritage pork), mushrooms, and much more.
4.00 pm	Return to Pulteney St by 5.30 pm (65 min/60 km).	Students to discuss and record their observations during the day.	Groups to plan Friday's presentations.	

Table A3: Day 3 Wednesday 21 September 2022

Time	Activity	Instruction	Special notes	Research Themes
6.00 am	Pick up at Nexus Building 10 Pulteney St; travel to wholesale markets (13 km/30 min).	Critical to meet on time—12-hour day on the road.	Group leaders to hand in Monday's retail exercise to T Simos. Ensure appropriate clothing/closed footwear/dress for a cold morning.	
6.30 am	Drakes Its fresh operation at Warehouse J SA Produce Markets Limited Burma road Pooraka.	Meet at the security gate, Don Callisto, Manager.	This facility operates after midnight and closes by 8 am each morning.	Understand transformation of traditional fruit and vegetable markets for growers & organized wholesale distribution centers. Impact of organized retail and food service sectors/consumer purchasing trends/new technologies.
7.15 am	Costas Australia's Largest Fresh Grower distributor Store 25 Diagonal Road Pooraka SA 5095.	Chris Christophedies, State Manager SA www.costagroup.com.au	Follow safety instructions. Stick to the group. Watch forklift & vehicle traffic movements.	Products & seasonal impacts. Competitive growing sourcing & pricing. Quality and handling of produce for retail clients/with an eye on changing consumer demand. Technology-driven productivity and efficiency along the market channel.
8.00 am	Return to SAPM cafeteria.	Restaurant to order and purchase your breakfast before we depart.		Competition in wholesale and retail channel & transformation of fresh produce sector in SA.
8.30 am	Depart SAPM (8 km/20 min).			
9.00 am	Bickfords Australia, 162 Cross Keys Rd, Salisbury South.	Meet Mr. George Kotses and staff, including Debra, Beverley & Nishant Goundar in the boardroom. Diversified alcoholic/non-alcoholic beverage group.	Split into four groups; 10-min intro/history; 30-min tour of the factory; 25-min presentation on branding and marketing; and 20-min questions/answers.	Fast-moving consumer goods (beverages). Brand & packaging strategies. Best practice/innovation models: Leveraging heritage, Product segmentation, and Labor productivity /advanced automation.

Table A3 continued.

Time	Activity	Instruction	Special notes	Research Themes
11.30 am	Depart from Bickfords Salisbury for Golden Grove 20 min/36 km.			
11.50 am	Monika's Organics Lot 2 Strachan Road Golden Grove.	Monika Fiebig	Introduction to organic farming and marketing of fresh produce.	Meet award-winning vegetable grower, Monika Fiebig—a leader in modern organic production and founder of branded Monika's Organics produce. Learn about certified organic practices and the challenges of competition/dealing with some of Australia's toughest retailers.
12.50 pm	Depart Monika's for Buckland Park (33 km/35 min).	Lunch on the bus. Bring your own refreshments.		
1.30 pm	P`Petual 234 Carmelo Road, Buckland Park SA 5120.	P'Petual Holdings Henri (MD & Founder), Andrew Potter (Head Grower).	Protected cropping innovation and systems are taken to a large scale. Lab coats, hairnets, and shoe covers will be provided.	Specialization & consolidation of distribution/sales channels. Maintaining market competitiveness.
3.00 pm	Depart for Waterloo Corner (8 min/6 km).			
3.15 pm	SA Mushrooms 153 Tozer Road Waterloo Corner.	Nick Femia (MD) and Cherie Eldridge (WHS & HR Manager)	Largest privately owned mushroom farm since 1998 in South Australia.	Learn about the mushroom growing process, fresh product distribution, sales, and category growth.
4.30 pm	Depart for 10 Pulteney St, back by 5.15pm (33 km/35 min).	Debriefing session on the bus.		

Table A4: Day 4 Thursday 22 September 2022 (PUBLIC HOLIDAY)

Table A5: Day 5 Friday 23 September 2022.

Time	Activity	Instruction	Special notes	Observe
8.15 am	Meet at Pulteney street bus to Adelaide hills region.	Be on time.		
8.30 am	Bus departs for Adelaide Hills.	Ceravolo Family; Tony (MD), Sandra, Joseph & Joyce Ceravolo.		
9.00 am–12	Ashton Valley Fresh & Ceravolo Farms 376 Main Lobethal Rd, Ashton Adelaide Hills (30 min/16.3 km).	https://www.facebook.com/CeravoloOrchards/ Also check #bravoapples.	Break into 2 groups for a tour of fruit grading, processing, packaging, and orchards operations.	Look for fresh produce. Value-adding & innovation/diversification. Succession management. Regional tourism/exports.
12.30–1.30 pm	Return to Pulteney St (30 min/16.3 km).	Lunch break.		
1.30–5.00 pm	Barr Smith South 2051	Student feedback and debrief. Groups prepare and finalize presentations.	Oversight groups Criteria for	
	Break into 4 groups.	25-min presentation/10 min of questions. Hand out assignment.	presentation. Marking of presentations.	

What to look out for during the site visits:

- Structure
  - Value chain from producers to consumers for each company
  - Position in the industry
  - Values and culture.
- Reasons for Success
  - Consumer focus
  - Product range
  - Target markets
  - Marketing strategy
  - Social media strategy.
- Business Challenges and Opportunities
  - How have they got where they are?
  - How have they managed growth?
  - How they are tackling the future?
  - Corporate and social responsibility (adoption and integration of social, ecological, and environmental concerns in business operations).
- Evaluate and Compare Business Strategies
  - Sustainability and competitiveness
  - Why are they working
  - How, and where could they be improved?

Table A6: Internships Offered to MGFAB and MAB Students Between 2014 and 2022 by Company.			
Year	**Master's Program (MGFAB or MAB)**	**Industry Partner**	**Research Topic**
2014	MGFAB	Harvest Moon	Explore a Guideline for Implementing Lean Production System for Vegetable Industries
2014	MGFAB	Almondco	Assessment of the Almond Industry from the Perspective of Existing and Prospective Australian Growers
2014	MGFAB	Feast Fine Foods	Assessing Opportunities and the Demand for Mutton in Adelaide Restaurants
2014	MGFAB	Elders	Export Opportunities for Australian Beef to Vietnam: A Case Study of Elders Ltd.
2014	MGFAB	ACIAR	Commercial Proposition for Mango Value Chain Enhancement in Jamesabad (Multan), Punjab
2015	MGFAB	SARDI	Estimating the Value of Food Losses and Waste in Australia
2015	MGFAB	Feast Fine Foods	Assessing the Opportunities for Value-Added Meat Products in Food Service Operations and Retail Markets in Adelaide—A Study for Richard Gunners' Fine Meats Ltd.
2015	MGFAB	Smart Group	Exploring Efficient Pathways to Asia and Product Attributes for Oaten Hay
2015	MGFAB	NASAA Organic Cert	Organic Oat Farming in Australia: Challenges and Opportunities of Certification
2015	MGFAB	Laucke Flour Mills	Challenges for Laucke to Continue to Expand in China
2016	MGFAB	Ausagave/FreeEyre	Analysis of Key Drivers in the Alternative Sweetener Market: Identifying Opportunities for Agave Sugars
2016	MGFAB	Smart Group	Use of Internet as an Effective Tool for the Marketing and Promotion of Farm Produce
2017	MGFAB	Careme Pastry	Analyzing the Frozen Pastry Market and Exploring Growth Markets and Trends in the Foodservice Sector—A Study for Careme Pastry
2017	MGFAB	Natural Food Barn	A Commercial Plan for Natural Food Barn Developing International Retail Business in China
2017	MGFAB	SA Lobster industry	Supply of SA Rock Lobster to China Following the China-Australia Free Trade Agreement
2017	MGFAB	Smart Group	Finding Funds, Grants, and Concessions Available to Australian Farmers—The Smart Group Internship

Table A6 continued.

Year	Master's Program (MGFAB or MAB)	Industry Partner	Research Topic
2017	MGFAB	Careme Pastry	Understanding Customer Needs and Value Adding Opportunities for Pastry in the Food Service Market—A Study for Careme Pastry
2017	MGFAB	CPH Accounting	Impact of Utilizing P2P to Build Consumer Trust on the Brand Value of Australian Baby Formula Imported into China
2018	MGFAB	SA Lobster industry	SA Rock Lobster Market Environment under FTA in China
2018	MGFAB	Grain Producers SA	Determining the Policy Challenges and Opportunities in Managing Land Use Conflict Between Farming and Mining and What Role Can Compensation Play
2018	MGFAB	Grain Producers SA	Finding and Analyzing Reasons for the Shortage of 20-Foot Export Containers in South Australia—Grain Industry Perspective
2018	MGFAB	Laucke Flour Mills	Discover and Develop Certified Safe Food Australia Products' Commercial Value to Chinese Consumers
2018	MGFAB	Honey and Fox	An Integrated Interactive Diagnostic Tool to Support Tailored Seafood Export Growth Planning
2018	MGFAB	Fonterra (China)	
2018	MAB	Availer	Business Case for Commercialization of New Wine Industry Innovations
2019	MAB	Fabal Group	Investigation of the Potential for a Wine/Chocolate Agritourism Venture in the Barossa Valley
2019	MAB	PIRSA	Expansion of the PIRSA Scorecard to Capture the Rapid Changes in Craft Brewing Sector and Explore How These Insights Can Be Better Shared with the Private Sector
2019	MGFAB	Rabobank	Wine Industry Analysis
2019	MGFAB	ANZ	Profit per Hectare Modelling Mixed Farming: Integration of Sheep and Crops in South Australia
2019	MAB	PIRSA	Expansion of the PIRSA Scorecard to Capture the Rapid Changes in Different Sectors

Table A6 Continued.

Year	Master's Program (MGFAB or MAB)	Industry Partner	Research Topic
2019	MGFAB	PNG Canarium Project	
2019	MGFAB	ACIAR	Risk Management in the Pacific
2019	MGFAB	Foodbank/Daitum	Optimizing Foodbank's Product Logistics
2019	MGFAB	Honey and Fox	A Training Needs Analysis of South Australian Food Businesses—Food Loss and Food Waste
2020	MAB	Grain Producers SA	Investigation of Net Value Derived by Quality Assurance in Bulk Handling Grain
2020	MGFAB	RAID	
2020	MGFAB	Sundrop	Had to cancel due to COVID-19 travel restrictions.
2020	MGFAB	Smart Group	Smart Farms Nut Sector Expansion Assessment
2020	MGFAB	Urban Food Garden	Urban Food Gardens NT Assessment
2020	MGFAB	Conservation International	Tonle Sap Lake Savings Groups
2020	MGFAB	Conservation International	Tonle Sap Lake Savings Groups
2020	MGFAB	Conservation International	Tonle Sap Lake Fisheries
2020	MGFAB	Ceravolo	Had to cancel due to COVID-19 travel restrictions.
2020	MGFAB	Foodbank / Daitum	Analytical Study of Expansion of Network and Efficiency Enhancement in Logistics and Operations in Food Bank (with Daitum)
2020	MGFAB	Availer / T Provenance	CBA on Implementation and Utilization of Supply-Chain Traceability System for Table Grapes and Almonds: Australia into China and Europe
2021	MGFAB	Conservation International	Tonle Sap Lake Evaluation of Fish Processing Practices
2021	MGFAB	Mexex	Current Landscape of Contract Farming in Australia: The Role of an Agribusiness Firm
2021	MGFAB	Mexex	International Market Selection Framework: An Australian Perspective
2022	University of Adelaide	Rabobank (Uni wide)	Ag Carbon Assessment Tools for the Banking Sector
2022	MGFAB	FIAL	Measuring Export and Market Readiness of Australian Health and Wellness Manufacturing Companies

Table A6 Continued.

Year	Master's Program (MGFAB or MAB)	Industry Partner	Research Topic
2022	MGFAB	NASAA Organic Cert	Assessing the Capacity of NASAA Organic to Increase Youth Engagement in the Organics Industry
2022	MGFAB	Something Wild	A Review of Leading Global Indigenous Food Companies to Provide Insights for South Australia's Indigenous-Based Company Something Wild

Table A7: The Role of the Educator in the Experiential Learning Process Applied to the Study Tour and the Internship.

Pre-experience	Study Tour	Internship
Ensure learners have the required critical thinking skills that underpins the experience.	Study plans advise learners to take the study tour after courses in global food and agricultural markets, policy analysis, and value chains. Students are introduced to key concepts of value chains, and provided with background material, including industry and company reports, for reading before company visits.	Students conduct the internships in the second year of their master's program, since they are expected to apply the concepts learned in their courses. By the second year of their degree, students are expected to have taken the core courses and some elective courses and have acquired experience in academic writing.
Ensure learners are willing and able to participate based on previous experience and cultural and pedagogic backgrounds.	Students provide a 200-word summary of previous experience and future career aspirations, which is used to understand students' needs.	Students are given the opportunity to apply for internships that align with their interests. Once the company and student are paired up, academic supervisors are assigned according to the research topic. Students sign formal internship agreements with the companies to allow the exchange of any confidential information required for the research project.
Ensure constructive alignment between the course learning outcomes (CLOs), taught content, and assessment.	Assignments alignment with CLOs: Students ask relevant questions during visits (CLO1). Groups present and reflect on the experience (CLO2). Learners write about the challenges and opportunities faced by visited companies (CLO2 and CLO3).	Assessment includes a research proposal (CLO1, CLO2, and CLO3), an oral presentation (CLO8), a final 8,000-word research paper (CLO5, CLO6, CLO7, and CLO8), and engagement with supervisors.
Ensure learners have an adequate understanding of the learning and assessment process.	Before the visits to the companies, students are also provided a list of "what to look for" during the visits. Assessment tasks are explained in the course outline (available before enrolling) on the first day and revisited during the study tour.	At the beginning of the research courses, expectations about the research project and the assessment tasks are discussed with students, including conducting research in agribusiness settings and writing reports for the companies.

Table A7 continued.

During the Experience	Study Tour	Internship
Develop a low-risk environment for learners to make mistakes and learn.	Emphasis on preparation prior to visits to develop a sense of confidence. Limit the class size to 20 students, allowing for more interaction with course coordinators and company managers.	Fortnightly meetings are used to guide the student, ensuring they are on track, and that the objectives of the internship are met while complying with the requirements of the master program.
Ensure the experience is as authentic as possible.	Visits to agribusiness companies where students can observe day-to-day operations and interact with business managers.	Students perform a series of activities for the company, such as solving a problem or analyzing an issue of interest. Internships may involve a significant time spent on site. All internships involve regular contact between the student, company, and academic supervisor.
Scaffolding[1] and support as required on a needs basis.	Builds from concepts from courses and examples from the companies visited.	Builds from courses in the program to help students apply what they have learned to a real-world problem.
Facilitation of learning through mentoring, guidance, and provision of feedback.	During visits, students are encouraged to actively participate, and course coordinators ensure that the questions during the visits cover the CLOs. The quality of the engagement is emphasized over the number of questions asked during the visits. Feedback is provided between visits and during group presentations.	Regular discussions with the academic supervisor and supervisor at the company or organization. Clarifying the requirements and expectations from both the companies and their degree. It is common to have the senior manager or person in charge of the internship join meetings between students and supervisors to provide feedback.
Support effective group dynamics and engagement.	Students are assigned to groups of five for a presentation to encourage interaction and discussion during the whole course. Group membership is assigned to ensure a mixture of experience, backgrounds, culture, and gender.	Students give a 10-minute presentation of their progress to the research project course coordinator, their supervisors, other academics, other students, and the senior manager or person in charge of the internship, promoting interactions and feedback from peers.
Support reflection in action.	Encouragement of engagement that is meaningful. Student preparation and reflection about the companies' position in the industry and market orientation.	Regular meetings with supervisors and the company manager provide opportunities for feedback and reflection.

Table A7 continued.

Post Experience.	Study Tour	Internship
Support post experiential learning reflection and feedback (scaffolded as required).	Students conduct a group presentation where they discuss their reflections from the study course. This provides an opportunity to discuss and reflect among peers (other students listening) and with the course coordinators.	A 10-minute presentation of their progress to the research project course coordinator, their supervisors, other academics, other students, and the senior manager or person in charge of the internship, draft report feedback by supervisor.
Encourage control in critical reflection.	Students write an assignment using their observations around the challenges and opportunities facing the businesses they visited.	The major output of the internship is a written report to the company that includes an analysis or a potential solution to a problem or opportunity.
Link the experience to real-world practice.	Students connect the written assignment with their observations about the value chain and industry networks, the business strategies utilized by senior management, how companies are differentiating themselves from the competition, and how they are engaging with and marketing themselves to consumers.	The internships and the capstone research projects aim at allowing students to use them as a stepping stone to their future careers. The goal is for them to apply what they learned in other similar situations.
Assess the learning from the experience.	The post-experience exercise has demonstrated that students who put more effort into the course, both pre-experience preparation, and participate more in observations and engagement during the experience, are far more likely to demonstrate a better understanding and application of the concepts and course learning outcomes.	The assessment is not just about the output, but also about the process. The proposal, the presentation, the engagement with the supervisors, and the final report, are part of the internship assessment. The research paper includes a student's reflection on the research process as part of the final report assessment.

Source: Bell and Bell (2020) and authors' analysis.

[1] In this context, scaffolding refers to progressively move students toward a stronger understanding of concepts.

References

Bagley, C.E., A.J. Sulkowski, J. Nelson, S. Waddock, and P. Shrivastava. 2020. "A Path to Developing More Insightful Business School Graduates: A Systems-Based, Experimental Approach to Integrating Law, Strategy, and Sustainability." Academy of Management Learning & Education 19(4):541–568.

Bell, R., and H. Bell. 2020. "Applying Educational Theory to Develop a Framework to Support the Delivery of Experiential Entrepreneurship Education." Journal of Small Business and Enterprise Development 27(6):987–1004.

Chong, K.M.E. 2020. "Using Experiential Learning of NGOs to Enhance Active Citizenship Education in School Curriculum: Case Study of Hong Kong Secondary Schools." Asian Education and Development Studies 9(4):559–577.

Cooper, S., C. Bottomley, and J. Gordon. 2004. "Stepping Out of the Classroom and Up the Ladder of Learning: An Experiential Learning Approach to Entrepreneurship Education." Industry and Higher Education 18(1):11–22.

DeLacey, B.J., and D.A. Leonard. 2002. "Case Study on Technology and Distance in Education at the Harvard Business School." Journal of Educational Technology & Society 5(2):13–28.

Fayolle, A., C. Verzat, and R. Wapshott. 2016. "In Quest of Legitimacy: The Theoretical and Methodological Foundations of Entrepreneurship Education Research." International Small Business Journal 34(7):895–904.

Hägg, G., and J. Gabrielsson. 2020. "A Systematic Literature Review of the Evolution of Pedagogy in Entrepreneurial Education Research." International Journal of Entrepreneurial Behavior & Research 26(5):829–861.

Humber College. 2014. "Classroom Design Principles." Retrieved from https://humber.ca/staff/announcement/classroom-design-principles

Joshi, M.P., E.B. Davis, R. Kathuria, and C.K. Weidner. 2005. "Experiential Learning Process: Exploring Teaching and Learning of Strategic Management Framework Through the Winter Survival Exercise." Journal of Management Education 29(5):672–695.

Kayes, D.C. 2002. "Experiential Learning and Its Critics: Preserving the Role of Experience in Management Learning and Education." Academy of Management Learning & Education 1(2):137–149.

Kirschner, P.A., J. Sweller, and R.E. Clark. 2006. "Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching." Educational Psychologist 41(2):75–86.

Kolb, A.Y., and D.A. Kolb. 2005. The Kolb Learning Style Inventory-Version 3.1 2005 Technical Specifications. Boston MA: Hay Resource Direct.

Kolb, D.A. 1984. Experiential Learning. Englewood Cliffs NJ: Prentice Hall.

Kolb, D.A., R.E. Boyatzis, and C. Mainemelis. 2014. "Experiential Learning Theory: Previous Research and New Directions." In D.A. Kolb and R.E. Boyatzis, eds. Perspectives on Thinking, Learning, and Cognitive Styles. Oxfordshire UK: Routledge, pp. 227–248.

Mathews, M. 2007. "Constructivist Pedagogy for the Business Communication Classroom." Journal of College Teaching & Learning (TLC) 4(11).

McCarthy, M. 2010. "Experiential Learning Theory: From Theory to Practice." Journal of Business & Economics Research (JBER) 8(5).

McHann, J.C., and L.A. Frost. 2010. "Integrating Experiential Learning into Business Courses: Using Learning Journals to Create Living Case Studies." American Journal of Business Education (AJBE) 3(8):1–12.

Meyers, C., and T.B. Jones. 1993. Promoting Active Learning. Strategies for the College Classroom. New York: Jossey-Bass Inc.

Mezirow, J. 1997. "Transformative Learning: Theory to Practice." New Directions for Adult and Continuing Education 1997(74):5–12.

Schön, D.A. 1983. The Reflective Practitioner: How Professionals Think in Action. New York: Basic Books.

Secundo, G., M. Gioconda, P. Del Vecchio, E. Gianluca, A. Margherita, and N. Valentina. 2021. "Threat or Opportunity? A Case Study of Digital-Enabled Redesign of Entrepreneurship Education in the COVID-19 Emergency." Technological Forecasting and Social Change 166: 120565.

Smart, K.L., and N. Csapo. 2007. "Learning by Doing: Engaging Students Through Learner-Centered Activities." Business Communication Quarterly 70(4):451–457.

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Teaching and Educational Methods

Teaching The Economics of Corporate Social Responsibility: A Mixed Motive Bargaining Simulation Game

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Abstract
Over the last three decades corporate social responsibility (CSR) has become an increasingly significant activity for most firms. Consequently, it is important for students to understand the economics of CSR and the possible trade-offs involved. However, teaching the economics of CSR is challenging for several reasons. The paper presents a mixed motive bargaining game that is designed to overcome some of these challenges and teach the economics of CSR in a novel and engaging way. The game is designed to be played during class and can be played in either small or large classes. The underlying theory and logic of the game is explained followed by an example from the game being played in a class of 70 students. All documents needed for running the game are provided in an online appendix along with an Excel workbook that contains the underlying program for the game.

> "*How easily we can be mistaken in matters which concern us closely, and how much also the judgments of our friends must be suspect when they are in our favor*."
>
> —René Descartes, Discourse on Method and the Meditations

1 Motivation

Corporate social responsibility (CSR) is defined to be "actions that appear to further some social good, beyond the interests of the firm and that which is required by law" (McWilliams and Siegel 2001, p. 17). For example, McDonald's states it is on track to eliminate Highest Priority Critically Important Antibiotics (HPICAs) in their chicken supply by the end of 2027 (McDonald's 2023). Coca-Cola, in an effort to reduce the environmental impact of their bottles, introduced a bottle made from 100 percent plant-based plastic in 2021 (Webber 2021). These are just two examples of CSR activities, but they are ubiquitous, covering many issues such as reducing pollution, carbon emissions, pesticide use, antibiotic use, food waste, genetically modified foods, inhumane treatment of production animals, and labor inequity, to name a few.

The auditing firm KPMG has been tracking CSR for 30 years, and CSR activities have increased significantly over the last three decades. In 1993, only 12 percent of the top 100 companies in revenue reported CSR activities, but by 2017, this had grown to 75 percent. In the food and beverage sector, 73 percent reported CSR activities in 2017 (KPMG 2017). The Governance and Accountability Institute (2020) found that 90 percent of the S&P 500 index companies published sustainability reports, a form of CSR.

As an increasingly significant part of businesses activities, it is important that students understand the economics of CSR. However, teaching the economics of CSR is challenging. On any CSR-related issue, there are usually two sides: the CSR side, representing the socially responsible interests, and the business side, representing business interests. The objectives of these two sides are often at odds and in tension. For example, in the context of Coca-Cola pursuing plant-based bottles, Dana Breed, the Global Research and Development Director for packaging and sustainability at Coca-Cola stated, "Our

goal is to develop sustainable solutions for the entire industry. We want other companies to join us and move forward, collectively. We don't see renewable or recycled content as areas where we want competitive advantage" (Webber 2021). Note this is a diplomatic way of saying that Coca-Cola faces a trade-off of giving up some competitive advantage, and hence profitability, for pursuing a sustainable solution.

Often the CSR side wants business to move in one direction, and business does not want to move in that direction. Proponents of CSR activities will often pursue legislative actions to induce change that is often countered by business proponents. For example, California's Proposition 12 is one of the most important and contentious CSR-related issues in agriculture in the last decade because it places minimum housing size requirements on egg-laying hens, breeding pigs, and calves raised for veal and bans the sale of eggs, pork, and veal in California that does not adhere to these requirements. Though it was passed in 2018, it has been continually contested in court since that time, reaching the Supreme Court in May 2023, who upheld the law (e.g., Torrella 2023).

Perhaps most importantly, as these examples should illustrate, CSR issues usually encompass some moral, ethical, or equity component that can invoke passionate divisiveness and protests. Consequently, in a classroom setting, one group of students may viscerally support a CSR activity (e.g., carbon reduction), and another group may viscerally support the opposite position of a pure business activity that is at odds with the CSR activity (e.g., economic growth). Because of the emotional content of the topic and cognitive biases involved (e.g., confirmation bias, Dunning-Kruger bias, status quo bias), neither group can see the other's viewpoint and provide a balanced, objective perspective on the trade-offs involved that could possibly lead to a better societal outcome.

The purpose of this paper is to provide a novel tool for helping students gain a better understanding and broader view of CSR issues and the trade-offs involved. CSR issues are a special case of the more general problem of a mixed motive bargaining game. A mixed motive bargaining game can occur in any scenario where two sides have a mix of coincident and opposing views but must come to some agreement, such as on political, business, family, or societal issues requiring some type of negotiation and compromise. Clearly, this applies to many agricultural-related issues, such as trade agreements, carbon emissions, animal rights, and labor inequities, but it is also at the heart of many legal debates, such as gun control or abortion, where there are two opposing sides trying to come to some agreement. Thus, the game will be useful for students of all disciplines wherever there may be a difference of opinion, but a compromising resolution is required (e.g., economics, business, political science, law, history, etc.).

The paper explains a role-playing mixed motive bargaining game that has been developed for teaching the economics of CSR in a unique way. The structure of the game is general enough to be applied to any scenario where there are mixed motives (e.g., carbon emissions, pesticide use, inhumane treatment of production animals). As an overview, students are randomly assigned to teams representing each side of the issue: the social activist side (e.g., environmentalists) and the business activist side (e.g., industrialists). Opposing matched teams go through multiple negotiation rounds of offers and bids until they discover a socially optimal solution that differs from their individual optimums. The game is especially useful for helping those with opposing views to have a better appreciation for the other side and demonstrating to those from different disciplinary backgrounds the trade-offs and solutions required. The game is structured so that it can be played during regular class time and can be played in either small or large classes. The results of an application of the game in 2022 for a class of 70 students are given.

2 Underlying Conceptual Framework

The academic literature on CSR is now rather long, but the basic economic principles are described in several early papers (e.g., McWilliams and Siegel 2001; Jensen 2002; Husted and Salazar 2006). We take our lead from the logic of Jensen (2002) and specify a CSR objective function that becomes embedded in

the firm's objective function. Davis and Serrano (2016, Chapter 13) give a nice undergraduate graphical treatment, so we construct the game based on their graphical treatment.

There are essentially two players in the game. Let *s* denote the individual focused on the social objective, the social activist. Let *f* denote the firm, which is focused on the firm's objective prior to any consideration of CSR. Initially, each player is assumed to have separate objective functions to be maximized. The social activist objective function is denoted as $S(X)$, and the firm's objective function is *isolated* profit at this point and denoted as $F(X)$. X is some variable that is chosen and controlled by the firm and could be any choice variable of the firm. It could be an input or an output. To make the application completely general, we will express this variable in terms of the percentage of some relevant unit. For example, it may be the percentage of factories exceeding a carbon emission target or the percentage of poultry farms not using cage-free housing or the percentage of some multiproduct firm's output attributed to one specific product. To make the example concrete, we will use the Davis and Serrano (2016, Chapter 13) application and assume that X refers to the percentage of unhealthy foods a multiproduct food firm sells (e.g., a grocery store, a multiproduct food firm such as PepsiCo, or more generally the food industry). This is a relevant and timely application because the popular press, in all its forms, is replete with passionate critics and defenders of the amount of unhealthy food in the food system (e.g., Nestle 2007; Desrochers and Shimizu 2012; Lusk 2013; Moss 2021). Let X^S be the level of X that maximizes S and let X^F be the level of X that maximizes F. Importantly, at this point, these two levels are determined separately and are different, $X^S \neq X^F$. Given those interested in a healthier food environment, this would imply $X^S \leq X^F$. In words, the social activist wants the firm to sell less unhealthy foods.

Up to this point, there is no engagement between the individuals *s* and *f*. However, all firms have a public image regarding their degree of being socially responsible and producing social benefits, beyond just the products they sell. We refer to this image or degree of goodwill as the firm's stock of social capital, call it G, and it is considered a valuable resource that can be either increased or depleted through various actions. It can be considered the degree to which one person's beliefs and actions align with another person's actions and beliefs. Thus, the more in line are two individuals or agents' beliefs and actions, the higher is the social capital stock. Clearly then, this can relate to issues of trust, sympathy, forgiveness, and general emotional connection between individuals and thus higher efficiency in interactions (Adler and Kwon 2002). In the present toxic food environment context, the stock of social capital will be a function of how much unhealthy food is produced or $G(X)$. Thus, as the firm sells more (less) unhealthy food, their social capital stock will decrease (increase), but their profitability may increase (decrease). So as X approaches X^S, their social capital stock increases, but as X moves away from X^F, isolated profitability decreases. At the conceptual level, the analysis is then rather straightforward. The firm chooses X to maximize its utility function that now includes profit and social capital, or in its most general form, $U = U(F(X),G(X))$.

However, as Jensen (2002) points out, the problem is that while profit F is an observable, cardinal, and objective variable, capital stock G is a latent and subjective variable. Consequently, while the firm can adjust X and objectively see the effect on profit F, that is not the case for the effect on social capital G. Even within the same organization, two individuals may disagree on the level of the social capital stock associated with some level of X, with some claiming it is low and others claiming it is high. In mathematical terms, without some objective measure of G, we do not know how $G(X)$ changes as X changes. Thus, unless there is some observable measure or index of social capital tied to the level of X, the firm cannot choose what level of X will maximize U. Furthermore, given its subjective nature and without some common measurable unit, the social activist *s* and the firm *f* will have difficulty even beginning a dialogue on the subject and will remain at polar extremes, as is often observed in the real world. The social activist group *s* may claim their position would increase both profit and social responsibility, whereas the firm *f* may claim pursuing the *s* position would decrease their profits and stakeholder wealth. Thus, teaching the economics of CSR breaks down at this point because the trade-

offs between *F* and *G* are subjective and cannot be represented.

A simple way to circumvent this problem for teaching purposes is to create an indirect payoff function between the social activist *s* and the firm *f*. At first, this may seem contrived, but a closer consideration reveals it is consistent with what the social activists *s* does and what the firm *f* perceives. The social activist *s* can influence the social capital stock of *f* by spending resources on things such as advertisements, lobbying efforts, social media influencers, etc. The more money the social activist spends, the more pressure there is for the firm to reduce X^F toward X^S. As the social activist spends more, the firm feels more pressure and perceives a greater payoff from adjusting their level of *X* such that their capital stock improves (e.g., see the quote in intro by Dana Breed of Coke-Cola). So, at least for teaching purposes, we can consider the social activist as paying a price for each unit, *X* decreases from X^F to X^S. In return, the firm *f* experiences an increase in their social capital stock proportional to the payment with the units expressed in dollars, so the unit problem is addressed.[1] For simplicity, the payment function is assumed to be linear yielding a graph like Figure 1. The trade-off the firm faces is between the loss of *isolated* profit in moving away from X^F versus the gain in social capital, measured in dollars, in moving toward X^S. This trade-off makes the relevant objective function for the firm to be the *joint* profit function of isolated profit and social capital, which in the graph is denoted Profit + $CSR.[2] As the graph shows, the point that maximizes this joint profit function X^J lies between X^S and X^F.

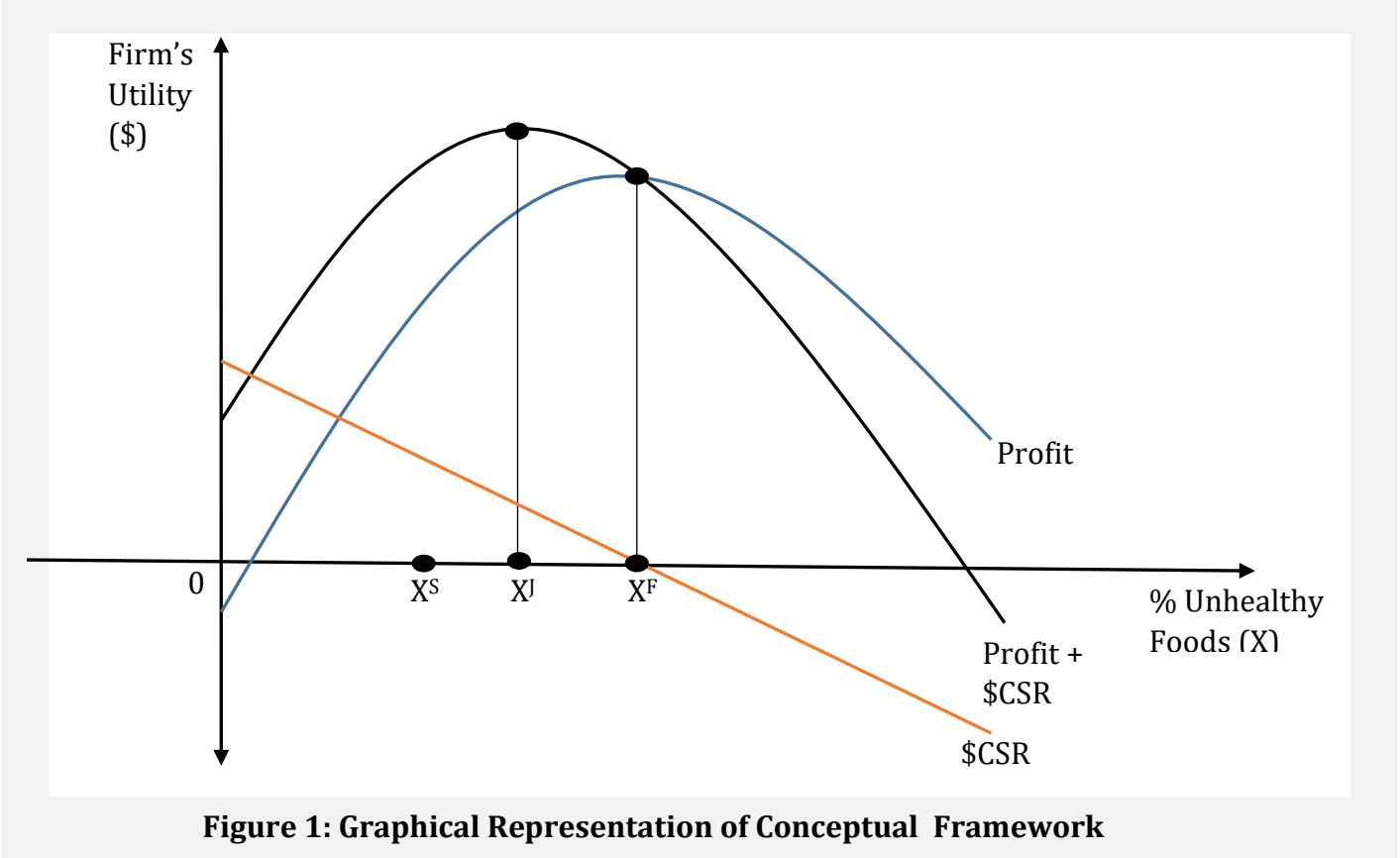

Figure 1: Graphical Representation of Conceptual Framework

[1] One way to think about this is within the context of willingness to accept: how much does it take for the firm to be willing to accept a reduction of *X*?

[2] For this paper, we are assuming there is an inverse relationship or trade-off between a higher social capital stock and profit (i.e., the social capital payoff function has a negative slope). This is the most controversial and difficult case to come to agreement on. However, there are certainly win-win cases where the social capital payoff function could have a positive slope, or what is referred to as the "strategic CSR" case (Husted and Salazar 2006). Everything presented could easily be adapted to that case as well, and more will be stated about this in the conclusions.

3 Bargaining Game Structure, Stages, and Instructions

Before explaining the game structure to the students, it is useful to go through the conceptual framework and graph given above so they have a *conceptual* feel for the underlying economics of the game. However, just as in the real world, market agents do not know the true or actual underlying form or values of the objective functions that will be true in the game as well.

3.1 Game Structure

To turn Figure 1 into a bargaining game requires four key elements. First, there needs to be a team of students representing the social activist *s* and a team of students representing the firm *f* and the teams matched. These teams will negotiate to discover the level of *X* that is acceptable to both teams. Second, the students have to be incentivized to negotiate or have some "skin in the game," and the easiest way to do this is to tie the outcome of the negotiation to a grade on the game. This can be accomplished by having overlapping grade ranges for different levels of *X* as shown in Figure 2. The overlapping grade ranges are such that there is a small range of *X* where both teams can get an A, and this would be the optimal range for both teams (i.e., Pareto optimal).[3] However, there are overlapping ranges where one team can get an A, and the other team can get a lower grade (i.e., B, C, or D).[4] The students are told there is some range where both can get an A, and thus if they both do not get an A, they know there is still room for Pareto improvement. The key here is that if the team tries to stick to its independent (initial) optimal value, they will receive a very low grade. Third, just as in the real world, firms do not know their profit levels until after they take some action. Thus, the teams do not know the underlying functions

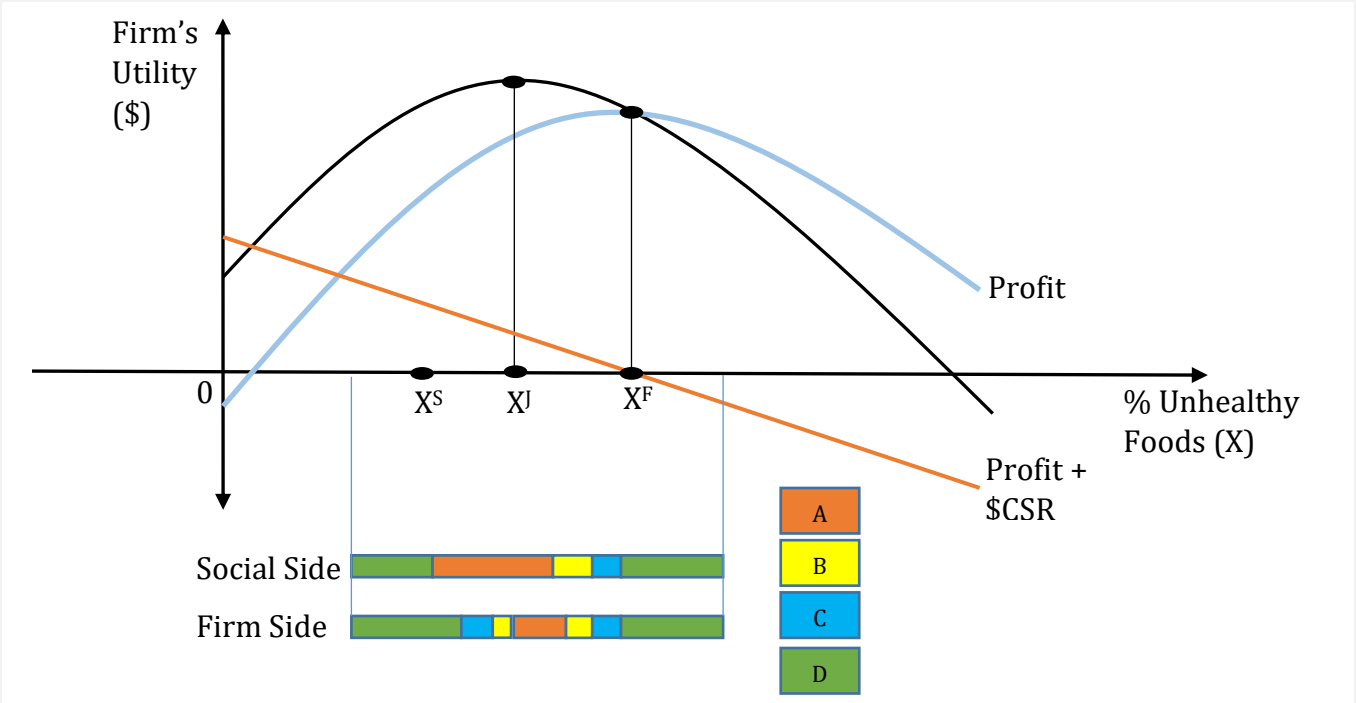

Figure 2: Graphical Representation of Conceptual Framework with Grade Distribution

[3] As a reminder, the term Pareto optimal means both parties can reach a higher utility level by adjusting their choice to a mutually agreeable position.

[4] The instructor can alter these ranges to their preferences in the Excel spreadsheet. See the Excel workbook explanation in the online appendix and accompanying Excel workbook.

generating profit and joint profit. All they will observe is for each level of X chosen, the value of isolated profit and joint profit. So conceptually, the students are discovering the optimal solution by effectively doing the equivalent of a grid search for the optimal level of X, with the optimal level being in the range where both teams get an A on the game. Fourth, the instructor or teaching assistant acts as the market monitor or the "invisible hand" and takes the agreed-upon level of X, enters it into the underlying simulation model, and generates the joint profit level for the firm and separate grades for each team based on the overlapping grade distribution. The underlying mathematics of the simulation model are given in the online appendix along with instructions on how to run the Excel-based simulation model. By choosing different levels of key parameters in the underlying simulation model, we can effectively represent different market outcomes so that what is optimal in one market may not be optimal in another market (see the online appendix for details)[5].

3.2 Game Stages and Instructions

The game is intended to be run during normal class time. Each team is provided with a set of instructions for the game, which are summarized here (the online appendix and online material have all game documents for the instructor and students)[5]. There are essentially seven stages.

1*. Initial Settings*

The game begins by Adam Smith, the market monitor (e.g., a TA), releasing two types of information: public and private. *Private Information*: The *f* team will be told their current or initial percentage level of unhealthy food they are selling (X^0) and the associated initial isolated profit level. Just as in the real world, this initial level X^0 may or may not be the X^F that maximizes isolated profit. The *s* team will be told their desired percentage of unhealthy foods (i.e., X^S) in the market and their total budget allotment for the game M. They will also be told the cost or price p they must pay for each 2 percent decrease in the X^0. They cannot spend more than their budget, or they fail the game. Neither group will be given the others' private information. *Public Information*: Both the *s* and *f* team will be told the initial percentage of unhealthy foods in the market X^0.

2. *The s Team Choice and Action*

The *s* team is the first mover and makes an offer to the *f* team of \$Z to go to Y percent of unhealthy foods in the market. For example, suppose the initial level of unhealthy food in the market is X^0 = 50 percent. The *s* team is given a \$400,000 budget, and they decide they want to spend \$50,000. Every 2 percent decrease cost \$10,000. Therefore, the \$50,000 will buy a 10 percent decrease or down to 40 percent.

3. *The f Team Choice and Action*

The *f* team must then either accept or reject this offer based on what they **expect** will happen to their **joint profits** (= profits without the payment + payment) if they switch from the initial percentage setting of unhealthy foods X^0 to the percentage Y percent associated with the \$Z payment. While they will know the payment offer \$Z, just like in a real market, the firm does not know exactly what will happen to isolated profits as they change X and, therefore, does not know what will happen to joint profits. As the unhealthy percentage is changed, isolated profit changes, and it may decrease more (less) than the additional amount of the \$Z payment from the *s* team, so the joint profit could actually go down (up).

4. *Contract Agreement*

Once the *s* team and *f* team come to an agreement, they submit a contract to Adam Smith, the market

[5] The online appendix and online materials can be requested at https://www.aetrjournal.org/.

monitor, stating the agreed upon payment and unhealthy food percentage the firm has agreed to produce. To make sure everyone on each team agrees with the contract, each team must turn in a contract signed by each team member.

5. ***Market Recalibrates, New Profit***

Based on the contract percentage agreement, Adam Smith enters the contract information into the simulation model (the market), and a new isolated and joint profit level is generated associated with this new percentage. This information is given to the firm to be used in the negotiations for the next round. For example, continuing the example from above, suppose at the initial unhealthy food percentage level of 50 percent, the isolated profit to the firm is $1,000,000. Although they do not know for sure, the *f* team thinks this may be close to the profit maximum (without the *s* payment) and therefore does not want to reduce the unhealthy food percentage to 40 percent. They, therefore, reject the initial offer of going down to 40 percent, and after some negotiation, both teams agree to go to 44 percent. This will cost the *s* team $30,000. Adam Smith enters this information in the market, and the isolated profit at 44 percent is $980,000, which is $20,000 less than $1,000,000, but adding the $30,000 to the $980,000 gives a joint profit of $1,100,000, which is higher.

6. ***Grade for Each Group***

The incentives of this game are such that the *s* team wants to get the *f* team to choose the percentage of unhealthy food as close to their target percentage as possible. The firm's objective is to choose the percentage of unhealthy food that maximizes **joint profit** = profit + payment. The closer the percentage gets to the *s* objective, the higher the grade for the *s* team. The closer the percentage is to the value that maximizes **joint** profit, the higher the grade for the *f* team. As mentioned, there are regions of overlapping As and Bs, but also As and Cs or Bs, and Ds. Much like the market, they do not know their grade until after the contract percentage is entered into the market. Continuing the example from above, at 44 percent, the *s* team would receive a B grade and the *f* team a C grade. The underlying reason for this is that both could do better by making further adjustments (i.e., there are Pareto improvements to be made).

7. ***Repeat Steps 1-6 or Terminate***

Repeat stages 2–6 until both teams are satisfied (stand) or the last round. Table 1 provides a sample table for both the *s* team (top panel) and *f* team (bottom panel).

4 The Application

The simulation game was run in Spring 2022 at Virginia Tech University in the Food and Nutrition Economics course. This is a senior-level course that is required of all dietetic majors at the university but is also taken by agricultural economics and several other majors (e.g., animal science, food science, economics, political science, psychology). Given this constitution of students, opinions on CSR are very strong both for and against the food industry. In 2022, there were 70 students in the class who were assigned to fourteen teams: seven teams representing the social activist side and seven teams representing the firm side. Each social activist team was paired with a firm team based on seat location proximity. The simulation is intended to be and was run during the class period, and was done in two successive class periods. We fixed the number of negotiation rounds at four, so they did two rounds in the first class and two in the next class. We allowed about 15 minutes per round for negotiations and 10 minutes for Adam Smith to compile the results, thus each round took about 25 minutes. While Adam Smith was compiling the results, we taught or discussed related materials.

The game is interactive, so all the negotiations are going on verbally at the same time. Consequently, unless the instructor is willing to implement some very strict rules with high monitoring cost across teams, the A grade solution is likely to become public information rather quickly and,

Table 1: Sample of Information Provided by Rounds to Each Team[a]

Social Activist	Initial Settings	Round #1	Round #2…	Final Round
Percentage before contract	50			
Target percentage	40			
Total budget before contract	$400,000			
Price per 2% points	$10,000			
Contract percentage	--	44		
Contract payment	--	$30,000		
Total budget after contract	--	$370,000		
Grade	--	B		
Firm				
Percentage before contract	50			
Profit before contract	$1,000,000			
Contract percentage	--	44		
Contract payment	--	$30,000		
Profit after contract	--	$980,000		
Profit + Contract payment	--	$1,100,000		
Grade	--	C		

[a] The social activist team does **not** receive the firm's information and vice versa. In the bargaining, they can share the information if they desire.

therefore, truncating negotiations and learning. To minimize this problem, we first created three market types by setting different parameter values for the underlying simulation model such that the optimal solution varied by market type. Table 2 provides the key data for the three types of markets. The main difference across markets is the budget and price per 2 percent decrease for the social side and the

Table 2: Initial Data by Market Types

	Social Side			Firm Side	
Market Types	**Target Percentage**	**Initial Budget**	**Price per 2%**	**Initial Percentage**	**Initial Profit**
Low	30	550	22.92	46	1,893
Medium	30	400	16.66	50	1,925
High	30	200	8.33	54	1,933

initial percentage of unhealthy food (i.e., X) and profit level for the firm side. By altering these values, the payoff function becomes steeper or flatter, and the maximum joint profit point will move either closer or further away from the firm's isolated profit maximization percentage X^F as shown and described in the online appendix. The low, middle, and high market types have joint profit maximums that are at X = 38, 42, and 48, respectively. The percentage ranges for each team in a specific market to get an A are respectively: low market (34, 36, and 38), middle market (40, 42, and 44), and high market (46, 48, and 50). Again, these maximums and ranges are **not** known to the teams. See the online appendix for more details on underlying model, the explanation of the accompanying Excel workbook, and the Excel worksheet for the full grade distribution overlaps by market type.

We then distributed the three market types across seven geographically named markets: Southeast (low), Northeast (middle), South Central (high), North Central (low), Southwest (middle), Northwest (high), and Hawaii (low). Each market had a social side representative team and a firm side representative team. The teams were **not** told their market type, and the only information a social team would receive would be the target percentage, initial budget, and price per 2 percent decrease for their market type. The only information a firm team would receive would be the initial percentage and the initial profit for their market type. Market types were assigned based on team (seat) locations within the classroom, so two markets in close proximity would be assigned different market types in order to hopefully minimize the optimal solution from one market being shared with a nearby neighbor market.

After explaining the game conceptually and the instructions, the game commenced. The teams were given 15 minutes to negotiate and come to an agreement on a contract, sign their contract, and turn in their contract to Adam Smith. Adam Smith would then enter the data into the appropriate market simulation model to generate the values for the next round of negotiations, if needed. The results of the simulation were then shared with the teams and then the second round of negotiations commenced, and this process continued until all teams decided to stand and are satisfied with their results.

5 The Results

As indicated, the rules specified there would only be four rounds. Table 3 gives the results by markets. Out of the seven markets, four markets were able to get an A for both the social side and firm side team members in the first round (Southeast, North Central, Southwest, and Hawaii). Southeast, North Central, and Hawaii corresponded to the low market type from Table 2. Based on the graphical review, the students should realize that the optimal solution for both teams will lie somewhere between their initial percentage settings, so it will be more efficient if they share this information, work together, and compromise. Thus, as this is effectively a grid search problem, an obvious tactic would be in the first round to choose the midpoint, or something close, between the two initial percentages. And indeed, the model parameter settings for the low market type are such that the optimal of 38 percent is exactly at the midpoint between the firm's initial percentage setting (46 percent) and target percentage setting of the social side (30 percent). Thus, the chosen levels are all very close to that (North Central 34, Hawaii 36, and Southeast 38), and all got As in the first round. For the middle market type, the midpoint between the firm's initial percentage setting (50 percent) and target percentage setting of the social side (30 percent) is 40 percent. The actual percentage that maximizes joint profit is 42 percent in this market, but the A grade distribution overlap covers the midpoint of 40 percent, thus the Southwest teams got an A in the first round as well.

Table 3: Results for All Seven Markets

	Southeast	Northeast	South Central	North Central	Southwest	Northwest	Hawaii
Market Type	Low	Middle	High	Low	Middle	High	Low
Number of Rounds	1	3	3	1	1	3	1
Contract Percentage	38	42	46	34	40	46	36
Social Side							
Contract Payment ($)	366.67	200.00	66.67	458.33	233.33	66.67	412.50
Final Grade	A	A	A	A	A	A	A
Firm Side							
Profit after Contract ($)	1,757.00	1,837.00	1,893.00	1,653.00	1,800.00	1,893.00	1,708.00
Profit + Contract Payment ($)	2,123.67	2,037.00	1,959.67	2,111.33	2,033.33	1,959.67	2,120.50
Final Grade	A	A	A	A	A	A	A

The markets that took three rounds were Northeast, South Central, and Northwest. South Central and Northwest were high market types, and choosing the midpoint did not result in an A in that market. In the high market, the firm's initial percentage setting was 54 percent, and the target percentage setting of the social side was 30 percent. The midpoint in that case is then 42 percent, but the percentage that maximizes joint profit in the high market is 48 percent, and the A range for both teams is 46, 48, and 50. The South-Central teams started at 42 percent in round one and then moved up to 44 percent in round two before landing in the A range with 46 percent in round three. The Northwest teams started at 42 percent in the first round but went the wrong direction in round two to 36 percent, which reduced profit even further. In the third round, they went in the right direction and increased their contract to 46 percent, which resulted in an A for both teams. The Northeast teams also took three rounds. The Northeast was a middle market, whose A range is 40, 42, and 44. The midpoint for that market from the initial settings would have been 40 percent, and the Northeast teams started at 36 percent in the first round. In the second round, they went in the right direction and increased the percentage to 38 percent, but that still was not an A for both teams. In round three, they increased the contract percentage to 42 percent, which was an A for both teams. Feedback from the students was that they enjoyed the game and found it helped them better understand the economics of CSR than simply lecturing on the topic.

6 Conclusions

CSR has become an increasingly important issue, especially for agricultural products. CSR often involves ethical and moral issues attached to products that can lead to very strong diverse opinions regarding the pursuit of CSR activities. The economics of CSR, therefore, are challenging to teach and further debatable because the measurement of CSR can be very subjective and difficult to measure; thus, trade-offs and different opinions are difficult to appreciate and reconcile. The purpose of this article was to students demonstrate a role-playing mixed motive bargaining game that can be played in the classroom to help better understand different perspectives and the economics involved. This is achieved by creating a CSR payment function that when added to a profit function creates a joint payoff function that both parties are negotiating to try to maximize. To incentivize the game, there are overlapping solutions where both teams may get an A (Pareto optimum), and there are regions where one team can improve without hurting the other—a Pareto improvement. The game is sufficiently flexible in that it can be administered in small or large classes during the class time. In the example given, it was played by 70 students, broken into seven matched teams. Four of the teams were able to get an A in the first round, and the remaining teams were able to get an A by round three.

The game is certainly not a pedagogical panacea regarding CSR, but it should provide a useful starting point for deeper classroom discussions on more difficult issues. For example, the key to allow the game to run is the ability to monetize the payoff to the firm from cooperating and negotiating. Clearly the more ambiguous this payoff is, the more difficult the negotiations become for the reasons cited early in the paper. This in itself is a key concept to understand regarding CSR, as emphasized by Jensen (2002), and with such subjectivity, one can expect within this context there to be internal conflicts with shareholders on the directions the firm should move to accommodate CSR activities.

Furthermore, the game as structured assumes honesty between the parties because they must agree to the percentage of the activity in the contract (symmetric information). However, it is well known that in such negotiations, there can be incentives and returns to asymmetric information and deception (Crawford 2003), such as in the case of "greenwashing." Greenwashing occurs when a firm pursues an action or makes a claim that on the surface seems to serve a CSR objective, but upon closer inspection is false or only partially true. There are numerous examples of greenwashing, such as McDonald's switching to paper straws that were supposed to help protect the environment but turned out could not be recycled, though the plastic versions they replaced could (Picheta 2019). And again, the general point made by Jensen (2002) about CSR measurement challenges applies because greenwashing adds noise to the signal and thus makes negotiations more difficult. Even with these limitations, the game provides a good starting point framework for a novel way of engaging students, within the CSR context, with some basic economic principles, such as trade-offs, bargaining, strategy, and Pareto improvements that can lead to deeper educational discussions on issues such as the economics of deception (e.g., greenwashing).

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References

Adler, P.S., and S. Kwon. 2002. "Social Capital: Prospects for a New Concept." Academy of Management Review 27(1):17–40.

Crawford, V.P. 2003. "Lying for Strategic Advantage: Rational and Boundedly Rational Misrepresentation of Intentions." American Economic Review 93(1):133–149.

Davis, G.C., and E.L. Serrano. 2016. Food and Nutrition Economics: Fundamentals for Health Sciences. Oxford: Oxford University Press.

Desrochers, P., and H. Shimizu. 2012. The Locavore's Dilemma: In Praise of the 10,000 Mile-Diet. New York: Public Affairs.

Governance and Accountability Institute. 2020. Navigating the Way to Sustainability. https://www.ga-institute.com/storage/press-releases/article/90-of-sp-500-index-companies-publish-sustainability-reports-in-2019-ga-announces-in-its-latest-a.html

Husted, B.W., and J. Salazar. 2006. "Taking Friedman Seriously: Maximizing Profits and Social Performance." Journal of Management Studies 43(1):75–91.

Jensen, M. 2002. "Value Maximization, Stakeholder Theory, and the Corporate Objective Function." Business Ethics Quarterly: 235–256.

KPMG. 2017. The Road Ahead: The KPMG Survey of Corporate Responsibility Reporting in 2017. https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/10/kpmg-survey-of-corporate-responsibility-reporting-2017.pdf

Lusk, J. 2013. The Food Police: A Well-Fed Manifesto about the Politics of Your Plate. New York: Random House.

McDonald's. 2023. Responsible Antibiotic Use. McDonald's Corporate website. https://corporate.mcdonalds.com/corpmcd/home.html

McWilliams, A., and D. Siegel. 2001. "Corporate Social Responsibility: A Theory of the Firm Perspective." The Academy of Management Review 26(1):117–127.

Moss, M. 2021. Hooked: Food, Free Will, and How the Food Giants Exploit Our Addictions. New York: Random House.

Nestle, M. 2007. Food Politics: How the Food Industry Influences Nutrition and Health. Oakland: University of California Press.

Picheta, R. 2019. "McDonald's New Paper Straws Aren't Recyclable — But Its Axed Plastic Ones Were." Cable News Network (CNN) Business, August 5. https://www.cnn.com/2019/08/05/business/mcdonalds-paper-straws-recyclable-scli-gbr-intl/index.html

Torrella, K. 2023. "California Has the Country's Strongest Animal Welfare Law. Now It Just Needs To Be Enforced." Vox.com, June 3. https://www.vox.com/future-perfect/23745935/proposition-12-pigs-pork-california-eggs-veal-hens

Webber, J. 2021. "World's Worst Corporate Plastic Polluter Coca-Cola Unveils Plant-Based Bottle." Plant Based News.org, October 29. https://plantbasednews.org/news/environment/plastic-polluter-coca-cola-plant-based-bottle/

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Extension Education

Minority-Owned Agricultural Businesses and Challenges with the Paycheck Protection Program: Seeking Ways to Reach Farmers

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Abstract
The Paycheck Protection Program (PPP) was a source of relief to agricultural producers during COVID-19, but it did not reach all farmers equally. Areas with a higher population of female and African American producers had lower PPP approval rates due to lack of knowledge about eligibility and the application process. Through in-person interviews with Extension specialists and farmers, we identified the communication strategy used to inform minority farmers about the PPP. Lending institutions, associations, and government agents were part of disseminating information on the PPP. Information was shared via word of mouth, emails, phone calls, social media, and online meetings. We find that these communication methods were not as effective as they could have been in reaching minority farmers. We provide recommendations to increase the efficiency of the communication methods used in reaching minority farmers: (1) building a connection with farmers prior to using online resources; (2) using personalized communications; and (3) seeking partnerships to leverage their social capital.

1 Introduction

Access to information, financial capital, and other tangible/intangible resources play an important role in creating a resilient farm business. Barriers to accessing such resources can result in significant impacts on running a farm business, as witnessed through the decline in the numbers of farms within certain minority-owned agricultural production groups (Brown, Dagher, and McDowell 1992). Among the barriers to access resources are a lack of knowledge about eligibility and the application process. The additional challenges faced by minority farmers in accessing financial capital have garnered significant discussions on providing additional resources for these groups, reflected in the Farm Service Agency's programs for minority and women farmers and ranchers. Yet, how to improve access to government programs for these groups, especially in a time of great economic turmoil, remains a question.

The COVID-19 pandemic was an economic turmoil that led to great challenges for small businesses. The U.S. government introduced the Paycheck Protection Program (PPP) to help small businesses withstand the economic crisis caused by the pandemic. In 2020 and 2021, the U.S. Small Business Administration (SBA) distributed almost $12 million forgivable loans through the PPP. Loans could be used toward expenses such as payroll, rent, mortgage interest, utilities, and worker protection costs related to COVID-19. Agriculture was among the industries contemplated in the program. Although it was a low-cost and effective program for those who applied and received the loan, many eligible farmers and ranchers did not apply for the PPP. Regions and states with a higher population of female and African American producers had lower PPP approval rates.

Studies document that small businesses owned by ethnic minorities were more vulnerable to the pandemic (Fairlie 2020). Beyond the economic turmoil, studies have shown that minority farmers and ranchers had greater difficulties with the PPP loans. Demko and Sant'Anna (2023) showed that non-white-

, Hispanic-, and female-owned small businesses received smaller PPP loans than their business counterparts of the same size. In addition, female-owned businesses in rural counties received smaller PPP loans per employee than female-owned businesses in urban counties. African American agricultural producers living in rural counties or belonging to low- to moderate-income groups received lesser amounts of PPP loans (Sant'Anna, Kim, and Demko 2022). Such hardships put an additional burden on minority farmers who already suffer from lower production value, net cash farm income, government payments, assets, and debts compared to other U.S. farms (Collins et al. 2022).

The main purpose of this manuscript is to identify the ways used to communicate with female and African American farmers about government programs that they are eligible for, particularly programs that are not specifically for agriculture. How can we increase minority farmer participation in programs not specifically designed for them? We attempt to answer this question by analyzing responses from one-on-one interviews with Extension agents and farmers. We identify the current communication methods and provide recommendations for how to communicate with minority farmers for future consideration. Specifically, we are focusing on how the Extensions communicate with female and African American farmers.

Interviews conducted with Extension agents, specialists, and minority farmers suggest that information providers relied heavily on online platforms and social media for information dissemination. We argue that such approaches ignored the challenges of internet access in rural communities, the lack of internet literacy among aging farmers and certain minority groups, as well as the mistrust in government programs. We believe that these are possible explanations for the low participation rate of agricultural producers in the PPP. This paper is split into five sections: (1) the introduction of the topic; (2) an overview of minority farmers participation in the PPP; (3) an explanation of interview procedures and a discussion of interview findings on information channels; (4) recommendations for communicating information to minority farmers about broadly targeted government programs; and (5) recommendations on disseminating information for these groups in the future.

2 Minority Farmers and Their Participation in the PPP

The term "minority farmers" has various interpretations among institutions servicing farmers. The U.S. Department of Agriculture (USDA) uses the term to describe socially disadvantaged farmers and ranchers. This includes farmers who are African American, American Indian, Alaska Native, Hispanic or Latino, and Asian or Pacific Islander. Other government entities such as the Farm Service Agency include women under the definition of historically underserved farmers. In this paper, we focus on female and African American farmers. For female farmers, we examine women of all races.

Past Agricultural Census data reveals that while the share of women in agriculture has increased, that of African American farmers has declined. Although the number of African American farmers greatly increased between 2007 and 2012, the 2017 Ag Census shows that the number of African American principal operators decreased in 2017, representing 1.4 percent of the farming population. The number of U.S. women-operated farms has been growing. When counting principal and secondary farm operators, the number of female farmers reached 1 million in 2007 or 30 percent of all U.S. farmers (Hoppe and Korb 2013). Even though these groups represent smaller shares among principal producers in the United States, they could have benefitted from participation in the PPP.

The PPP had two rounds in 2020 and 2021. The SBA provided loan forgiveness to businesses that spent at least 60 percent of the loan on payroll expenses (Autor et al. 2022). Rules of eligibility changed between these two rounds, changing the distribution of loans according to business size. The SBA provided official guidance on how to quantify the maximum amount of a PPP loan for different types of businesses, including for self-employed farmers (U.S. Small Business Administration 2020a). In 2020, small businesses with less than 500 employees per branch or location could qualify for a loan. In 2021, only businesses with less than 300 employees could apply. Furthermore, these businesses had to show

financial losses due to COVID-19 restrictions. As a result, the PPP reached smaller farms in 2021. In total, farmers received more than 600,000 loans or $17 billion through the PPP (Demko et al. 2021). The average loan size was $19,000 in 2021 compared to $58,000 in 2020 (Demko, Sant'Anna, and Liang 2021). Although these numbers may seem large, the total amount of PPP loans distributed among farmers was less than what could have been achieved (U.S. Small Business Administration 2020b; Giri et al. 2021).

Small businesses could apply for a PPP loan through SBA-approved lending institutions including deposit-taking banks, credit unions, Farm Credit Associations, Fintechs, Community Development Financial Institutions, and so on. Although the SBA provided an application form for the PPP loan to the applicants, every lender required different information from them. Lending institutions that processed the PPP applications received revenue fees paid by the U.S. Treasury in exchange. Financial support to the recipient came from the federal government, removing any risk faced by approved institutions and motivating them to reach out to eligible small businesses. Among farmers, 55 percent of approved loans covered payroll only (Demko et al. 2021), even though there were other allowable expenses (e.g., rent).

Table 1 provides the number of PPP recipients by minority status with North American Industry Classification System (NAICS) Code 11 "Agriculture, Forestry, Fishing, and Hunting" and compares to the 2017 Ag Census. We observe that 27,312 PPP recipients were female, equivalent to 12.5 percent of those who answered their gender as either male or female. This percentage is significantly lower than that of female primary operators reported in the 2017 Ag Census, which was 29 percent. Among African American recipients, we notice a closer share of PPP recipients relative to the share of African American primary producers. A total of 4,613 PPP recipients were African American, representing ~3 percent of those who answered their race, higher than 1.4 percent of the 2017 Ag Census. Overall, the number and the share of minority farmers in the PPP data suggest that the rate of participation (or receiving the loan) was lower for the female and higher for the African American producers compared to the population represented by the most recent census. However, it must be noted that many PPP recipients did not disclose their demographic information, so the interpretation of the results needs caution (Atkins, Cook, and Seamans 2021; Sant'Anna et al. 2022).

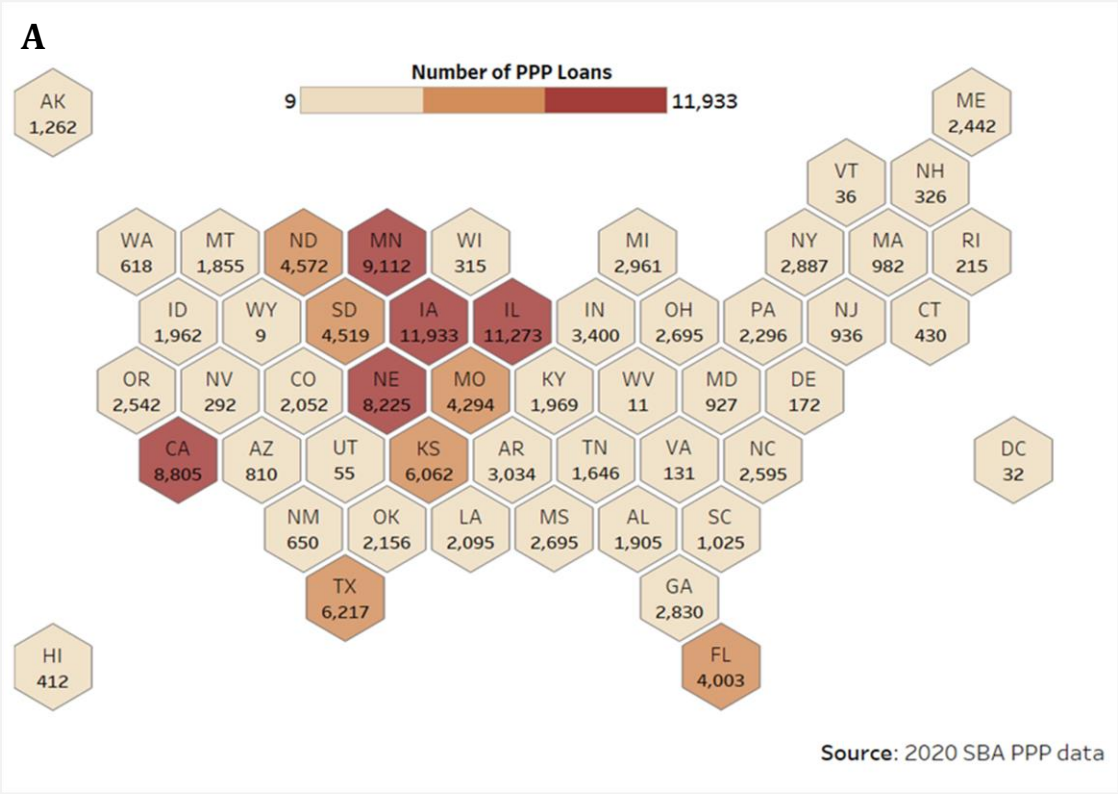
Table 1: Number and Shares of PPP Recipients and Primary Operators by Minority Status

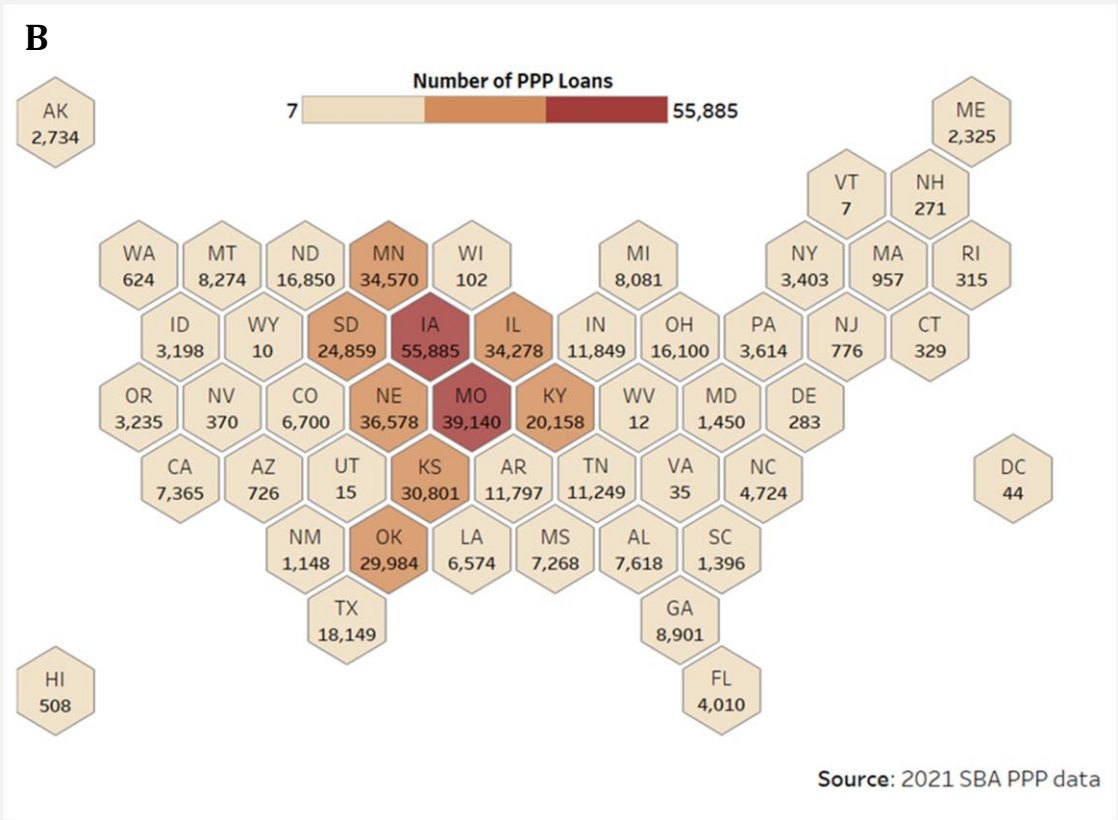
	PPP Recipient (%)	2017 Ag Census Primary Operator (%)
Female-owned	27,312 (12.46%)	798,500 (29.14%)
African American-owned	4,613 (2.99%)	38,447 (1.40%)
African American-owned, Female	1,105 (0.7%)	8,746 (0.3%)

Note: Percentages in brackets represent the share of PPP recipients or primary operators that are African American or Female over the total.

This low participation could be linked to the fact that farmers had less familiarity with SBA. At the federal level, producers are used to participating in programs administered by the USDA and Natural Resources Conservation Service (NRCS), not by the SBA. In fact, Giri et al. (2021) finds that the participation rate in the Coronavirus Food Assistance Program, a program administered by the USDA, had a higher participation rate than that of the PPP. Also, as shown in Figure 1.A and 1.B, a strikingly low number of PPP participation in certain states, even after considering the number of farms and ranches, questions the effectiveness of information flow to farmers at the local level.

Low approval rates could have come from the lack of information about the PPP. Demko and Sant'Anna (2023) find that small business applicants had to fill out multiple application forms with different lenders to increase their chances of acceptance. Approval was especially difficult for businesses requesting smaller loans, and many businesses believed themselves to be ineligible (Demko and Sant'Anna 2023). Given the different nature of agribusinesses, we believe a look at the reasons why





Figures 1: Number of PPP Recipients in Agribusiness in 2020 (A) & 2021 (B)

minority farmers applied or did not apply to the PPP is warranted. Could it also be linked to communication issues?

3 Interview Procedures and Findings

To gain insights on actual challenges and experiences concerning information dissemination about PPP loans, we interviewed a total of 10 Extension specialists and farmers in Mississippi and West Virginia during Spring 2023. The interviews were IRB-approved and are registered under the project IRB-23-577. Interviews were conducted in Mississippi because it has the highest percentage of African American farmers in the nation. The participation rates of Mississippian farmers in the PPP were 7.7 percent in 2020 and 20.8 percent in 2021, numbers that are close to the national average. Interviews were also conducted in West Virginia because it had a remarkably low participation rate in the PPP in both years, 11 producers in 2020 and 12 in 2021.

The interviewees included agricultural economics Extension specialists, community development specialists, minority farmers who received the loan, and those who did not receive the loan. Respondents were interviewed either in person, online, or over the phone. Farmers and Extension agents were contacted via email and in person at conferences targeted at farmers and other stakeholders. Respondents were asked to answer up to 12 questions. Separate interview questions were set up for (1) Extension agents, (2) PPP recipients, and (3) PPP non-recipients (including those that applied and were denied, and those that did not apply). Interview questions are shown in the Appendix. Two major topics of the questions were (1) individual experience with the PPP information assessment and application process and (2) experience with other general information dissemination. Based on the flow of the interview, additional questions were asked. Farmers who participated in the interviews were characterized by the Ag Census as small farms.

Interviewees allowed us to identify different channels involved in disseminating PPP loan information to farmers (Figure 2). These channels were lending institutions (e.g., banks), associations (e.g., chamber of commerce), and agents (e.g., University Extension and SBA agents). Information was disseminated through various media: word of mouth, emails, phone calls, social media (e.g., Facebook, internet), and online meetings. As discussed previously, multiple analyses from the literature reveal that PPP approval among minority farmers was lower than it could have been. As such, the overall effectiveness of these outlets needs to be reviewed. In the rest of this section, we discuss the communication methods used and why we believe they were not as effective as they could have been.

Communication about the PPP from the SBA to farmers came in different formats. SBA had a dedicated section on its website with detailed information about the PPP loans, rules of the program, eligibility criteria and requirements, application forms, and updates. Beyond website posts or conducting live sessions, it also relied on other institutions to spread information on the program, including third parties such as news and social media, University Extension services, and lending institutions.

During COVID-19, many states mandated a lockdown, and meeting in person was strongly discouraged. As such, the number of in-person meetings normally hosted by the local government, Extension, and cooperative was limited or was moved online—a huge disadvantage for farmers and others, who value in-person meetings and the interaction with their peers and Extension agents. “I love the Extension agencies. I learn a lot at the workshops,” mentioned one woman farmer. Yet, dissemination of information about the PPP occurred mostly online through government platforms and social media. Indeed, one of the interviewed Extension specialists who dealt with PPP information dissemination recognized that heavy reliance on online platforms without giving in-person training and workshops played a role in the low participation numbers.

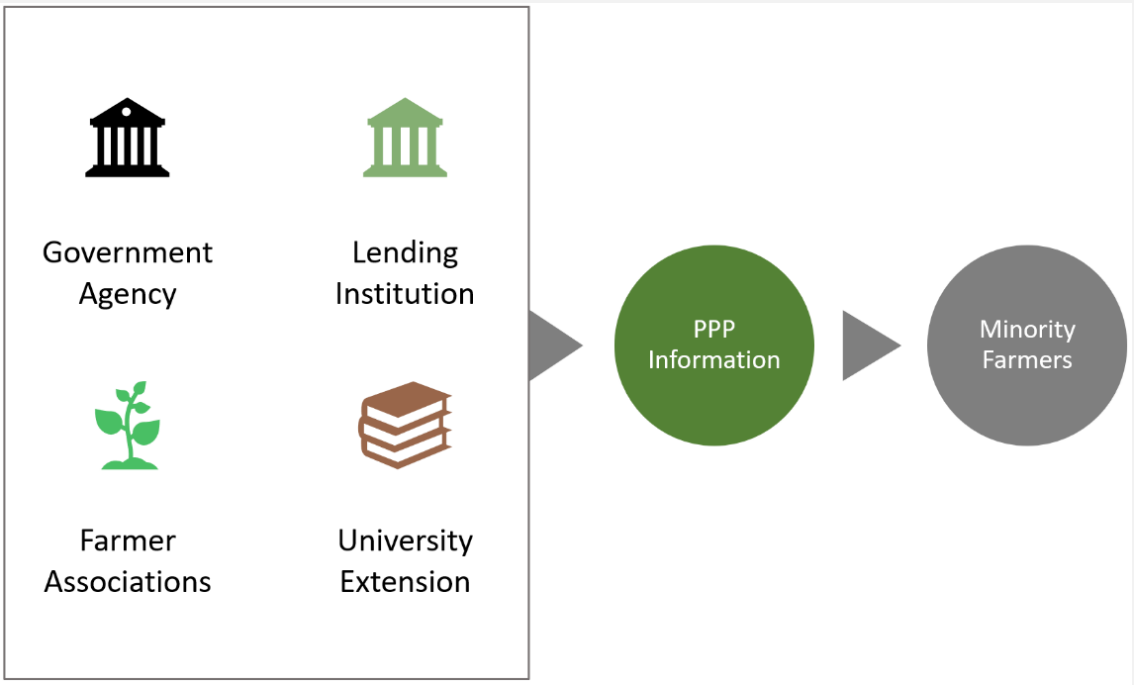


Figure 2: Information Channels About the PPP to Minority Farmers

Focusing only on online platforms to disseminate information on a government program can be problematic, especially for rural agricultural producers. Many farmers may not have access to reliable internet, as one interviewee stated. Rural counties are more likely to have low-quality internet access compared to urban counties, as documented by the Federal Communications Commission (2020). The 2017 Ag Census shows that only 60 percent of African American farmers have access to the internet, compared to 76 percent of white farmers. Unreliable internet access means that a farmer may need to fill out the same form multiple times due to flaky internet connections. Thus, agricultural producers, including minorities in rural counties, faced greater challenges in accessing information only available online.

Another factor that may limit the use of online platforms is the aging agricultural producer (64.5 percent of principal producers are at least 55 years or older) that grew up without using the internet or a smartphone and may not be as fluent with it as younger business owners. On average, the age of female principal producers is just below 59, while for African Americans it is 60 (U.S. Department of Agriculture, National Agricultural Statistics Service 2019). In fact, one interviewee shared that she prefers to fill out application forms on paper instead of online. Yet, applications for the PPP had to be done online.

The preference for filling out applications on paper instead of online does not mean that online communications are inefficient. For instance, female producers pay attention to information on social media and emails; however, they give greater value to the communication when they know who it is coming from. One woman farmer interviewed mentioned how she did not trust social media content and will pay more attention to emails that come from Extension agents and agriculture department personnel she already knows. This was not always the case for the PPP because Extension agents were not well versed in it. It was a new program, from which they did not receive much training or information to advise farmers.

PPP information was also advertised using social media such as Facebook and Twitter. While these can work very effectively with some business owners, it does not work well with everyone. An African American farmer commented that many African American farmers in the local agricultural

cooperative did not sign up for the PPP due to the mistrust over the information available online through social media platforms such as Twitter. In particular, they mistrusted the information that the PPP loans offered extremely low interest rates (1 percent). As such, information dissemination about the PPP to farmers was challenging. It was a new government program administered by the SBA instead of the USDA, which farmers were normally familiar with. Farms are unlikely to have participated in any of the SBA programs before the beginning of the pandemic.

Information on the PPP via online platforms would have been more efficient if they were personalized and coming from people they knew. This was challenging because Extension agents were not well versed in the PPP as they are with other programs specifically designed for farmers. There was limited information targeting agricultural producers, especially at the beginning of the first round. Many agricultural Extension specialists were not aware of the PPP loans or had a hard time keeping up with its changing rules, showing the disconnect between the valuable information outlet and the government agency. "There were no training or canned materials as there are with USDA programs," said one of the Extension agents interviewed.

Farmers also indicated they heard about the PPP through their association or a lending institution. These agents communicated via email or phone. A female agribusiness owner said that she heard about the PPP from a non-bank (e.g., a Fintech) and from the local chamber of commerce she is part of. Lending institutions were motivated to inform their clients about the PPP because they earned fees based on the loan amount. One interviewee mentioned that he first heard of PPP loans and eligibility from his banker. However, this meant that, at times, banks would only reach out to those businesses that were eligible to apply for higher loan amounts. A respondent said that she never heard anything about the PPP from her bank but rather from her employee that had ties to another lending institution.

Lack of transparency and misinformation were some of the challenges with PPP information dissemination because even its name could also be misleading. Just hearing the name was enough for some farmers to lose interest in it, believing themselves to be ineligible. One female farmer interviewee shared, "I did not know that I was eligible for PPP." Another interviewee stated lack of a paycheck as one of the main reasons they did not apply. Afterall, they did not hire other workers or pay themselves from the farm revenues. One business owner mentioned, "My goal was not to get into SBA lens unless something dire is going on."

Interviews conducted identified three reasons for low PPP approvals by minority farmers: (1) a lack of training of Extension agents and material for dissemination on the PPP; (2) heavy reliance on online platforms for both advertisement and application; and (3) a lack of transparency and misinformation. In the next section, we provide recommendations on how to better inform minority farmers on government programs that do not specifically target minority farmers.

4 Recommendations for Communicating with Minority Farmers About Broadly Targeted Government Programs

In the previous section, we discussed the different outlets used by the SBA to disseminate information, including online platforms and third parties such as University Extension and lending institutions. The communication channels used could have been more efficient in reaching minority farmers. In this section, we focus on recommendations that would help improve the effectiveness of the communication strategies used.

4.1 Do Not Overlook the Importance of Building Relationships with Minority Farmers

Online platforms for information dissemination are more effective when you build a connection with the audience you are trying to reach. How can agents connect with minority farmers and gain their trust?

Extension and government agents rely on workshops, seminars, conferences, and grower group meetings to meet and get to know their audience. This is a great avenue to build a relationship with farmers because they value in-person meetings. One downside is that the participation rate by minority agricultural producers of local agricultural Extension- and government agency-sponsored meetings is lower than desired. One of the agricultural economics Extension specialists recalled that most of the local meetings they attended targeted row crop producers with an extremely low number of African American participation. A reason for the low participation from minority farmers is that they are more likely to be small-scale (Schmidt, Goetz, and Tian 2021) rather than row crop producers (Table 2 and 3). As such, they are less likely to attend local meetings where large-scale commodity producers are the focus. Female and African American farmers are concentrated in cattle and other crops, but not grains. While sessions focused on cattle could also reach these groups of farmers, it becomes harder to reach those involved in other crops when most sessions focus on grain producers. Row crop production represents a significantly smaller portion of female and African American producers compared to white and male producers.

Table 2: Number and Shares of PPP Recipients and Primary Operators by Gender

	PPP Data		2017 Ag Census	
Specialty (NAICS)	**Female**	**Male**	**Male**	**Female**
Oilseed and grain (1111)	44.95%	33.38%	17.27%	8.86%
Vegetables	1.38%	3.11%	2.15%	2.57%
Fruit and tree (1113)	1.54%	2.98%	4.66%	5.49%
Greenhouse (1114)	1.11%	3.34%	2.12%	2.75%
Other crop (1119)	7.57%	11.90%	21.91%	21.81%
Cattle (1121)	38.23%	38.89%	35.20%	31.77%
Hog (1122)	1.87%	1.60%	1.19%	1.04%
Poultry (1123)	2.38%	2.88%	2.16%	2.58%
Sheep (1124)	0.53%	1.25%	3.95%	6.85%
Aquaculture (1125)	0.45%	0.68%	9.40%	16.28%

Source: SBA PPP Data, 2017 Census of Agriculture

Table 3: Number and Shares of PPP Recipients and Primary Operators by Race

	PPP Data		2017 Ag Census	
Specialty (NAICS)	**White**	**African American**	**White**	**African American**
Oilseed and grain (1111)	44.47%	12.26%	16.42%	7.09%
Vegetables	0.95%	4.35%	2.03%	6.62%
Fruit and tree (1113)	1.21%	2.72%	4.55%	2.73%
Greenhouse (1114)	0.94%	5.50%	2.21%	1.22%
Other crop (1119)	6.67%	57.51%	22.71%	17.66%
Cattle (1121)	40.48%	12.75%	33.65%	50.12%
Hog (1122)	1.75%	0.63%	1.14%	1.24%
Poultry (1123)	2.48%	1.99%	2.15%	1.25%
Sheep (1124)	0.69%	0.49%	4.26%	3.82%
Aquaculture (1125)	0.36%	1.81%	10.89%	8.23%

Source: SBA PPP Data, 2017 Census of Agriculture

Female producer participation at local meetings is also low, with time constraint being a major factor. Our interview responses suggest that female farmers face extra time challenges, as they juggle household and family responsibilities with farm activities and, often, an off-farm job. Not having childcare options and long travel distances to the meetings factor into the women's ability to attend Extension events. Although attending online events can reduce travel distance, access to quality internet may become a barrier to participating. Hybrid meetings with recordings offer flexibility and provide more opportunities for all participants to absorb the information.

As such, the best way to build relationships with minority farmers is to organize seminars or meetings that target small-scale farms or productions where minority farmers are heavily engaged. Homogeneous group learning sessions can enhance the learning experience because a participant may feel more connected (Powell et al. 2019). Barbercheck et al. (2009) finds that a significant percentage of female producers preferred to attend educational events specifically designed for them. Conversations with Extension agents also revealed that female producers feel more comfortable engaging in groups predominantly female, such as women in agriculture conferences, women in ag associations, and Annie's Project. This suggests that the race, gender, and ethnicity of the information provider also matter. Homogeneous characteristics between the information provider and the receiver are found to be key factors in guaranteeing the receiver's increased engagement and acceptance of information (Kulik and Holbrook 2000; Beck, Behr, and Madestam 2018). A homogeneous group setting also helps build a personal connection between the informer and the receiver. The interviews suggest that the producers are more likely to apply for a government program if they receive a personalized notification from an Extension agent or other agency that they trust and have had contact with before.

4.2 Use of Online Communications Is More Effective When Personalized

The recent trend of switching from a physical workplace to an online setting has reshaped how people interact and work. This trend has changed communication strategies in the agricultural sector, which has seen an intensity in the use of the internet to communicate and apply for government programs. The interviewed Extension agents, regardless of their institutions, were found to reach out to both female nd African American farmers using a variety of methods, including (1) social media (e.g., Facebook, YouTube, or Instagram), (2) email and snail mail, (3) phone, (4) radio and television, (5) podcasts, and (6) seminars and workshops (Figure 3). Extension agents reported conducting podcasts on YouTube, setting up Facebook pages for certain farm groups, and advertising on the radio and tv channels when unique events occur.

The use of social media and the information available from trustworthy institutions could be helpful in reaching out to minority farmers, especially the female producers and those who cannot participate in in-person or real-time events. Our recommendation is not to avoid this type of communication but to make sure that it is personalized and comes from a person that the farmer knows and trusts. For those who prefer a more personalized means of communication, the use of data management software, list serves, and canned information as suggested by Extension agents is helpful in personalizing material and emails.

Once a bond between the informer and producer is formed, online platforms become more effective. Since women producers can be reached via social media (e.g., Facebook or Instagram), partnering with influencers to disseminate information on government programs may be an option. Influencers have a large following, allowing them to quickly spread the word about upcoming conferences, workshops, or government programs. Agents could use influencers to advertise about consultation booths at libraries to help female producers apply for government programs.

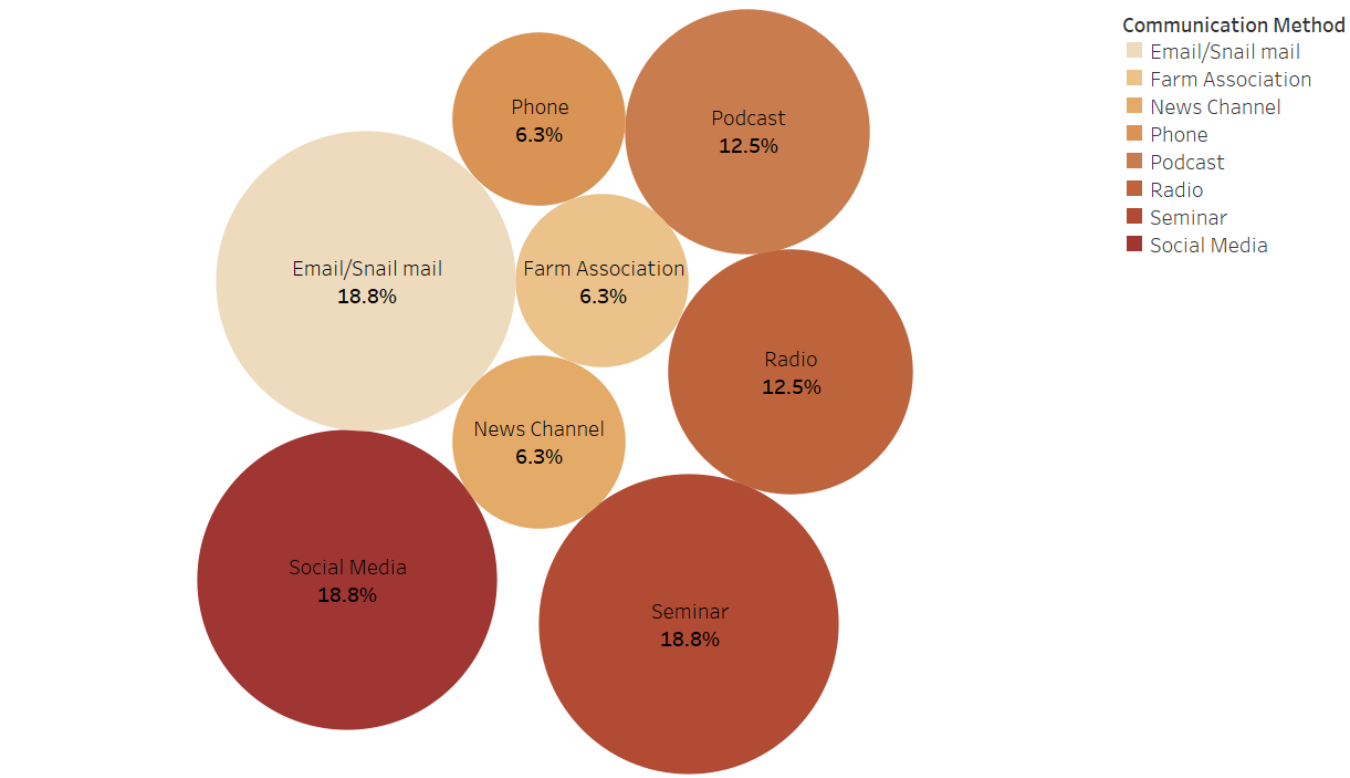


Figure 3: Common Methods of Communication Cited by Extension Agents

One female producer interviewed mentioned how she appreciates being able to work on a printed application form for a government program with the help of NRCS. Right now, she does this over the phone, and the NRCS agent then sends her copy of the application by mail, which she then corrects and approves prior to having the NRCS agent send it off. Having a booth in the library would allow the producer to get help with an expert agent and use the library computers and internet to send off the application on the same day.

Other forms of communication can be used to reach out to farmers without internet access. For farmers without internet access, creating a call tree during the conferences could be a means to quickly reach a larger sample of farmers when a new program is out. This leverages the networks created in events, such as Annie's Project. The calling tree could potentially be turned into a texting tree if needed.

4.3 Seek Partnerships to Leverage Social Capital

Partnering with organizations specifically affiliated with the minority producers can help spread the information. For approaching African American agricultural producers, collaboration with local minority cooperatives could be considered. During the interview process, it was found that a local minority cooperative identified more names of African American producers from the PPP list than the local Extension service could. This was an indication that ethnic minority producers were more affiliated with the race-specific cooperative than general Extension services.

Beyond collaborating with agriculture-specific groups, Prins and Ewert (2002) suggest partnering with faith-based institutions to leverage their social capital. This indeed was the case for an African American farmer interviewee, who mentioned that he was informed about the PPP within his church organization. Thus, working with the local church could be helpful for information dissemination for certain ethnic minority groups. According to Burlig and Stevens (2024), church is a channel where information dissemination among farmers occurs, separated from agricultural Extension services. For

female farmers, setting up consulting and information booths in libraries could be a way to reach them during the time they take their children to the library. Libraries make a great place to inform female farmers about new seminars or programs and to aid with program applications. In rural areas, libraries are an important source of materials for homeschooling, and they also provide activities for children and families as well as having internet available. Hancks (2012) finds that libraries play a successful role in community economic development, allowing the community to develop relationships with local agencies.

5 Concluding Remarks

During COVID-19, the U.S. government instituted the PPP to help small businesses by providing them with a forgivable loan to help them meet their business expenses. In this study, analysis of the program shows that female and African American agricultural producers did not participate as much as possible, despite the extremely low cost of the program. We believe that the low participation rate is, in part, due to a lack of efficiency in communicating about the program to minority farmers. Hence in this study, we identify the ways used to communicate with female and African American farmers about government programs, such as the PPP, that are not specifically designed for agricultural producers.

We report on how the PPP was communicated to farmers and how it was received by minority farmers. Our interviews highlight the challenges in reaching women and African American farmers: (1) cancellation of in-person meetings because of health concerns meant that PPP information had to be disseminated through other means (i.e., online); (2) misinformation from past government programs and lack of training of Extension agents on the program meant that eligible applicants did not think they could apply for PPP loans; (3) heavy reliance on online platforms without personalizing the information to the receiver or without it coming from providers who the receivers knew; and (4) a lack of information for farmers with limited internet access and without a lender relationship. Communication methods used were more effective in reaching businesses that would have requested larger loans. Once weaknesses and challenges were identified, we sought recommendations on how to increase online platform efficiency and reach minority farmers.

Even though information on the PPP was available online, interviewed farmers were not interested in applying because they thought they may not be eligible, given the name of the program. In some cases, there was distrust in the information provided because they did not know the informer. Specifically, the African American farmer interviewed expressed this concern. This distrust possibly stems from past incidences where African American farmers received different treatment by government agencies and faced systemic discrimination and mistrust toward government programs in general (Ferguson 1998; Gilbert, Sharp, and Felin 2002; Coppess 2021; Russell, Hossfeld, and Mendez 2021; Mishra, Short, and Dodson 2024). Thus, it is important to gain trust and build a connection with the minority farmers one is trying to reach. This can be facilitated by partnering with local associations and groups in which they are active. We also encourage the local government agents and University Extensions to collaborate with other groups that have a strong affiliation with minority producers, including churches and libraries. Furthermore, it is important to organize meetings that target small farms, where minority farmers are more predominant. An Extension agricultural economist who specialized in specialty crops (e.g., fruits and vegetables), stated that the Extension meetings that she attended had a diverse group of producers, including female and ethnic minorities. Such observation was unique, not shared by many other Extension agents and specialists who tend to work in row crop production. This allows Extension and government agents, lenders, and association members to build a relationship with the farmer beforehand and later use online platforms to communicate on the latest programs.

Yet, relying heavily on online platforms for information dissemination when targeting minority agricultural producers, as done by the PPP, needs consideration. Rural communities are less likely to have broadband access. Other means of communication should have also been used. Offering advice over the phone, helping farmers fill out the forms, and mailing forms for confirmation, would increase participation in these types of programs. Also, setting up a help desk at the local library or church to help with applications could have increased PPP participation by minority farmers. Further suggestions identified were building a phone

tree and using influencers. Our study focused on the role of Extension and identifying often-overlooked outlets of Extension services in reaching out to minority farmers. From the policy-makers' point of view, this should represent only a fraction of information channels that need to be evaluated because the University Extension services reflect only a part of all possible information outlets. To reach out to minority agricultural producers, it is essential for these government agencies to evaluate other delivery methods and identify ways to make improvements.

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Appendix

Interview Questions for Farmers

- What made you apply for the PPP? In which years did you apply? (This can lead to a discussion on why they applied one year and not the other.)
- Did you receive help with the application? If so, who helped you? How did they help you?
- How did you get the information about the PPP?
- What difficulties/challenges, if any, did you face when applying for the PPP? Do you feel that the PPP was accessible?
- Did you apply for/receive PPP loan forgiveness?
- Do you have any other comments related to your experience and application of the PPP loan and forgiveness that you would like to share?
- How would you rank these institutions in terms of trustworthiness?
  University Extension, Cooperatives, Local Banks, Farm Credit, Government Institutions
- Which of the following institutions is your major source of information on new programs?
  University Extension, Cooperatives, Local Banks, Farm Credit, Government Institutions
- Did you have to fill out multiple applications until having it approved? Can you tell us which institutions you used?
- Do you have any financial accounts opened in lending institutions? Did you have a previous relationship with the lender? (e.g., account, took out a loan, etc.)
- How did you feel about the process of applying for the loan and interacting with the lending institution?
- Have you participated in any other government-sponsored programs before?
- How would you prefer to receive information about new government programs such as the PPP? (e.g., cooperatives/association meetings, Extension agents, university professors, government agents, social media, etc.)

Interview Questions for Extension Personnels

- What channels do you use to reach farmers?
- Do these changes according to farmer's race or gender (minority farmers)?
- What would you say about the challenges facing minority farmers?
- Are there any barriers that minority farmers in the area commonly face when trying to access resources or services?
- Did your Extension office provide help to farmers with the PPP application? If so, how did you help?
- What were the barriers in reaching minority farmers with information about the Paycheck Protection Program (PPP)?
- Can you provide recommendations on how to reach minorities in the rollout of programs that are not specific for farmers?
- Any other comments or suggestions or experiences that you have had and would like to share regarding communicating with minority farmers specially about PPP?

References

Atkins, R., L. Cook, and R. Seamans. 2021. "Discrimination in Lending? Evidence from the Paycheck Protection Program." *Small Business Economics* 58(2):843–865.

Autor, D., D. Cho, L.D. Crane, M. Goldar, B. Lutz, J. Montes, W.B. Peterman, D. Ratner, D. Villar, and A. Yildirmaz. 2022. "An Evaluation of the Paycheck Protection Program Using Administrative Payroll Microdata." *Journal of Public Economics* 211:104664.

Barbercheck, M., K.J. Braiser, N.E. Kiernan, C. Sachs, A. Trauger, J. Findeis, A. Stone, and L. Stewart Moist. 2009. "Meeting the Extension Needs of Women Farmers: A Perspective from Pennsylvania." *The Journal of Extension* 47(3):8.

Beck, T., P. Behr, and A. Madestam. 2018. "Sex and Credit: Do Gender Interactions Matter for Credit Market Outcomes?" *Journal of Banking & Finance* 87:380–396.

Brown, A., M. Dagher, and D. McDowell. 1992. "The African American Farmer: Meeting the Production, Marketing, and Policy Challenges." *American Journal of Agricultural Economics* 74(3):820–825.

Burlig, F., and A.W. Stevens. 2024. "Social Networks and Technology Adoption: Evidence from Church Mergers in the U.S. Midwest." *American Journal of Agricultural Economics* 106(3):1141–1166.

Collins, L.A., T.M. McDonald, A.K. Giri, and D. Subedi. 2024. "The Relative Financial Performance of African American Farms in the United States Since the Great Recession." *Applied Economic Perspectives and Policy* 46(1):32–51. https://doi.org/10.1002/aepp.13346

Coppess, J. 2021. "The History and Development of USDA Farm Loan Programs, Part 3: 1946 to 1961." *farmdoc daily* (11):46, Department of Agricultural and Consumer Economics, University of Illinois at Urban-Champaign.

Demko, I., and A.C. Sant'Anna. 2023. "Impact of Race and Gender on the SBA Paycheck Protection Program (PPP) Loan Amounts." *Economic Development Quarterly* 37(3):211–229.

Demko, I., A.C. Sant'Anna, and K. Liang. 2021. "An Overview of the Paycheck Protection Program (PPP) Loans and Implications for Agricultural Enterprise Recovery from COVID." *Journal of Agriculture, Food Systems, and Community Development* 11(1):201–208.

Fairlie, R. 2020. "The Impact of COVID-19 on Small Business Owners: Evidence from the First Three Months after Widespread Social-Distancing Restrictions." *Journal of Economics & Management Strategy* 29(4):727–740.

Federal Communications Commission. 2020. "2020 Broadband Deployment Report." Retrieved from https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf.

Ferguson, K. 1998. "Caught in 'No Man's Land': The Negro Cooperative Demonstration Service and the Ideology of Booker T. Washington, 1900–1918." *Agricultural History* 72:33–54.

Gilbert, J., G. Sharp, and M.S. Felin. 2002. "The Loss and Persistence of Black-Owned Farms and Farmland: A Review of the Research Literature and Its Implications." *Journal of Rural Social Sciences* 18(2):1.

Giri, A.K., D. Subedi, E. Wesley, F. Peterson, and T.M. McDonald. 2021. "Impact of the Paycheck Protection Program on U.S. Producers." *Choices* 36(3):1–7.

Hancks, J.W. 2012. "Rural Public Libraries' Role in Community Economic Development." *Public Library Quarterly* 31(3):220–236.

Hoppe, R.A., and P. Korb. 2013. *Characteristics of Women Farm Operators and Their Farms.* Washington DC: U.S. Department of Agriculture, Economic Research Service, Economic Information Bulletin 111, April.

Kulik, C.T., and R.L. Holbrook, Jr. 2000. "Demographics in Service Encounters: Effects of Racial and Gender Congruence on Perceived Fairness." *Social Justice Research* 13:375–402.

Mishra, A.K., G. Short, and C.B. Dodson. 2024. "Racial Disparities in Farm Loan Application Processing: Are Black Farmers Disadvantaged?" *Applied Economic Perspectives and Policy* 46(1):111–136.

Powell, M., M. Fery, A. Agenbroad, and M. Guzy. 2019. "Personal Connections: What Women in Sustainable Agriculture Value in Their Professional Development." *The Journal of Extension* 57(5):7.

Prins, E., and D.M. Ewert. 2002. "Cooperative Extension and Faith-Based Organizations: Building Social Capital." *Journal of Extension* 40(3):n3.

Russell, K., L. Hossfeld, and G.R. Mendez. 2021. "'Not a New Pattern': Black Farmers' Perspectives on Barriers to Participating in Federal Farm Programs." *Journal of Agriculture, Food Systems, and Community Development* 10(4):195–209.

Sant'Anna, A.C., K.N. Kim, and I. Demko. 2022. "Limits to Capital: Assessing the Role of Race on the Paycheck Protection Program for African American Farmers in America." *Applied Economic Perspectives and Policy* 46(1):217–233. https://doi.org/10.1002/aepp.13338

Schmidt, C., S.J. Goetz, and Z. Tian. 2021. "Female Farmers in the United States: Research Needs and Policy Questions." *Food Policy* 101:102039.

U.S. Department of Agriculture, National Agricultural Statistics Service. 2019. "2017 Census of Agriculture." Retrieved from https://www.nass.usda.gov/Publications/AgCensus/2017/index.php.

U.S. Small Business Administration. 2020a. "Paycheck Protection Program. How to Calculate Maximum Loan Amounts – by Business Type." Washington DC, June 26. https://www.sba.gov/sites/default/files/2020-12/How-to-Calculate-Loan- Amounts-508_6-26-20.pdf

U.S. Small Business Administration. 2020b. "SBA to Make Economic Injury Disaster Loans Available to U.S. Agricultural Businesses Impacted by COVID-19 Pandemic" [Press release]. Retrieved from https://www.sba.gov/article/2020/may/04/sba-make-economic-injury-disaster-loans-available-us-agricultural-businesses-impacted-covid-19.

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Case Study

A Case Study on the Home Cooking Movement—Legalization, Market, and Competition

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JEL Codes: Q13; Q18
Keywords: Diffusion of innovation, economic systems and structures, Home Cooking Movement (HCM), legalization, Microenterprise Home Kitchen Operations (MEHKO)

Abstract
The National Food Freedom Initiative, led by the Institute for Justice, has been promoting "food freedom" since 2013, advocating for people's rights to buy or sell foods of their choice and for reduced government regulation. Similar progress by California Assembly members and non-profit organizations, coupled with increased home kitchen operations driven by consumer demand, led to the passage of Assembly Bill No. 626 (AB 626) in 2018, which legalized residential preparation and sale of foods containing perishables (i.e., meat and seafood). California's AB 626 laid out a legislative foundation for other states, such as Utah and Iowa, expanding the Home Cooking Movement (HCM). However, while the HCM is an emerging tool to extend the food freedom initiative, little is known about the economic viability and resilience of the HCM food system and the growth potential of home kitchen operations and businesses. To fill the gap, this case study examines the evolving legislative landscape of the HCM, accesses the economic systems underpinning HCM across three core structures—motivation, decision-making, and information structures, and uses the framework of Diffusion of Innovation Theory to analyze the challenges facing the HCM. By creating an enhanced economic understanding of an innovative food system, this case study offers valuable insights to beneficiaries such as policymakers, consumers, industry advocates, and opponents, as well as students majoring in agribusinesses and food economics.

1 Introduction

Food systems have undergone continuous evolution and adaptation throughout human history, but the pace of change has been particularly rapid over the last 200 years (Lusk 2013; Braun et al. 2021). Our food system has shifted from the traditional format focusing on the upstream (i.e., farmers connect consumers directly) into a more segmented one, comprising midstream (i.e., processing and wholesale) and downstream (i.e., retail) parts (Reardon and Timmer 2012). These shifts in the food system have been motivated by factors such as a growing population coupled with disruptions such as climate change, geopolitical conflicts, urbanization, changing consumer preferences, and uncertainties like the global pandemic (Tendall et al. 2015; Braun et al. 2021).

According to the World Food Summit 1996, the primary objective of a food system is food and nutrition security—"*all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (Pinstrup-Andersen 2009; p. 5). There has been a collective effort among the global scientific community to transform the food system into a resilient, sustainable one, which is pivotal in achieving the Sustainable Development Goals (SDGs) by 2030 (Fanzo et al. 2021). A sustainable food system is characterized by its ability to ensure food security and nutrition for everyone while also preserving the economic, social, cultural, and environmental resources necessary to continue providing food security and nutrition for future generations (Braun et al. 2021). A food system is intrinsically complex, consisting of many channels involving production, aggregation, processing, distribution, consumption, and disposal, and is incredibly diverse. With increased disposable income and heightened variety seeking, new food systems are being

developed and expanded; and consumers can experience a variety of different food systems, even within a localized area (O'Neill 2014).

Originally, the Home Cooking Movement (HCM) emerged from the convergence of chefs' initiatives to sell homemade meals, and consumers' willingness to purchase, often through informal channels. In recent years, the HCM has gained momentum due to the establishment of legal frameworks. These frameworks allow residents to produce and serve homecooked perishable foods prepared in a private residence to the consumer directly, through take-out (or delivery), or even dine-in at home (Institute for Justice 2023b). It presents an opportunity for chefs to generate additional income and showcase their culinary expertise at much lower operational costs compared to brick-and-mortar restaurants (Chang 2022). Meanwhile, rooted in the local economy and food system, the HCM also provides consumers with alternative food experiences through which they can interact with chefs directly (Moreno and Malone 2021). Despite these benefits, there is limited understanding of how organizational arrangements and individual decisions are made in this innovative and emerging food system.

The HCM is in the early stage characterized by the presence of Innovators and Early Adopters among both chefs and consumers. This aligns with the principles of Rogers' Diffusion of Innovation Theory (Rogers 2003). Several persistent challenges continue to affect the broader diffusion of the sales limit of homecooked foods across the states. To name a few, the legal frameworks in states such as California and Iowa impose limits on home kitchens' revenues and the number of meals served. Although home kitchen operators need to obtain a Microenterprise Home Kitchen Operations (MEHKO) permit and Food Protection Manager Certification to legally sell homecooked foods, consumers have limited knowledge about these practices. Therefore, food safety concerns linger. To comprehensively assess the HCM's growth potential, it is critical to examine factors challenging the further proliferation of home kitchen operations. To fill the gap, this case study aims to (1) examine the evolving legislative landscape of the HCM, (2) assess the underlying economic structures that govern the HCM food system, and (3) analyze multifaceted challenges influencing the broader diffusion of the HCM within both chefs' and consumers' communities. It is worth noting that this study represents the pioneering efforts to scrutinize the HCM through economic lenses, contributing to an enhanced economic understanding of this innovative food system. The valuable insights derived from this research are relevant to a wide range of stakeholders, including policymakers, industry advocates and opponents, consumers, and students specializing in agribusinesses and food economics.

The remainder of this study is structured as follows. We begin by examining the evolving regulatory development toward the legalization of HCM (Section 2). Specifically, we delve into the historical evolution of cottage food laws, the food freedom initiative and its impacts on cottage food reforms, and legislation and regulations associated with the MEHKO permit. Then, following Neuberger and Duffy's (1976) system-theoretical approach and Davis and Serrano's (2016) discussion on food systems, we assess three core structures upholding the economic system of the HCM: motivation, decision-making, and information structures (Section 3). Next, we examine the challenges facing the broader diffusion of HCM under the Diffusion of Innovation Theory (Rogers 2003). Last, we conclude and discuss implications for various stakeholders.

2 Regulatory Developments Toward the Legalization of HCM

2.1 U.S. Food Safety Regulation

The United States has a long history of selling homecooked food, and one typical example is the sale of baked cookies by Girl Scouts, which dates back to the 1910s (Christiansen 2017). Over the years, the selling of homecooked food has evolved across the nation in various forms and so have laws regarding food safety regulation. In the United States, the primary responsibility for creating and enforcing food safety regulations lies with the state governments. To establish the most effective kitchen practices,

many states use the "Food Code" developed by the U.S. Food and Drug Administration (FDA) as a guide (O'Hara, Castillo, and McFadden 2021). The Food Code exempts the production of low-risk foods that do not require time and temperature control, for religious and charitable purposes. This exemption provided a regulatory pathway for the development of the cottage food law (O'Hara et al. 2021).

The U.S. federal government has been heavily involved in food safety since the late 1800s (Williams 2010). With the exception of meat, poultry, and eggs, which fall under the jurisdiction of the U.S. Department of Agriculture (USDA), the FDA is in charge of regulating all food items involved in interstate trade (Labuza and Baisier 1992). The U.S. Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and the Consumer Product Safety Commission (CPSC) also play crucial roles in ensuring overall food safety under different aspects (Labuza and Baisier 1992). The passage of the Food and Drug Act in 1906 is the very foundation that led to the development of the present FDA (Food and Drug Administration 2023). The long historical progression of food and safety regulations leads to the current point where U.S. consumers can be confident in the overall food safety and quality of food products (Figure 1). The current food safety regulation results from numerous trials and errors, along with subsequent research and development.

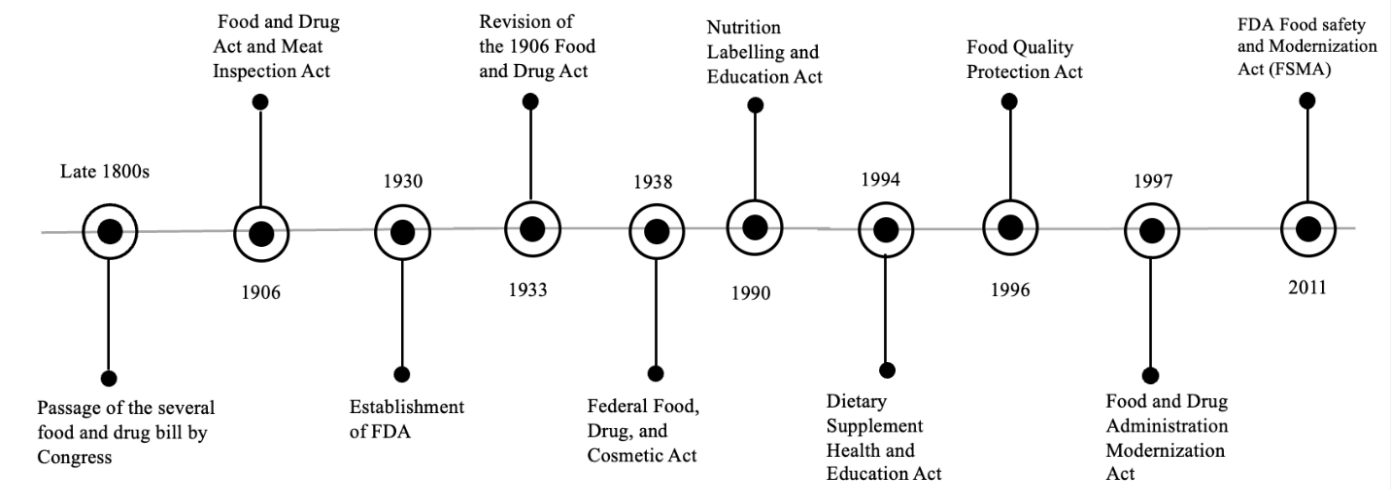

Figure 1: Timeline of the Development of the FDA and Its Food Safety Regulation

Source: Food and Drug Administration (2023)

The 2011 Food and Safety Modernization Act (FSMA) is considered a milestone in regulating food safety and building a national food safety system (Stewart and Gostin 2011; Food and Drug Administration 2023). The main aim of FSMA is to protect public health more effectively by focusing on the prevention of foodborne illnesses before they occur rather than responding to treating them (Centers for Disease Control and Prevention 2022). Under the FSMA, the Integrated Food Safety Centers of Excellence have been established to provide training and assistance to support state and local health departments in strengthening their ability to track and investigate enteric diseases (Centers for Disease Control and Prevention 2023a). At the state level, health departments collaborate with the FDA to administer the FSMA and enforce laws and rules related to food safety, such as Oklahoma state's Food Safety Division, operating under the State Department of Agriculture, Food, and Forestry (Oklahoma Division of Food Safety 2024). In Oklahoma, this division oversees the Homemade Food Freedom Act in the state, ensuring compliance with training requirements and labeling rules for homemade foods.

Despite joint efforts at both federal and state levels, FSMA is not free from flaws and regulatory gaps. First, the FSMA primarily focuses on regulating food products other than meat and poultry, and it collaborates with the USDA to establish specific safety standards for these products (Stewart and Gostin

2011). Second, small producers are also exempt from some safety requirements compared to larger farms. Although these exemptions, along with some modified requirements, are intended to consider the scale and resources of small producers, they create a gap in maintaining a robust food safety system that could lead to foodborne illness because small farms account for 91 percent of all farms and 23 percent of agricultural production (Stewart and Gostin 2011; Boys, Ollinger, and Geyer 2015). The lack of consistent federal policies to regulate small-scale businesses means heavy reliance on local government regulations, which vary widely across regions or may not align with rules for large commercial operators. This lack of consistency poses particular challenges for small business owners. Additionally, in the context of small businesses like home kitchens, there is a notable absence of consistent liability insurance policies, with requirements either not mandated or specified (California Department of Public Health 2019; House Bill 94 2021; House Bill 2431 2022). This exposes home kitchens to legal and financial vulnerability, including potential legal claims or lawsuits seeking compensation for medical expenses, pain and suffering, employment disputes, property damage, or other damages incurred by affected consumers. Therefore, in the context of our constantly evolving food system, ongoing reforms in food regulation are imperative to meet the market demand while upholding food safety standards.

2.2 Cottage Food Law

Cottage foods are a selected group of homemade food products sold for human consumption (McDonald 2019). While eligible cottage food products vary across states, the typical ones present a low risk of foodborne illness, including confectionary products like candy, preserved fruit and vegetable products such as jam and jelly, baked goods like bread and cookies, snack foods like popcorn and granola, and dry goods or condiments (McDonald 2019; O'Hara et al. 2021).

In 1978, Vermont became the first state to establish cottage food laws that allowed residents to produce and market cottage foods. Before 2007, only four states (i.e., Maine, Massachusetts, Vermont, and Virginia) legalized the sales of non-perishable foods prepared in a home kitchen. The cottage food market grew rapidly after 2007 and 2008 with the passage of cottage food laws in various states. In June 2022, Rhode Island marked the last state to legalize the sale of cottage foods with the passing of House Bill 7123 (2022). The law went into effect in November, allowing both farmers and non-farmers to obtain permits to sell cottage foods. As of now, all 50 states in the United States, along with the District of Columbia, have implemented cottage food programs that permit residents to sell home-prepared foods (such as baked goods and shelf-stable foods) directly to consumers (Institute for Justice 2022). The timeline of the implementation of the cottage food law in the United States is visualized in Figure 2.

The specifics of cottage food laws vary within states. For example, California has a tiered system with Class A and Class B operators (California Department of Public Health 2023a). Class A operators need no training but can sell only directly to consumers at a lower gross annual sale limit of $75,000. On the contrary, Class B operators can sell indirectly to consumers through stores and restaurants at a higher gross annual sale limit of $150,000, but they need to complete a training course offered by the California Department of Food and Agriculture and label their products with relevant information. This creates inefficient markets and potentially raises the transaction costs for local operators. Local operators also may not have the technical legal expertise to navigate the regulatory landscape, which could impede its economic growth. Between-state discrepancies in cottage food laws are also significant. For example, Florida cottage food producers or home chefs do not need any licenses or training to start the business and have an annual sales cap of $250,000 (Florida Department of Agriculture and Consumer Services 2021; California Department of Public Health 2023b). These in-state and between-state variations in cottage food legislation led to confusion and disparity in the economic opportunities available to home chefs, further complicating the regulatory landscape of cottage food businesses and emphasizing the need for standardization and clarity in food safety regulations.

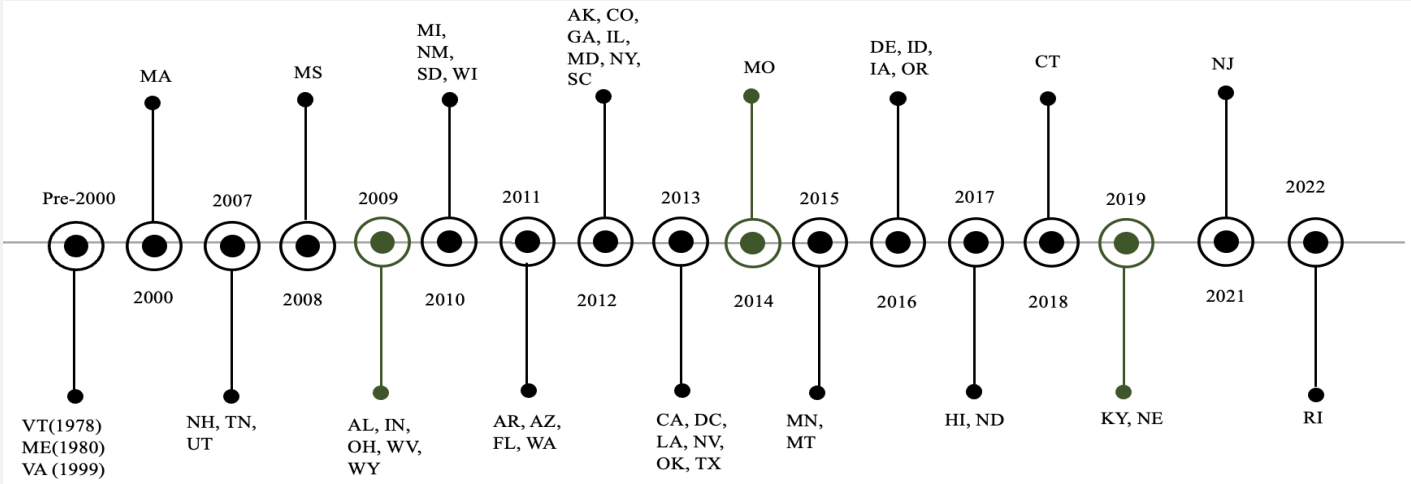

Figure 2: Timeline of the Implementation of Cottage Food Laws Across States

Sources: O'Hara et al. (2021), Table 1 Year Food Manufacturing Sectors Eligible for Cottage Food Production; Cottage Food Laws by State (2023)

Notes: KS, PA, and NC do not have specific cottage food laws, but residents are allowed to sell homemade food. The figure represents the initiation of cottage food laws across states.

2.3 National Food Freedom Initiative

The emergence and development of cottage food laws and the HCM both fall under the umbrella of the "Nation Food Freedom Initiative" led by the Institute for Justice (2023b), which focuses on "*eliminating restrictions that prevent people from making food for sale in their home kitchens*." In 2021, the Institute for Justice facilitated cottage food reforms in nine states (Alabama, Arkansas, Florida, Illinois, Indiana, Minnesota, New Mexico, Oklahoma, and Wyoming) through bill drafting and organizing support for home chefs and policymakers. These reforms aim to relax cottage food regulations, covering a wide range of changes, such as eliminating local bans and permitting requirements, lifting sales caps, and broadening sales channels through online platforms and local retailers (Smith 2021). From an economic perspective, a relaxation in policy (essentially deregulation) could increase economic opportunities, and reduce barriers to competition and innovation. This opens up the market and allows those who do not have the means or background in technical regulatory issues to be able to participate.

The Wyoming Food Freedom Act of 2015 is a notable example of the National Food Freedom Initiative leading the way to legislation. It allows home chefs to sell nearly all types of homemade foods without any license, permit, or certification requirement from any state government agency. Following Wyoming's lead, several states, such as North Dakota (House Bill 1433 2017), Utah (House Bill 181 2018), Montana (Senate Bill 199 2021), and Oklahoma (House Bill 1032 2021), enacted similar food freedom acts, easing numerous restrictions for home chefs producing food for sale in their home kitchens. More recently in January 2024, Alaska introduced a food freedom bill that will exempt sales of homemade food from state licensing requirements, including inspection and labeling after its approval (House Bill 251 2024). Additionally, the controversial Arizona bill, also known as the Tamale Bill, which was vetoed by Governor Katie Hobbs, has been re-introduced which would allow the selling of perishable food items made in home kitchens if approved (House Bill 2042 2024). While the Institute for Justice (2023c) reported no documented cases of foodborne illness linked to food sold across seven states with the broadest homemade food laws (California, Iowa, Montana, North Dakota, Oklahoma, Utah, and Wyoming) as of September 2023, concerns about the food safety has been brewing around the HCM as a whole (Gonzalez 2023; Wimer 2023). In response, state policymakers have taken measures to amend their food freedom law. For example, the North Dakota Health Department has imposed restrictions on the sales of

high-risk foods such as meat products (except poultry), fresh fruits, vegetables, juices from fresh fruits and vegetables, and raw sprouts (Farquhar 2020). Food operators are required to display a sign or label that states: "*This product is made in a kitchen that is not inspected by the state or local health department*." Similarly, poultry products must include a label stating, "*Poultry products do not come from a government-approved source*." Oklahoma has also taken proactive steps to enhance food safety under the Homemade Food Freedom Act. Oklahoma Food Safety Division oversees the Homemade Food Freedom Act ensuring compliance with a set of labeling rules for homemade foods (e.g., legible print stating "*This product was produced in a private residence that is exempt from government licensing and inspection*"). Additionally, food operators are required to undergo food safety training and obtain permits, and a centralized platform for reporting complaints on foods being made and sold under the Oklahoma Homemade Food Freedom Act is available to the public. Overall, the evolving landscape of food regulations underscores a complex dynamic between the National Food Freedom Initiative and the necessity of ensuring food quality and safety at the state level.

2.4 MEHKO Legislation

While residentially produced shelf-stable foods are a cornerstone of cottage foods, direct sales of homecooked perishables, such as meat or seafood, are largely outlawed throughout the United States. Nevertheless, home cooks in California and other states have a long history of selling or trading homecooked meals with neighbors, contributing to charitable fundraisers, or hosting home-based pop-up meals (Alexander 2018; Pixcar 2021; Institute for Justice 2022). In response to the growing lobbying efforts from home kitchen operators and third-party advocacy groups (such as COOK Alliance and the Institute for Justice), California passed Assembly Bill No. 626 (AB 626) in September 2018, which legalized the sale of certain homecooked perishable foods through the MEHKO permits. This groundbreaking legislation was the first of its kind in the United States, reflecting the recognition of the value and potential of home-based food entrepreneurship. AB 626 allowed counties in California to opt in and issue MEHKO permits and enabled the sale of perishable meals containing meat and eggs, which was previously prohibited under the cottage food law. Unlike other states that adopted food freedom acts at the state level, California's MEHKO permits are issued and regulated by the county-level environmental health department (House Bill 94 2021). In a county that has opted into the law, a valid MEHKO permit will be issued to the home kitchen operator by the local county health department after the completion of the initial inspection to verify compliance with the requirements of state law. The MEHKO operator must obtain a Food Protection Manager Certification from an accredited organization, and any individual involved in the preparation, storage, or service of food must obtain a food handler card (COOK Alliance 2022a).[1] Under the current regulation, MEHKO operators are required to receive one on-site routine inspection per year by the environmental health department. By May 2022, nine Californian counties had authorized MEHKO operators (Figure 3).

Following California's path, Utah became the second state to legalize home kitchen operations through the passage of House Bill 94 in May 2021, allowing home chefs to sell their homecooked meals directly to the public (House Bill 94 2021; Sibilla 2023). Likewise, Iowa passed House Bill 2431, signed on June 14, 2022, allowing home food processing establishments to sell most types of food, including perishable foods like red meat and poultry (House Bill 2431 2022). Unlike California, Utah and Iowa do not require counties to opt in to regulate home kitchens but do require permits and/or licenses to operate. Similar legislation has been under development in other states, such as Washington

[1]In California, the oversight of food safety regulation and compliance training and permitting falls within the purview of each county that has opted into the state legislation of MEHKO. For example, information about Food Handler Card and Food Protection Manager Certification provided by San Diego county's Environmental Health and Quality Department can be found here: https://www.sandiegocounty.gov/content/sdc/deh/fhd/food/foodhandler.html

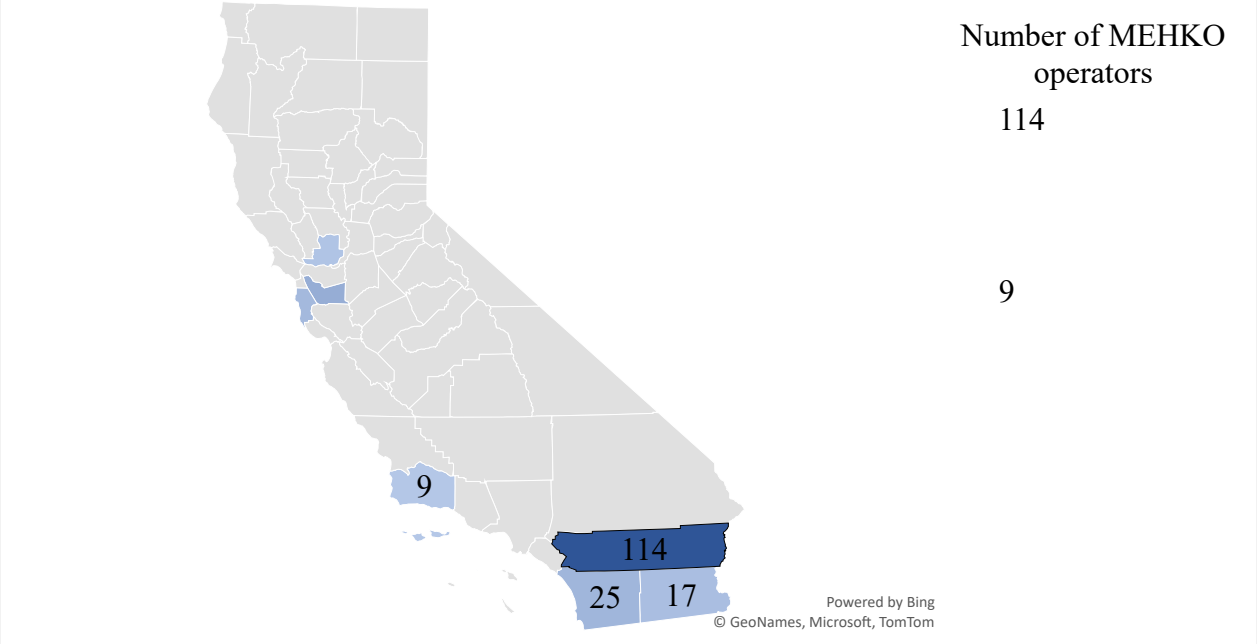

Figure 3: Number of Active MEHKO Operators in California Based on Counties

Source: COOK Alliance (2022c); https://www.cookalliance.org/map

(House Bill 1706 2023), Florida, and Georgia (Martinez 2023). A comparison of home kitchen operation legislation in four states is summarized in Table 1.

As of July 2023, the HCM in California was promoted further with the passing of Assembly Bill No. 1325 (AB 1325). AB 1325 raised the maximum number of meals to 90 per week and raised the gross annual sales cap to $100,000. Additionally, AB 1325 expanded the definition of "meals" to allow for more flexibility in selling individual items such as desserts, appetizers, and beverages. This new legislation increases support for home kitchen operators by offering them more and better economic opportunities for their businesses and expanding the overall HCM market. Lowering barriers to entry, such as previous limitations on sales, meal quantities, or food options, AB 1325 encourages healthy competition and the potential for a wider array of food offerings. The expansion of the meal base also encourages more producers to supply these items, creating economic benefits for local producers and suppliers. In addition, the California Legislature allocated $8 million to bolster California's MEHKO program to provide education and business technical assistance to chefs (CAMEO 2023). Overall, these legislative efforts have the potential to help grow the HCM outside of California by providing modified groundwork legislation for states considering MEHKO legislation.

3 The Economic System of the HCM

To better understand and evaluate an economic system, Neuberger and Duffy (1976) proposed the system-theoretical approach that identifies three foundational structures in an economic system: motivation, decision-making, and information structures. Scholars have adopted this approach to discuss and analyze the long-term resilience and efficiency of economic systems (e.g., Conn 1977; Davis and Serrano 2016; Enderle 2017).

A food system, by nature, is a microcosm of an economic system consisting of organizational arrangements and processes of production, distribution, and consumption of food from the farm to the table (Davis and Serrano 2016; Braun et al. 2021; U.S. Department of Agriculture 2023). As such, the HCM is an emerging economic system that includes its own operational process of transforming raw materials

Table 1: Comparison of MEHKO Legislation in Four Different States

State	California	Utah	Iowa	Florida
Legislative Type	Assembly Bill No. 626; Assembly Bill No. 1325	House Bill 94	House Bill 2431	House Bill 707
Last Action	Signed 09-18-2018; Signed 07-21-2023	Signed 03-22-2022	Signed 06-14-2022	Died 03-14-2022
Requires Permit	Yes (MEHKO)	Yes (MEHKO)	Yes (HFPEL*)	No
Allows for the Sale of Perishable Goods	Yes	Yes	Yes	Yes
Allows for Dine-In	Yes	No	No	No
Allows for Delivery	Yes, but only by the operator	Yes, but details on whether third-party is allowed are not included	Yes, but only by the operator	Yes
County Opt-In	Yes	No	No	No
Inspection Requirement	Yes, one inspection per year	Yes, but no time frame is specified	Yes, but no time frame is specified	Yes, but no time frame is specified
Liability Insurance Requirement	Not required	Not specified	Not specified	Not specified
Meals Must be Cooked, Served, and Sold on the Same Day	Yes	Yes	Yes	Yes
Includes Internet Food Service Intermediary	Yes	No not specified	No not specified	No not specified
Gross Annual Sales Limit	$50,000; $100,000	None	$50,000	$250,000
Number of Meal Limit	30 meals or meal components per day and 60 total per week; 30 meals per day and 90 meals per week	None	None	10 individual meals per day

Source: The table is organized and compiled by authors using data and resources from the following sources: Assembly Bill No. 626 (2018); House Bill 94 (2021); House Bill 2431 (2022); House Bill 707 (2022); Assembly Bill No. 1325 (2023)
Note: *Home Food Processing Establishment License (HFPEL).

into homecooked food for sale with the support of consumers, home chefs, county agencies, advocacy groups, and third-party ordering platforms like Foodnome. To comprehensively examine the functionality and efficiency of the HCM food system, we elaborate on the three underlying and intertwined economic structures.

3.1 Motivation Structure

The motivation structure specifies objectives, incentives, or rewards that influence consumers, producers, and regulatory agencies to engage in an economic system (Conn 1977; Davis and Serrano 2016). In the context of HCM, for example, home kitchen operators expect to gain additional income sources while exercising their culinary skills and maintaining a relatively flexible work schedule. Meanwhile, consumers who order from home chefs could be driven by a number of factors, such as variety seeking and the desire to support local food producers. The emerging popularity of the food-sharing economy in the tourism sector and the growth of enterprises such as Eatwith, a global platform offering a communal dining experience, also motivate consumers into HCM (Ketter 2019). These motivations for chefs and consumers to participate in the HCM contribute to the dynamic of supply and demand for homecooked meals, whereas the motivations of regulatory parties and advocacy groups support the regulatory landscape of the HCM's development and expansion. In this section, we will focus on the core drivers in the HCM system influencing the emergence of supply and demand for homecooked meals.

3.1.1 U.S. Food Trends

In the recent decade, Americans have been spending approximately 10 percent of their disposable income on food (Okrent et al. 2018). However, the share of disposable income has experienced a sharp increase to 13 percent in 2022 due to a surge in the rise of food away from home (U.S. Department of Agriculture, Ecomonic Research Service 2023b). The food expenditure series (Figure 4), published by the U.S. Department of Agriculture, Economic Research Service, indicates that food-away-from-home (FAFH) expenditures have surpassed food-at-home (FAH) expenditures in recent years (Saksena et al. 2018; U.S. Department of Agriculture Economic Research Service 2023a). Despite a sharp decline in FAFH spending in 2020 due to the pandemic, expenditures in FAFH was up by 28 percent in 2021 compared to 2020 and up by 20 percent in 2022 compared to 2021 (U.S. Bureau of Labor Statistics 2023). This represents $3,030 and $3,639 in average expenditures on FAFH in 2021 and 2022, respectively. FAFH expenditures are

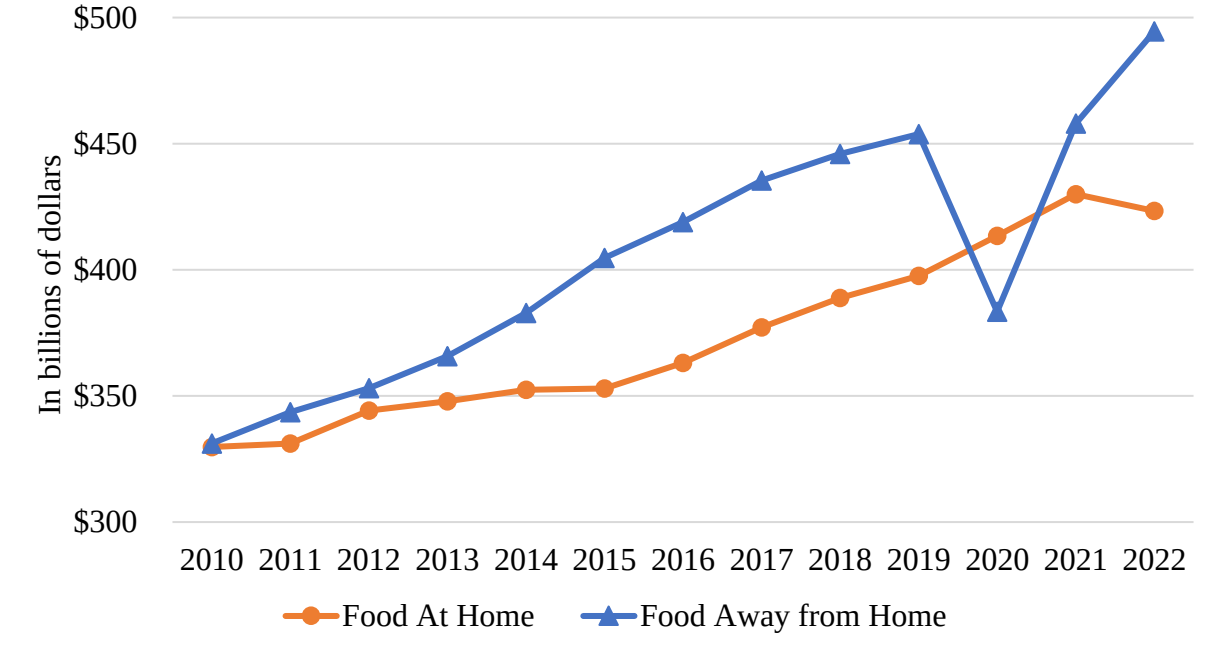

Figure 4: Food-at-Home and Food-Away-From-Home Expenditures in Constant Dollars, 2010–2022.

Source: U.S. Department of Agriculture, Economic Research Service (2023a)

projected to further increase and account for a larger share of U.S. consumers' food dollars in the long run; this trend is largely due to higher income and education levels and shifts in household structures (Saksena et al. 2018; Ellison et al. 2021; Parum and Senarath 2021).

The projected expansion of the FAFH market creates growth opportunities and diversification prospects for home kitchen operations. Although recent studies showed different results in estimating the average FAH and FAFH own price elasticities given different data and methods used (Okrent and Alston 2012; Lusk 2017; Ellison et al. 2021), a general implication is that consumers appear to be more sensitive to prices when dining out. Indeed, the hospitality literature shows that variety-seeking behavior, driven by both internal and external factors, is common in restaurant choices (Ha and Jang 2013). Additionally, partly driven by the desire to support local producers and the local economy, consumers have shown growing interest in seeking out locally sourced or produced foods (Feldmann and Hamm 2015). This shows that the community itself is restructuring its food system to have a more local or regional focus while moving toward its own local production and distribution channel (Bloom and Hinrichs 2011). Thus, this increasing demand for FAFH and local food provides opportunities for home chefs to capture the growing food industry.

3.1.2 Growing Consumer Preferences for Ethnic Foods

The shifting demographics in the United States are creating a more diverse food environment, encouraging consumers to explore and develop preferences for ethnic foods, which are a central focus of the HCM. U.S. Census Bureau (2022) data show that the U.S. population is becoming increasingly diverse, with about 4 out of 10 Americans identifying with a non-white race or ethnic group. This trend is expected to continue because the increased diversity among the younger population is more prevalent—more than half of children under 16 were identified as a racial or ethnic minority in 2019 (Frey 2020). The growing demographic diversity has led to a unique food market segment within these communities, particularly in areas with a substantial non-native population (Palumbo and Teich 2004).

An example of how ethnic food gained prominence in the United States is sushi. It was considered disgusting and faced skepticism when first introduced to the United States in the 1960s, but it is now available in more than 4,000 restaurants across the nation (Ruby and Rozin 2019). Roseman (2008) identified reasons behind the growing interest in ethnic foods, including, for example, "like food of a different ethnicity/culture than me" and "food with a variety of different tastes." Similarly, Latino foods also faced resistance and were perceived as foreign and potentially unsettling by earlier generations of Americans; however, today, Latino foods are an integral part of American food culture, enjoyed by people of all backgrounds (Pilcher 2023).

Research indicates that ethnic or cultural food consumption is associated with nostalgia, upbringing, and a sense of belongingness (Wright et al. 2021b). For consumers with racial or ethnic identification, especially those from immigrant communities, access to cultural foods can help alleviate psychological stress and provide a connection with their cultural heritage (Sanou et al. 2014; Moffat, Mohammed, and Newbold 2017). Among these consumers, cultural food security, defined as availability, access, utilization (i.e., food preparation, sharing, and consumption), and stability of cultural foods (Power 2008; Wright et al. 2021a), becomes a significant driver of food choices.

The growing consumer preference for ethnic foods contributed to the initial proliferation of commercial home kitchens in the local communities, even before the establishment of the regulatory framework in California. Today, a significant number of MEHKO operators cater to the demand for ethnic foods, such as Indian and Mexican, offering a different taste or association with cultural traditions.

3.1.3 Cost Comparison of FAFH Outlets

One of the significant drivers for chefs to engage in home cooking businesses is their competitive advantage in cost and low barriers to entry, compared to traditional food establishments such as brick

and-mortar restaurants, food trucks, and commissary kitchens.[2] The MEHKO, by nature, allows operators (i.e., home chefs) to prepare food for sale in their home kitchen, eliminating the need to rent or own commercial kitchen spaces, which is usually the largest expense for traditional food establishments. In addition, due to small-scale operations based on delivery or take-out, home chefs can use the appliances and tools they already own, avoiding additional expenses on pricey commercial equipment such as range hoods. In the current market, menu prices for similar or same food items between traditional restaurants and MEHKO operators exhibit similarity, indicating comparable pricing (Shef 2024). This suggests a larger profit margin for MEHKO operators owing to their lower costs, making them more appealing to individuals with limited initial capital. Overall, MEHKO operators offer a holistic approach to economic development by supporting local entrepreneurship ultimately leading toward long-term sustainability.

An industry survey distributed to restaurant owners shows that the average startup restaurant cost is between $175,500 and $750,500 (Restaurant Owner 2018), and food truck startup costs range between $50,000 to $175,000 (Rankin 2021; Roaming Hunger 2023). For MEHKO chefs, the startup costs are notably lower, totaling a few thousand dollars to obtain mandated permits and licenses and complete facility inspections governed by their local environmental health agency (California Department of Public Health 2023; Table 2). These expenses vary by county but are generally affordable. For example, the MEHKO permit application costs $435, and its annual fee is $635 in Santa Clara County (Blodgett 2022). The completion of Food Protection Manager Certification costs between $50–$90, and the certification is good for five years (California Department of Public Health 2023; COOK Alliance 2022a). Table 2 provides a brief cost comparison between traditional food businesses and MEHKO operators.

3.1.4 Key Drivers of HCM Growth

Although the MEHKO framework is pivotal to legalizing the sale of homecooked food, its initial restrictions and sales limits made it difficult for home kitchens to grow, limiting the supply of homecooked meals and the expansion of the HCM. In July 2023, the enactment of AB 1325 by the California Assembly marks a significant advancement in (1) increasing the gross annual sales cap to $100,000 from $50,000, (2) freeing home chefs to serve up to 90 meals weekly (up from 60 previously), and (3) expanding the definition of a "meal" by allowing chefs to sell foods that were previously prohibited, such as appetizers, beverages, and desserts (Assembly Bill No. 1325 2023; Institute for Justice 2023a). These reforms strengthened the incentives for Californian food entrepreneurs to turn their home kitchens into businesses and for policymakers in other states to reexamine the effectiveness of their current legislation.

A critical underlying driver of the HCM is the growing popularity of the novel market model—the sharing economy—in the last decade. According to Trenz et al. (2018) and Quattrone, Kusek, and Capra (2022), the sharing economy model is "*collaborative consumption or peer-to-peer sharing [and] is an economic model that leverages the ability (and perhaps the preference) of individuals to rent/borrow goods and services rather than buying/owning them*." (p. 1) The technological advancement and change in consumer attitude toward product ownership have allowed for the rapid growth of the sharing economy in sectors such as workspace, hospitality, delivery services, and rental services (Botsman and Rogers 2010; Cheng 2016; Ganti 2021). In the context of HCM, chefs leverage their culinary skills within their residences to offer food choices to local consumers. Following the established categorization of sharing practices developed by Trenz et al. (2018), the HCM is a type of commercial sharing that (1) builds on the commercial interests of home chefs (i.e., resource provider); (2) involves direct monetary compensation for chefs; and (3) does not involve the transfer of ownership. As the sharing economy is projected to

[2]A commissary kitchen is a rentable shared kitchen that has commercial-graded equipment where food service operators such as food truck and mobile vendors can prepare and store their food (Webstaurant Store 2023).

Table 2: Comparison of MEHKO Legislation in Four Different States

Costs	MEHKO	Food Truck	Commissary Kitchen	Brick-and-Mortar Restaurant
Place of business (Capital Cost)	No cost outside what is already paid for in the operators' home.	Average food truck[1] $50,000–$175,000	Security Deposit[2] $100–$250 Hourly rent[2] $15–$45 Monthly rent[2] $250–$1,250	Security Deposit[3] $12,000–$36,000 Rent[3] $2,000–$12,000 or Down Payment[3] $100,000–$350,000 Mortgage[3] $2,000–$12,000
Equipment and Supplies (Material Cost)	Equipment can be equipment already in the home kitchen.	$50,000– $200,000[1]	Equipment included in rent[2]	$50,000–$400,000[3]
Certificates and Licensing (Legal Cost)	MEHKO Permit[5] $500–$700 & Food Protection Certificate/ Food Handlers Certificate[5] $50–$90	Business License[1] $65–$150 Health Permits[1] $100–$1,000 Food Handlers Certificate[5] $50–$90	Food Handlers Certificate[5] $50–$90	$675–$9,200[3]
Energy Cost	Low	High (Considering the cost of travel)	Low	High
Advertising Cost	Social Media Advertising; Local Advertising; Online Presence (Medium)	Social Media Advertising; Local Events and Promotions; Signage and Wraps[1] (Medium)	Online Presence; Website Development; Local Advertising[4] (Medium)	Local Advertising; Online Presence; Social Media Marketing; Signage and Décor ($20,000–$30,000) (High)
Insurance Cost	$0–$300 per year[6] (Low)	$2,000–$5,000 per year[1] (High)	$300–$500 per year[6] (low)	Average of $2,160 per year[3] (High)
Additional Costs	Sometimes, street parking (Low)	Parking on average costs[4] $500–$1,000 a month (Medium)	Dry storage[2] $30–$60 a month Cold storage[2] $60–$100 a month (Medium)	Furniture/Décor[3] $40,000–$80,000 (High)

Source: The table is organized and compiled by authors using data and information from the following sources: Brett (2022)[1]; Shrauner (2021)[2]; Rankin (2021)[3]; Emily (2023)[4]; Assembly Bill No. 626 (2018)[5]; Frankel (2023)[6]

quadruple its market in the next few years (*Statista* 2023), the increasing consumer familiarity with this economic model could potentially contribute to the growth of HCM.

While these sharing economy models "*create opportunities for underused goods and services to be available and within easy reach of matching demand*" (Quattrone et al. 2022; p. 1), they could generate negative externalities (e.g., Trenz et al. 2018; Quattrone et al. 2022; Mosaad, Benoit, and Jayawardhena 2023). The two most notable pioneers of commercial sharing, Airbnb's online accommodation platform and Uber's ride-sharing service, have been facing criticism (Guttentag 2015; Quattrone et al. 2022). For example, the increasing popularity of Airbnb in Berlin leads to a housing shortage in some districts (Trenz et al. 2018). As the HCM gains momentum, it has the potential to bring disruptions to the traditional restaurant industry and cause externalities in economic, social, and environmental domains. This underscores the importance of establishing an externalities-based regulatory framework. This sharing economy has had a major economic impact on the sector of tourism and hospitality that aligns very closely with the HCM (Guttentag 2015; Sigala 2017).

3.2 Decision-Making Structure

The decision-making structure "*reveals who has the authority over which decisions and the basis of that authority*" (Neuberger and Duffy 1976, p. 14), focusing on the distribution of decision-making authority or power among various stakeholders holding different motivations and objectives. Overall, the HCM's decision-making structure is characterized by the nature and concentration of decision-making power (such as government regulations versus cultural tradition), decision-making parties (such as consumers, home chefs, local authorities, and policymakers), and their function in the market (such as food preparation, consumption, and regulation) (e.g., Conn 1977; Enderle 2017). This section elaborates on the interplay of market structure, product differentiation, and pricing strategies in the HCM food system.

Although in its infancy, California's HCM food system spans nine counties, representing approximately 30 percent of the state population (Institute for Justice 2023b). The legal market for MEHKO operators and homecooked meals is still in its nascent stages and has yet to mature into one of the conventional market structures. Nevertheless, the characteristics of MEHKO operators, including low barriers to entry or exit, price-sensitive demand within the market of MEKHOs, small-scale operations with small market share, and limited influences on market prices, align the HCM market structure more closely with that of perfect competition (Robinson 1969). However, some disagreements might merge in the areas of product differentiation and chefs' price setting power.

First, foods prepared by MEHKO operators are differentiated in terms of cuisine types, taste, price, and convenience (location and distance of the MEHKO). Driven by their own culinary cultures or backgrounds, home chefs have the flexibility and autonomy to sell meals of unique creation. It is worth noting that MEHKO food is not bound by ethnic or cultural foods, allowing them to compete with food offered in conventional restaurants. Moreover, some MEHKO operators further differentiate themselves by offering dine-in experiences in their residences or creating backyard spaces for an outdoor dining option (County of San Diego 2023). As implied by the emerging "experience economy," this is in line with the growing consumer interest in a holistic food experience, which shifted from focusing on the basic tangible attributes of food (Morgan, Watson, and Hemmington 2008). Evidence shows that the demand for personal chefs to provide high-end dining service from one's home kitchen was booming during the COVID-19 pandemic (Lucas 2020; Furniss 2021).

Second, through product differentiation and interpersonal connections established from direct interactions with consumers, chefs gain the power to determine their own prices and promotion strategies. Relevant studies show that consumers are willing to pay a premium for locally sourced food (e.g., Feldmann and Hamm 2015; Aprile, Caputo, and Nayga 2016; Printezis, Grebitus, and Hirsch 2019) and value interpersonal exchange in the economic decision-making (Chen et al. 2019). Unlike chain restaurants, MEHKO operators' brands are built on chefs' personal stories and cultural backgrounds, fostering trust and relatability among consumers. MEHKO allows consumers to socially interact with locals and have unique experiences aligning with the concept of a sharing economy that has been largely neglected in the food sector, as it has been focused mainly on accommodation and ride-sharing context

(Puram and Gurumurthy 2023). This also differentiates MEHKO from traditional restaurants while adding social, environmental, and economic value. While further economic research needs to be conducted to rigorously evaluate consumers' price sensitivity to food offered by MEHKO in comparison to traditional restaurants, recent studies in consumer valuation of locally grown foods provide a basis for the hypothesis that consumers may be less price sensitive to MEHKO operators compared to traditional restaurants. This reduced price sensitivity could be attributed to strong consumer affinity developed through interpersonal connections and willingness to support local chefs and local communities. This potentially explains the premium pricing strategy adopted by chefs, which is why the current MEHKO foods are priced similarly to traditional restaurants despite significantly lower operational costs.

3.3 Information Structure

The information structure in an economic system includes mechanisms and channels for the collection, processing, storage, and dissemination of decision-relevant information (Neuberger and Duffy 1976). This structure supports stakeholders' decision-making by providing two key types of information: macroenvironmental information and decisions of other decision-makers (Enderle 2017). In the context of HCM, the transparency, accessibility, and interpretability of information and data is pivotal to the efficacy of the system (see Davis and Serrano 2016 for a discussion on the local food system). For example, establishing transparent regulations and rules about home kitchen practices improves compliance among chefs and increases consumer confidence in food safety and quality. The HCM food system's information structure serves to inform stakeholders to make decisions and enhances the motivations for engagement. This section discusses how information forms and flows between chefs, consumers, advocacy groups, and policymakers.

3.3.1 Information Channel Between Chefs and Consumers

Social media has been one of the fastest-growing technologies of modern times and a powerful marketing tool that has a large and active audience (Zenith Optimedia 2019; Appel et al. 2020). Evidence shows that social media marketing is effective in building and fostering trust among consumers and expanding the base of the targeted audience (Valerio, William, and Noémier 2019), especially in the restaurant industry, where customer engagement and social sharing are critical (Li, Kim, and Choi 2021). The use of social media marketing enables home chefs to connect with consumers directly and promote their brands and stories, share their culinary practices in the kitchen, and encourage word-of-mouth recommendations among the local community.

Third-party food delivery services serve as an effective intermediary for transmitting information between suppliers and buyers in the FAFH sector, allowing consumers to place orders through mobile apps and allowing chefs to access a wider consumer base (Xu and Huang 2019). These Online-to-Offline (O2O) services, such as Uber Eats, GrubHub, and DoorDash, have become increasingly popular, offering consumers convenient and fast access to a wide collection of restaurant choices (Puram and Gurumurthy 2023). These services also offer restaurants new opportunities to increase revenue without the need to expand their physical locations or provide seating (Xu and Huang 2019). In the United States, the O2O food delivery market reached $26 billion in 2022 (IMARC Group 2022). This significant growth in the market highlights the increasing adoption of O2O services and the potential opportunities they provide for MEHKO operators. The marketing benefits of using O2O services include decreased marketing costs, increased reach to consumers, and additional services such as menu development (Ram and Sun 2020).

Consumers nowadays tend to rely more on recommendations, past experiences, and customer reviews when making restaurant choices (Valerio et al. 2019). Various food marketing channels such as Foodnome and Shef.com serve as online platforms for both consumers and home-kitchen operators to market their food and brand themselves, and allow consumers access to place online orders and directly pick up their meals from the home kitchens (Foodnome 2023; Shef 2023). These intermediaries acting as facilitators in reducing transaction costs and effectively benefiting both parties in line with the theory of

the firm, play a vital role in connecting consumers with chefs. Since HCM is linked with the local economy, word of mouth is also an effective means of promotion (Dougherty and Green 2011). Overall, social media and online services have built an information structure of the HCM, allowing consumers to make food purchases and have transparent information about the individual home kitchen. This also grants chefs greater visibility and the freedom to introduce new services and processes. In essence, the market structure of HCM empowers chefs to make their own decisions regarding pricing and food offerings.

3.3.2 Advocacy and Corporate Social Responsibility

Non-profit advocacy organizations have been playing a crucial role in spurring the HCM, managing and disseminating information among consumers, chefs, and policymakers. These organizations have helped to advance the legislation, build strong advocacy for the HCM in the local communities, and provide financial and technological support to MEHKO operators. For example, the COOK Alliance has been leading advocacy efforts, engaging in policy leadership activities on behalf of the chef community, and facilitating effective communication with various stakeholders. One of their effective communication tools is the HomeCOOKed virtual conference, connecting legislators, operators, consumers, advocates, and academics (COOK Alliance 2022b). Other organizations have supported the HCM via different approaches. For instance, the Institute of Justice continues liberating its National Food Freedom Initiative to reduce or eliminate restrictions on home-based food businesses (Institute for Justice 2022); and CAMEO, California's statewide micro-enterprise development network, is partnering with COOK Alliance to create an entrepreneurial ecosystem for the growth of the MEHKO system in California (CAMEO 2023).

While studies show that advocacy organizations play an important role in reducing negative externalities such as the health effects of corporate practices (Biglan 2009), it is unclear how HCM's advocacy influences externalities caused by the progression of this movement. With the increased criticism of the negative societal and environmental impacts of the sharing economy and the support of digital platforms (Etter, Fieseler, and Whelan 2019; Mosaad et al. 2023), it is critical to examine whether the advocacy efforts and information are socially responsible. Hartmann (2011) argued that while issues such as the environmental impact of food production and food safety have been a central topic in agricultural economics, Corporate Social Responsibility (CSR) remains a challenging agenda in the food sector due to the multifaceted nature of the food supply chain. Houghtaling et al. (2020) found that only 21 percent of Supplemental Nutrition Assistance Program (SNAP) authorized retailers provided relevant CRS information, revealing a substantial need to enhance the commitments of SNAP-authorized retailers to promote healthy eating. Built on Hartmann's (2011) discussion of the economic theories on which CSR is based, the CSR of MEHKO operators, third-party ordering platforms, and advocacy organizations (either for-profit or non-profit) lies in "*the provision (reduction) of a good (bad) with at least some public good characteristic or of a positive (negative) externality.*" These "good" characteristics in the food system could be the provision of healthy food options or nutritional information (Ye, Cronin, and Peloza 2015), ensuring an inclusive and diverse working culture, and incorporating women, people of color, and underrepresented populations (Darden 2023).

The HCM has been fundamentally designed to create opportunities for underrepresented groups, including women, people of color, and migrants, to participate and thrive within the food industry. Like other businesses, the food business also relies on the shareholder theory and is focused on maximizing profit and its shareholder value (Friedman 1970). HCM is rooted in the local communities and implements community-driven CSR, thus asserting stakeholder theory in some ways (Freeman 2001). HCM contributes to the expansion of local business, promotes efficient use of resources, and encourages economic development at the local level, thus aligning with the concept of CSR.

4 Challenges of the HCM

Despite the growth momentum since the pandemic, home-based food businesses remain small-scale economic activities facing significant challenges. To obtain a comprehensive understanding of factors influencing the economic viability and long-term resilience of HCM, we use the Theory of Diffusion of Innovation to analyze factors—relative advantage, compatibility, complexity, trialability, and observability—that hinder the adoption of the HCM among consumers, chefs, and policymakers (Rogers 2003).

4.1 Regulatory Challenges

The United States does not have a federal law that regulates and legalizes the HCM, and the state government is mainly responsible for maintaining the regulation of home kitchen operations. For example, in California, counties must opt into the MEHKO legislation and require permits for residents to operate home kitchens (Assembly Bill No. 626 2018). The fact that only 9 out of 54 counties have chosen to participate in MEHKO legislation indicates a limited level of *trialability*, as per the principles of the diffusion of innovation. This has resulted in a sluggish diffusion process for MEHKO within the state of California. Further, there is a varying perception of policymakers toward the HCM across different states. In states such as Utah and Iowa, all residents are eligible to operate home kitchens irrespective of the county (House Bill 94 2021; House Bill 2431 2022). In states such as Florida, House Bill 707 was rejected by the Agriculture and Natural Resources Appropriations Subcommittee of the Florida Senate, outlawing sales of homemade perishable goods (House Bill 707 2022). Last, there is no clear regulation regarding the sales of homecooked food across state lines, especially for businesses that are located near state borders, limiting *observability* of home kitchen operations between states and adding risks for unregulated sales of homecooked meals.

All these varying policies, even within a state, create confusion and administrative burdens for young entrepreneurs, suggesting a potential need for a more unified set of guidelines. Administrative burden, referred to as *sludge*, has a significant effect on the outcome of an individual, affecting their access to benefits and the rights to which they are entitled (Herd and Moynihan 2019; Sunstein 2022). These burdens affect groups that have a low level of human capital, particularly cognitive resources, making them less likely to access public services (Christensen et al. 2020). Such administrative burden could discourage potential home kitchen entrepreneurs, who are more likely to come from low-income, immigrant, and single-parent households, from entering the food business and impede the democratization of economic opportunity (COOK Alliance 2022a). All these factors add to the *complexity* of home kitchen operations and impose barriers to entry for potential chefs, further hindering the expansion of the HCM.

MEHKO also encounters another regulatory challenge in its ability to operate both full- and limited-services for its consumers. Limited-service restaurants and full-service restaurants are some of the greatest contributors to FAFH expenses. Limited-service restaurants are places where consumers order and then pay before consumption, while in full-service FAFH restaurants, patrons are served after being seated (Okrent and Alston 2012). Figure 5 shows the growing expenditure in limited-service restaurants and full-service restaurants. Between full-service and limited-service FAFH, full-service FAFH has a much more responsive demand to changes in price compared to limited-service FAFH (Okrent and Alston 2012). This indicates that small price changes for full-service FAFH have a more significant impact on consumer demand as compared to changes in the price of limited-service options. This information could allow MEHKO operators to understand consumer behavior and attract dine-in customers. However, the current ununified regulatory landscape shows that California is the only state allowing for dine-in MEHKO operators. Without the dine-in option, MEHKO operators cannot fully address the growing consumer demand for full-service FAFH consumption.

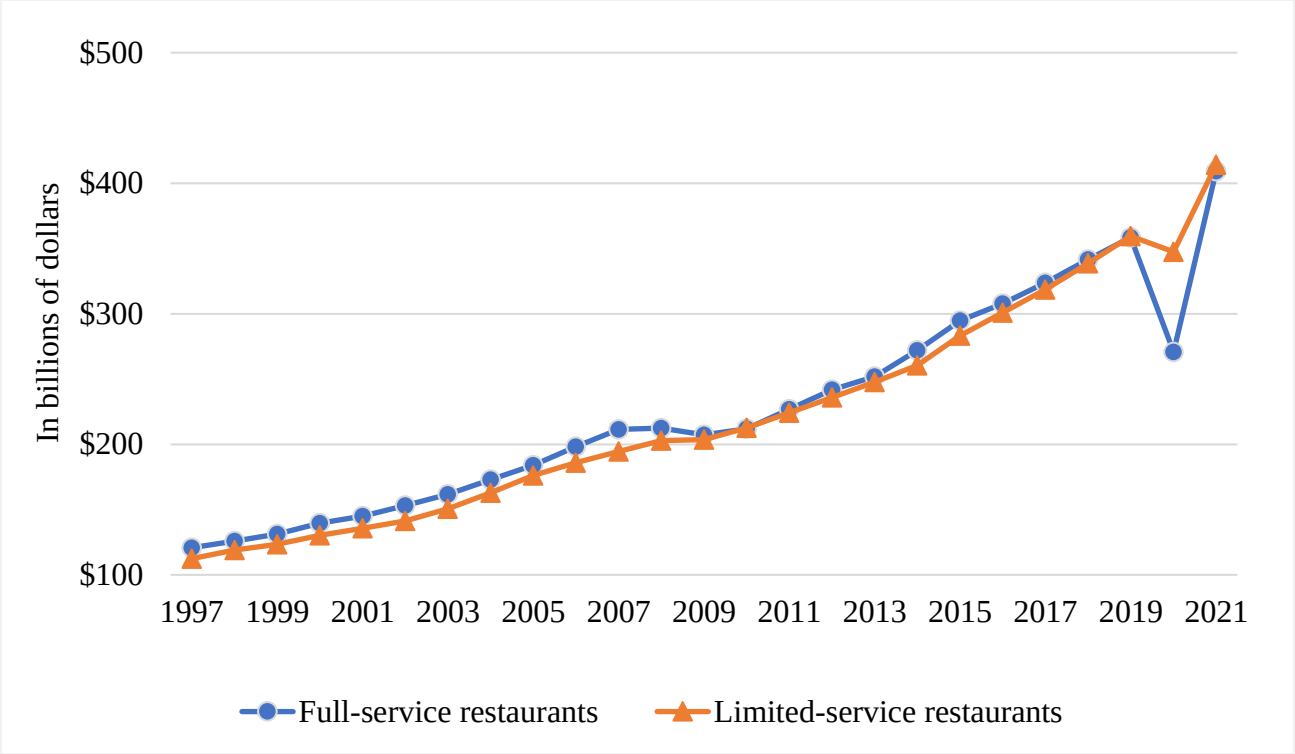

Figure 5: Full-Service Restaurants and Limited-Service Restaurants Expenditures in Nominal Dollars, 1997–2021

Source: U.S. Department of Agriculture, Economic Research Service (2023a)

MEHKO also has an annual sales limit in terms of total revenue and number of sales per week. In Iowa, the annual sales limit is $50,000, which is lower than the median household income in Iowa of $65,429 in 2021 (U.S. Census Bureau 2021; House Bill 2431 2022). Such a constrained annual sales threshold put MEHKO operators in a disadvantaged position in terms of the opportunity cost of time and entrepreneurial capital. Further, the sales limit sets chefs in a position of diseconomy of scale, limiting profit margin or even making home kitchens hard to stay afloat despite lower operational costs compared to brick-and-mortar restaurants. Therefore, the sales limit diminished the *relative advantage* of MEHKO operators in the competition with other FAFH outlets (such as food trucks), further hindering the growth potential of MEHKO operators.

4.2 Operational Challenges

A core motivation for chefs to start a home kitchen is to test out culinary ideas and business plans and have full flexibility and autonomy in the menu designs and food offering choices. Home chefs take pride in providing creative, trendy, and seasonal foods to consumers and use this approach to keep their customers loyal. However, the reality is current regulations require home operators to obtain approval from the health department if they want to change their menu (Chang 2022). Moreover, in addition to following health department regulations and policies, MEHKO operators often find themselves struggling with other business challenges such as professional food menu selection and design, financial management, and difficulty in finding helpers (unless they are certified as well). These challenges add significant difficulties to chefs' day-to-day practices and limit flexibility for innovation, diminishing the *relative advantage* of MEHKO operators amid competition with traditional restaurants.

Another operational challenge is associated with negative externalities brought by home-based businesses, including unintended environmental and social consequences. For example, without the

knowledge and equipment of commercial practice of waste management, there have been concerns about inappropriate disposal of fats, oils, and grease from the home kitchen causing blockages and sewage backups in residential septic systems with limited capacity, as well as littering and illegal dumping by customers or even chefs. In addition, smoke and odor in the home kitchen can affect neighborhood air quality and the well-being of residents. Negative social consequences include concerns about unexpected traffic of customers picking up food in the neighborhood, undermining neighborhood safety and property value. These challenges threaten the *compatibility* between home kitchen operations and the societal environment, drawing criticism from various bodies of audiences, such as the Homeowners' Association and Restaurant Association.

4.3 Marketing Challenges

The HCM sector is grappling with a host of marketing challenges, particularly in attempting to improve the visibility among potential consumers. Unlike established food chains, such as Chick-fil-A, Domino's, Taco Bell, and Olive Garden, with significant marketing investment in the continuous improvement of brand recognition and consumer loyalty, home kitchens have a very low level of visibility due to their limited geographical presence and consumer awareness. Home kitchen operators also lack knowledge and training in how to recruit customers, increase market share and market penetration, and obtain timely feedback from customers. Last, although there are a few startups serving as information channels between chefs and consumers, they are not as established as online food ordering platforms targeting traditional commercial restaurants, such as Uber Eats and DoorDash. The limited feedback loops between supply and demand make it very challenging for chefs to understand the needs and wants of contemporary consumers who tend to rely on others' reviews when making decisions on where to shop or dine at a restaurant (Dixon 2022). These factors altogether could decrease the *trialability* and *observability* of homecooked meals among prospective consumers and add additional hurdles to the proliferation of home cooking businesses and the improvement of consumer acceptance.

As per current regulation, California prohibits MEHKO operators from partnering with other O2O services such as DoorDash and Uber Eats. This policy deprives MEHKO operators of opportunities to reach a broader customer base, raise consumer awareness about the HCM, and promote home-cooked foods among consumers through online platforms. It gives traditional restaurants a *relative advantage,* given the increasing share of the online food delivery market in the current FAFH sector.

4.4 Food Quality and Safety Issues

Food influencers have been using social media platforms, such as TikTok, to promote and sell food products. Despite the growing popularity of social media in food marketing, some home chefs and food influencers have faced criticism for their improper handling, packaging of the food, quality control, and inconsistent nutritional information (Kaur 2022; NBC News 2022). There have been several cases of legal issues and penalties associated with the violation of food safety measures. For example, in 2015, a couple from Nebraska won approximately $11 million against a buffet restaurant after an infection of Salmonella bacteria that led to severe health damage (Flynn 2015). Additionally, numerous food companies, such as Dunkin' Donuts, prefer disposing of unsold foods rather than donating them to those in need due to due to concerns about potential food safety lawsuits if individuals fall ill after consuming donated items (Fowler 2021; Greenwald 2022). This begs the question of whether home kitchens, which are not as established and resourceful as big companies, could uphold food safety standards and regulations. Despite the growing popularity of home kitchens, food safety concerns among consumers and industry stakeholders have not been alleviated.

Moreover, home-based cooking practices are prone to foodborne illnesses and other negative health impacts. The National Outbreak Reporting System of the U.S. Centers for Disease Control and Prevention has shared data that between 2010 and 2021, there were 1,266 foodborne illness outbreaks,

24,068 illnesses, 3,443 hospitalizations, and 101 deaths associated with consumption of food prepared from a private residence (Centers for Disease Control and Prevention 2023b). This demonstrates that home kitchen operations are not free from health risks and food safety concerns. Moreover, MEHKO takes place within private residences, limiting consumer access to observe kitchen activities and the environment. In contrast, traditional restaurants usually offer consumers an open view of their kitchens or bar areas, allowing them to personally assess and make informed decisions regarding the food preparation process.

Unlike traditional restaurants, which are mandated to have liability insurance, there is a notable absence of clear guidelines or requirements for individual MEHKO operators to secure similar coverage. In California, for instance, the Internet Food Service Intermediaries—an entity that facilitates the sale of homecooked meals via online platforms or mobile applications such as Foodnome—are required to clearly post if individual MEHKO operators have liability insurance "*that covers any incidences arising from the sale or consumption of food listed or promoted*" (California Department of Public Health 2019). However, it is not a legal requirement to obtain such insurance for MEHKO operators (California Department of Public Health 2019). In other states such as Utah and Iowa, there is no explicit mandate for MEHKO operators to have liability insurance. The absence of a mandatory liability insurance requirement for individual MEHKO operators has multiple ramifications, including, for example, raising concerns about their accountability in ensuring food safety and managing potential health risks for consumers, posing significant risks and potential financial liabilities for the MEHKO owners in the event of safety-related incidents originating from their kitchens, and undermining consumer confidence in the quality and safety of homecooked food, thereby impeding the development of the market for MEHKO operators. Another regulatory ambiguity associated with MEHKO is the lack of clarity in regular on-site inspections. Though the procedure may vary across states, the standard practice of inspecting restaurants is at least twice annually (Hasan 2023). In contrast, California requires MEHKO operators to undergo only an initial inspection followed by annual checks (Assembly Bill No. 626 2018). States such as Utah and Iowa also fall short of providing clear guidelines on the frequency and process of required inspections, if any. All of these above-mentioned aspects could impede the *compatibility* between HCM and health-conscious consumers, placing MEHKO operators at a *relative disadvantage* compared to traditional restaurants, which are generally well-known for their adherence to safety and health standards and the high level of transparency that consumers trust.

5 Conclusion

The HCM remains an emerging market in its early stages of development. California's legislation model has provided a regulatory foundation for the establishment of HCM in other states. Combined with the support from the broader reach of the National Food Freedom Initiative, the HCM has evolved into an innovative food system and market with great growth potential.

This case study provides an in-depth examination of the regulatory landscape, economic structure, and growth challenges of the HCM. By applying the theoretical frameworks, such as economic systems and underlying structures, as well as the Diffusion of Innovation Theory, to analyze economic drivers and barriers in the HCM food system, this case study provides a unique opportunity for various learners. Policymakers, consumers, industry advocates, and opponents, as well as students majoring in agribusinesses and food economics, can gain valuable insights into evaluating innovative market development. The accompanying teaching note provides detailed guidance on using this case to facilitate critical thinking, improve analytical skills, and develop educational and training materials targeting various stakeholders. This case analysis will engage learners in the new developments and trends of the food industry by creating an interactive learning community. This community will, in turn, develop constructive feedback on improving the existing regulatory landscape and facilitating the market growth of HCM.

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References

Alexander, R. 2018. "Thousands of California Home Cooks Have No Idea They're Breaking the Law Every Day." *The Counter*. https://thecounter.org/california-homemade-food-operations-act-2018/.

Appel, G., L. Grewal, R. Hadi, and A. Stephen. 2020. "The Future of Social Media in Marketing." *Journal of the Academy of Marketing Science* 48(1):79–95. doi:10.1007/s11747-019-00695-1.

Aprile, M.C., V. Caputo, and R.M. Nayga. 2016. "Consumers' Preferences and Attitudes Toward Local Food Products." *Journal of Food Products Marketing* 22(1):19–42. doi:10.1080/10454446.2014.949990.

Assembly Bill No. 626. 2018. Microenterprise Home Kitchen Operations. California State Assembly, Regular Session. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB626.

Assembly Bill No. 1325. 2023. Microenterprise Home Kitchen Operations. California State Assembly, Regular Session. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240AB1325.

Biglan, A. 2009. "The Role of Advocacy Organizations in Reducing Negative Externalities." *Journal of Organizational Behavior Management* 29(3–4):215–230. doi:10.1080/01608060903092086.

Blodgett, T. 2022. "Micro-Kitchens in San Diego County Get Cooking." CBS8.com. https://www.cbs8.com/article/news/local/micro-kitchens-in-san-diego-get-cooking/509-7e10a577-ee74-485b-8147-51bdc3c0924b.

Bloom, J.D., and C. Hinrichs. 2011. "Moving Local Food through Conventional Food System Infrastructure: Value Chain Framework Comparisons and Insights." *Renewable Agriculture and Food Systems* 26(1):13–23. doi:10.1017/S1742170510000384.

Botsman, R., and R. Rogers. 2010. "What's Mine Is Yours: The Rise of Collaborative Consumption." https://tantor.com/SellSheets/1920_MineIsYours.pdf.

Boys, K.A., M. Ollinger, and L.L. Geyer. 2015. "The Food Safety Modernization Act: Implications for U.S. Small Scale Farms." *American Journal of Law & Medicine* 41(2–3):395–406. doi:10.1177/0098858815591524.

Braun, J.V., K. Afsana, L.O. Fresco, M. Hassan, and M. Torero. 2021. "Food Systems—Definition, Concept and Application for the UN Food Systems Summit." *UN Food Systems Summit*. https://sc-fss2021.org/.

Brett, L. 2022. "The Complete Breakdown of Food Truck Operation Costs." *Food Truck Empire*. https://foodtruckempire.com/how-to/costs/.

California Department of Public Health. 2019. "General Requirements for Internet Food Service Intermediaries." https://www.cdph.ca.gov/Programs/CEH/DFDCS/CDPH%20Document%20Library/FDB/FoodSafetyProgram/RetailFood/Internet%20Food%20Service%20Intermediary%20General%20Requirements.pdf.

California Department of Public Health. 2023a. "Cottage Food Operations." https://www.cdph.ca.gov/Programs/CEH/DFDCS/Pages/FDBPrograms/FoodSafetyProgram/CottageFoodOperations.aspx.

California Department of Public Health. 2023b. "Microenterprise Home Kitchen Operations." https://www.cdph.ca.gov/Programs/CEH/DFDCS/Pages/FDBPrograms/FoodSafetyProgram/MicroenterpriseHomeKitchenOperations.aspx.

CAMEO. 2023. "CAMEO Partners with COOK Alliance to Expand MEHKOs in California." https://cameonetwork.org/news/cameo-partners-with-cook-alliance-to-expand-mehkos-in-california/.

Centers for Disease Control and Prevention. 2022. "CDC and the Food Safety Modernization Act." https://www.cdc.gov/foodsafety/fsma/index.html#:~:text=The%20act%2C%20signed%20into%20law,illness%20and%20outbreak%20surveillance%20systems.

Centers for Disease Control and Prevention. 2023a. "Integrated Food Safety Centers of Excellence." https://www.cdc.gov/foodsafety/centers/index.html.

Centers for Disease Control and Prevention. 2023b. "National Outbreak Reporting System (NORS) Dashboard." https://wwwn.cdc.gov/norsdashboard/.

Chang, N. 2022. "The Challenges, and Joys, of Operating an East Bay Home Restaurant." *The Oaklandside*, September 6. https://oaklandside.org/2022/09/06/alameda-county-mehko-rules-purpose-and-hope-nancy-chang/.

Chen, L.A., B.V. Miranda, J.L. Parcell, and C. Chen. 2019. "The Foundations of Institutional-Based Trust in Farmers' Markets." *Agriculture and Human Values* 36(3):395–410. doi:10.1007/s10460-019-09923-4.

Cheng, M. 2016. "Sharing Economy: A Review and Agenda for Future Research." *International Journal of Hospitality Management* 57:60–70. doi:10.1016/j.ijhm.2016.06.003.

Christensen, J., L. Aarøe, M. Baekgaard, P. Herd, and D.P. Moynihan. 2020. "Human Capital and Administrative Burden: The Role of Cognitive Resources in Citizen-State Interactions." *Public Administration Review* 80(1):127–136. doi:10.1111/puar.13134.

Christiansen, B. 2017. *Girl Scouts: A Celebration of 100 Trailblazing Years*. New York: Abrams. https://books.google.com/books?id=7_pBDwAAQBAJ.

Conn, D. 1977. "Toward a Theory of Optimal Economic Systems." *Journal of Comparative Economics* 1(4):325–350. doi:10.1016/0147-5967(77)90026-9.

COOK Alliance. 2022a. "Frequently Asked Questions." https://www.cookalliance.org/frequently-asked-questions.

COOK Alliance. 2022b. "Join Us for Our 4th Annual Conference on the Home Cooking Movement." https://www.cookalliance.org/homecooked2022.

COOK Alliance. 2022c. "MEHKO Map." https://www.cookalliance.org/map.

"Cottage Food Laws By State: How To Sell Your Homemade Foods." 2023. https://www.pickyourown.org/CottageFoodLawsByState.htm.

County of San Diego. 2023. "Home Kitchen Operations." https://www.sandiegocounty.gov/content/sdc/deh/fhd/food/homekitchenoperations.html.

Darden. 2023. "Ensuring an Inclusive and Diverse Culture." https://www.darden.com/our-impact/team-members/ensuring-an-inclusive-and-diverse-culture.

Davis, G.C., and E.L. Serrano. 2016. *Food and Nutrition Economics: Fundamentals for Health Sciences*. Oxford: Oxford University Press.

Dixon, S.J. 2022. "U.S. Consumers Frequency of Local Business Online Review Reading 2022." *Statista*. https://www.statista.com/statistics/315711/local-online-business-review-usage/.

Dougherty, M., and G. Green. 2011. "Local Food Tourism Networks and Word of Mouth." *The Journal of Extension* 49(2). doi:10.34068/joe.49.02.05.

Ellison, B., B. McFadden, B.J. Rickard, and N.L.W. Wilson. 2021. "Examining Food Purchase Behavior and Food Values During the COVID-19 Pandemic." *Applied Economic Perspectives and Policy* 43(1):58–72. doi:10.1002/aepp.13118.

Emily, N. 2023. "How Much Does a Food Truck Cost to Operate?" https://pos.toasttab.com/blog/on-the-line/how-much-does-a-food-truck-cost.

Enderle, G. 2017. "Old and New Perspectives on Economic Systems." In W.W. Gasparski, ed. *Praxiological Essays: Texts and Contexts*. London: Routledge.

Etter, M., C. Fieseler, and G. Whelan. 2019. "Sharing Economy, Sharing Responsibility? Corporate Social Responsibility in the Digital Age." *Journal of Business Ethics* 159(4):935–942. doi:10.1007/s10551-019-04212-w.

Fanzo, J., L. Haddad, K.R. Schneider, C. Béné, N.M. Covic, A. Guarin, A.W. Herforth, et al. 2021. "Viewpoint: Rigorous Monitoring Is Necessary to Guide Food System Transformation in the Countdown to the 2030 Global Goals." *Food Policy* 104:102163. doi:10.1016/j.foodpol.2021.102163.

Farquhar, D. 2020. "The Food Freedom Movement: Laws in Maine, North Dakota, Utah, and Wyoming." Denver CO: National Environmental Health Association. https://www.neha.org/food-freedom-state.

Feldmann, C., and U. Hamm. 2015. "Consumers' Perceptions and Preferences for Local Food: A Review." *Food Quality and Preference* 40:152–164. doi:10.1016/j.foodqual.2014.09.014.

Florida Department of Agriculture and Consumer Services. 2021. "Cottage Foods/Food Establishments/Food/Business Services/Home—Florida Department of Agriculture & Consumer Services." https://www.fdacs.gov/Business-Services/Food/Food-Establishments/Cottage-Foods.

Flynn, D. 2015. "NE Couple Wins $11.37-Million Judgment in Salmonella Case." *Food Safety News*. https://www.foodsafetynews.com/2015/10/nebraska-couple-wins-11-37-million-judgment-in-salmonella-case/.

Food and Drug Administration. 2023. "Milestones in U.S. Food and Drug Law." https://www.fda.gov/about-fda/fda-history/milestones-us-food-and-drug-law.

Foodnome. 2023. "Foodnome. Hungry For Something New?" https://foodnome.com.

Fowler, K. 2021. "Dunkin' Worker Shows Shocking Amount of Food They Throw Away Each Day." *Newsweek,* May 21. https://www.newsweek.com/dunkin-donuts-shocking-food-throw-away-tiktok-1593572.

Frankel, L. 2023. "Food Vendor Insurance: What It Is, Costs, and Companies." *Investopedia*. https://www.investopedia.com/food-vendor-insurance-7099204.

Freeman, R.E. 2001. "A Stakeholder Theory of the Modern Corporation." *Perspectives in Business Ethics Sie* 3(144):38–48.

Frey, W.H. 2020. "The Nation Is Diversifying Even Faster than Predicted, According to New Census Data." Brookings. https://www.brookings.edu/articles/new-census-data-shows-the-nation-is-diversifying-even-faster-than-predicted/.

Friedman, M. 1970. "A Friedman Doctrine—The Social Responsibility of Business Is to Increase Its Profits." *The New York Times*. https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html.

Furniss, T. 2021. "How Personal Chefs Became Covid-19's Must-Have Luxury Comfort." *South China Morning Post*. https://www.scmp.com/magazines/style/leisure/article/3152874/how-personal-chefs-became-covid-19s-must-have-luxury.

Ganti, A. 2021. "What Is the Sharing Economy?" *The Balance*. https://www.thebalancemoney.com/what-is-the-sharing-economy-5188892.

Gonzalez, D. 2023. "How the 'Tamale Lady' Became a Symbol of Growing Latino Political Influence in Arizona." *The Arizona Republic*. https://www.azcentral.com/story/news/politics/arizona/2023/05/04/how-the-tamale-lady-became-an-influencer-in-arizona-politics/70154688007/.

Greenwald, M. 2022. "Dunkin' Employee Shares Distressing behind-the-Scenes Video: 'This Hurt Me.'" *In The Know*. https://www.intheknow.com/post/dunkin-extra-donuts-food-waste/.

Guttentag, D. 2015. "Airbnb: Disruptive Innovation and the Rise of an Informal Tourism Accommodation Sector." *Current Issues in Tourism* 18(12):1192–1217. doi:10.1080/13683500.2013.827159.

Ha, J., and S.S. Jang. 2013. "Variety Seeking in Restaurant Choice and Its Drivers." *International Journal of Hospitality Management* 32:155–168. doi:10.1016/j.ijhm.2012.05.007.

Hartmann, M. 2011. "Corporate Social Responsibility in the Food Sector." *European Review of Agricultural Economics* 38(3):297–324. doi:10.1093/erae/jbr031.

Hasan, R. 2023. "How Often Are Restaurants Inspected in the USA." https://restorapos.com/blog/how-often-are-restaurants-inspected.

Herd, P., and D.P. Moynihan. 2019. *Administrative Burden: Policymaking by Other Means*. New York: Russell Sage Foundation.

Houghtaling, B., E. Serrano, V.I. Kraak, S.M. Harden, G.C. Davis, and S. Misyak. 2020. "Availability of Supplemental Nutrition Assistance Program-Authorised Retailers' Voluntary Commitments to Encourage Healthy Dietary Purchases Using Marketing-Mix and Choice-Architecture Strategies." *Public Health Nutrition* 23(10):1745–1753. doi:10.1017/S1368980019004154.

House Bill 94. 2021. Microenterprise Home Kitchen Amendments, Utah State Assembly, Regular Session. https://le.utah.gov/~2021/bills/static/HB0094.html.

House Bill 181. 2018. Home Consumption and Homemade Food Act, Utah State Assembly, Regular Session. https://le.utah.gov/~2018/bills/static/HB0181.html.

House Bill 251. 2024. Homemade Food Act, Alaska State Assembly, Second Session. https://www.akleg.gov/PDF/33/Bills/HB0251A.PDF?mc_cid=8796d252f4&mc_eid=b506de1996.

House Bill 707. 2022. Home Kitchen Operations, Florida State Assembly, Regular Session. https://www.flsenate.gov/Session/Bill/2022/707.

House Bill 1032. 2021. Homemade Food Freedom Act, Oklahoma State Assembly, Regular Session. http://www.oklegislature.gov/BillInfo.aspx?Bill=hb1032&Session=2100.

House Bill 1433. 2017. Homemade Food Freedom Act, North Dakota State Assembly, Regular Session. https://ndlegis.gov/assembly/65-2017/regular/bill-overview/bo1433.html?bill_year=2017&bill_number=1433.

House Bill 1706. 2023. Microenterprise Home Kitchen Amendments, Washington State Assembly, Regular Session. https://lawfilesext.leg.wa.gov/biennium/2023-24/Pdf/Bills/House%20Bills/1706.pdf?q=20240128210500.

House Bill 2042. 2024. Microenterprise Home Kitchen Amendments, Arizona State Assembly, Regular Session. https://www.azleg.gov/legtext/56leg/2R/bills/HB2042P.pdf?mc_cid=8796d252f4&mc_eid=b506de1996.

House Bill 2431. 2022. Home-Based Business Amendments, Iowa State Assembly, Regular Session. https://legiscan.com/IA/bill/HF2431/2021.

House Bill 7123. 2022. Cottage Food Amendment, Rhode Island Assembly, Regular Session. http://webserver.rilin.state.ri.us/BillText/BillText22/HouseText22/H7123Aaa.pdf.

IMARC Group. 2022. "United States Online Food Delivery Market Size, Report 2023–2028." https://www.imarcgroup.com/united-states-online-food-delivery-market.

Institute for Justice. 2022. "Food Freedom." *Institute for Justice*. March 21. https://ij.org/issues/food-freedom/.

Institute for Justice. 2023a. "Popular Bill to Expand California's At-Home Kitchen Business Program Becomes Law." Institute for Justice. https://ij.org/press-release/popular-bill-to-expand-californias-at-home-kitchen-business-program-becomes-law/.

Institute for Justice. 2023b. "Institute for Justice." March 9. https://ij.org/.

Institute for Justice. 2023c. "New Data Show Homemade Food for Sale Is Incredibly Safe." Institute for Justice, September 6. https://ij.org/report/new-data-show-homemade-food-for-sale-is-incredibly-safe/.

Kaur, B. 2022. "A TikTok Creator's Homemade Pickled Products Have Sparked Online Conversation Surrounding Food Safety." *NBC News,* December 29. https://www.nbcnews.com/pop-culture/pop-culture-news/tiktok-creator-homemade-pickled-products-spark-online-conversation-rcna63406.

Ketter, E. 2019. "Eating with EatWith: Analysing Tourism-Sharing Economy Consumers." *Current Issues in Tourism* 22(9):1062–1075. doi:10.1080/13683500.2017.1357682.

Labuza, T.P., and W. Baisier. 1992. "The Role of the Federal Government in Food Safety." *Critical Reviews in Food Science and Nutrition* 31(3):165–176. doi:10.1080/10408399209527566.

Li, J., W.G. Kim, and H.M. Choi. 2021. "Effectiveness of Social Media Marketing on Enhancing Performance: Evidence from a Casual-Dining Restaurant Setting." *Tourism Economics* 27(1):3–22. doi:10.1177/1354816619867807.

Lucas, A. 2020. "Pandemic Accelerated an Already Booming Market for Personal Chefs." *CNBC*. https://www.cnbc.com/2020/10/07/coronavirus-new-demand-for-personal-chefs-as-restaurant-industry-lags.html.

Lusk, J. 2013. *The Food Police: A Well-Fed Manifesto About the Politics of Your Plate*. New York: Crown Publishing Group.

Lusk, J. 2017. "Consumer Research with Big Data: Applications from the Food Demand Survey (FooDS)." *American Journal of Agricultural Economics* 99(2):303–320. doi:10.1093/ajae/aaw110.

Martinez, C. 2023. "Council Post: Fostering Economic Growth: Promising Policies To Empower Home Cooks." *Forbes,* September 18. https://www.forbes.com/sites/forbesfinancecouncil/2023/09/18/fostering-economic-growth-promising-policies-to-empower-home-cooks/.

McDonald, J. 2019. "The Relationship between Cottage Food Laws and Business Outcomes: A Quantitative Study of Cottage Food Producers in the United States." *Food Policy* 84:21–34. doi:10.1016/j.foodpol.2019.01.012.

Moffat, T., C. Mohammed, and K.B. Newbold. 2017. "Cultural Dimensions of Food Insecurity among Immigrants and Refugees." *Human Organization* 76(1):15–27. doi:10.17730/0018-7259.76.1.15.

Moreno, F., and T. Malone. 2021. "The Role of Collective Food Identity in Local Food Demand." *Agricultural and Resource Economics Review* 50(1):22–42. doi:10.1017/age.2020.9.

Morgan, M., P. Watson, and N. Hemmington. 2008. "Drama in the Dining Room: Theatrical Perspectives on the Foodservice Encounter." *Journal of Foodservice* 19(2):111–118. doi:10.1111/j.1745-4506.2008.00090.x.

Mosaad, M., S. Benoit, and C. Jayawardhena. 2023. "The Dark Side of the Sharing Economy: A Systematic Literature Review of Externalities and Their Regulation." *Journal of Business Research* 168:114–186. doi:10.1016/j.jbusres.2023.114186.

NBC News. 2022. "Chef Pii, the Creator of the Viral TikTok Pink Sauce, Has Seen Your Memes. They Don't Bother Her." *NBC News,* July 21. https://www.nbcnews.com/pop-culture/viral/chef-pii-creator-viral-tiktok-pink-sauce-seen-memes-dont-bother-rcna39362.

Neuberger, E., and W. Duffy. 1976. *Comparative Economic Systems : A Decision-Making Approach*. https://cir.nii.ac.jp/crid/1130000793963758080.

O'Hara, J.K., M. Castillo, and D.T. McFadden. 2021. "Do Cottage Food Laws Reduce Barriers to Entry for Food Manufacturers?" *Applied Economic Perspectives and Policy* 43(3):935–951. doi:10.1002/aepp.13047.

Oklahoma Division of Food Safety. 2024. "Produce Safety." https://ag.ok.gov/divisions/food-safety/.

Okrent, A., and J. Alston. 2012. "The Demand for Disaggregated Food-Away-from-Home and Food-at-Home Products in the United States." SSRN Scholarly Paper 2171315. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2171315

Okrent, A.M., H. Elitzak, T. Park, and S. Rehkamp. 2018. "Measuring the Value of the U.S. Food System: Revisions to the Food Expenditure Series." U.S. Department of Agriculture. https://www.ers.usda.gov/webdocs/publications/90155/tb-1948.pdf?v=8337.2.

O'Neill, K. 2014. "Localized Food Systems—What Role Does Place Play?" *Regional Studies, Regional Science* 1(1):82–87. doi:10.1080/21681376.2014.904596.

Palumbo, F.A., and I. Teich. 2004. "Market Segmentation Based on Level of Acculturation." *Marketing Intelligence & Planning* 22(4):472–484. doi:10.1108/02634500410542761.

Parum, F., and D. Senarath. 2021. "U.S. Consumers' Intake of Food at Home (FAH) and Food Away from Home (FAFH) as a Complex Economic System." *Journal of Food Distribution Research* 52(1). doi:10.22004/ag.econ.313454.

Pilcher, J. 2023. "American Latino Theme Study: Food." National Park Service https://www.nps.gov/articles/latinothemefood.htm.

Pinstrup-Andersen, P. 2009. "Food Security: Definition and Measurement." *Food Security* 1(1):5–7. doi:10.1007/s12571-008-0002-y.

Pixcar, M. 2021. "HOMEMADE: Bay Area Man Opens Alameda County's First Home Restaurant." *ABC13 Houston,* July 16. https://abc13.com/home-restaurant-cooked-food-the-bao-house-microenterprise-kitchen-operations/10892983/.

Power, E.M. 2008. "Conceptualizing Food Security for Aboriginal People in Canada." *Canadian Journal of Public Health* 99(2):95–97. doi:10.1007/BF03405452.

Printezis, I., C. Grebitus, and S. Hirsch. 2019. "The Price Is Right!? A Meta-Regression Analysis on Willingness to Pay for Local Food." *PLOS ONE* 14(5). doi:10.1371/journal.pone.0215847.

Puram, P., and A. Gurumurthy. 2023. "Sharing Economy in the Food Sector: A Systematic Literature Review and Future Research Agenda." *Journal of Hospitality and Tourism Management* 56:229–244. doi:10.1016/j.jhtm.2023.06.027.

Quattrone, G., N. Kusek, and L. Capra. 2022. "A Global-Scale Analysis of the Sharing Economy Model—An AirBnB Case Study." *EPJ Data Science* 11(1):1–29. doi:10.1140/epjds/s13688-022-00349-3.

Ram, J., and S. Sun. 2020. "Business Benefits of Online-to-Offline e-Commerce: A Theory Driven Perspective." *Journal of Innovation Economics Management* 33(3):135–162.

Rankin, S. 2021. "Restaurant Startup Costs: The Real Cost of Opening and Operating a Restaurant." Lightspeed. https://www.lightspeedhq.com/blog/restaurant-startup-costs/.

Reardon, T., and C.P. Timmer. 2012. "The Economics of the Food System Revolution." *Annual Review of Resource Economics* 4(1):225–264. doi:10.1146/annurev.resource.050708.144147.

Restaurant Owner. 2018. "How Much Does It Cost to Open a Restaurant?," November 14. https://www.restaurantowner.com/public/Survey-How-Much-Does-it-Cost-to-Open-a-Restaurant.cfm.

Roaming Hunger. 2023. "The Real Cost to Buy a Food Truck (2023 Prices)." https://roaminghunger.com/blog/13143/how-much-does-a-food-truck-cost.

Robinson, J. 1969. *The Economics of Imperfect Competition*. New York: St. Martin's Press. https://books.google.com/books?id=xM-vCwAAQBAJ.

Rogers, E.M. 2003. *Diffusion of Innovations*. 5th ed. New York: Free Press.

Roseman, M.G. 2008. "Changing Times: Consumers Choice of Ethnic Foods When Eating at Restaurants." *Journal of Hospitality & Leisure Marketing* 14(4):5–32. doi:10.1300/J150v14n04_02.

Ruby, M.B., and P. Rozin. 2019. "Disgust, Sushi Consumption, and Other Predictors of Acceptance of Insects as Food by Americans and Indians." *Food Quality and Preference* 74:155–162. doi:10.1016/j.foodqual.2019.01.013.

Saksena, M.J., A.M. Okrent, T.D. Anekwe, C. Cho, C. Dicken, A. Effland, H. Elitzak, et al. 2018. "America's Eating Habits: Food Away From Home." *Economic Information Bulletin*. Washington DC: U.S. Department of Agriculture, Economic Research Service. https://ideas.repec.org//p/ags/uersib/281119.html.

Sanou, D., E. O'Reilly, I. Ngnie-Teta, M. Batal, N. Mondain, C. Andrew, B.K. Newbold, and I.L. Bourgeault. 2014. "Acculturation and Nutritional Health of Immigrants in Canada: A Scoping Review." *Journal of Immigrant and Minority Health* 16(1):24–34. doi:10.1007/s10903-013-9823-7.

Senate Bill 199. 2021. Montana Local Food Choice Act, Montana State Assembly, Regular Session. http://laws.leg.mt.gov/legprd/LAW0203W$BSRV.ActionQuery?P_SESS=20211&P_BLTP_BILL_TYP_CD=SB&P_BILL_NO=199&P_BILL_DFT_NO=&P_CHPT_NO=&Z_ACTION=Find&P_ENTY_ID_SEQ2=&P_SBJT_SBJ_CD=&P_ENTY_ID_SEQ=.

Shef. 2023. "Homemade Food, Delivered to Your Door." https://shef.com/.

Shef. 2024. "Nivii's Menu." https://shef.com/order/shef/nivii-c?esid=RECOMMENDED_SHEFS&esp=0&esri=13&esti=13&rank=2&bf=CUISINE&cuisine=INDIAN.

Shrauner, D. 2021. "Commissary Kitchen: How To Rent One and How Much It Costs." CKitchen.com. https://www.ckitchen.com/blog/2021/8/commissary-kitchen-how-to-rent-one-and.html.

Sibilla, N. 2023. "New Landmark Law in Utah Legalizes Selling Home Cooked Meals." *Forbes,* April 7. https://www.forbes.com/sites/nicksibilla/2021/04/07/new-landmark-law-in-utah-legalizes-selling-home-cooked-meals/.

Sigala, M. 2017. "Collaborative Commerce in Tourism: Implications for Research and Industry." *Current Issues in Tourism* 20(4):346–355. doi:10.1080/13683500.2014.982522.

Smith, E. 2021. "IJ Delivers Food Freedom Nationwide." Institute for Justice, July 23. https://ij.org/ll/ij-delivers-food-freedom-nationwide/.

Statista. 2023. "Value of the Global Sharing Economy 2021." https://www.statista.com/statistics/830986/value-of-the-global-sharing-economy/.

Stewart, K., and L.O. Gostin. 2011. "Food and Drug Administration Regulation of Food Safety." *JAMA* 306(1):88–89. doi:10.1001/jama.2011.885.

Sunstein, C.R. 2022. "Sludge Audits." *Behavioural Public Policy* 6(4):654–673. doi:10.1017/bpp.2019.32.

Tendall, D.M., J. Joerin, B. Kopainsky, P. Edwards, A. Shreck, Q.B. Le, P. Kruetli, M. Grant, and J. Six. 2015. "Food System Resilience: Defining the Concept." *Global Food Security* 6:17–23. doi:10.1016/j.gfs.2015.08.001.

Trenz, M., A. Frey, and D. Veit. 2018 "Disentangling the facets of sharing: a categorization of what we know and don't know about the sharing economy." *Internet research* 28(4): 888-925. https://doi.org/10.1108/IntR-11-2017-0441.

U.S. Bureau of Labor Statistics. 2023. "Consumer Expenditures-2022." https://www.bls.gov/news.release/cesan.nr0.htm#.

U.S. Census Bureau. 2021. "U.S. Census Bureau QuickFacts: California." https://www.census.gov/quickfacts/fact/table/alamedacountycalifornia,riversidecitycalifornia,CA/AFN120217.

U.S. Census Bureau. 2022. "National Population by Characteristics: 2010–2019." https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-detail.html.

U.S. Department of Agriculture. 2023. "Definitions: Sustainability and Food Systems." https://www.usda.gov/oce/sustainability/definitions.

U.S. Department of Agriculture, Economic Research Service. 2023a. "Food Expenditure Series." https://www.ers.usda.gov/data-products/food-expenditure-series/food-expenditure-series/.

U.S. Department of Agriculture, Economic Research Service. 2023b. "Budget Share for Total Food Increased 13 Percent in 2022." http://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=76967.

Valerio, C., L. William, and Q. Noémier. 2019. "The Impact of Social Media on E-Commerce Decision Making Process." *International Journal of Technology for Business* 1(1):1–9.

Webstaurant Store. 2023. "What Is a Commissary Kitchen?" WebstaurantStore. https://www.webstaurantstore.com/article/259/commissary-kitchens.html.

Williams, R.A. 2010. "A New Role for the FDA in Food Safety." SSRN Scholarly Paper. Rochester, NY. doi:10.2139/ssrn.3831560.

Wimer, A. 2023. "The Evidence Is In: Homemade Food Sales Are Safe." https://www.forbes.com/sites/instituteforjustice/2023/09/27/the-evidence-is-in-homemade-food-sales-are-safe/?sh=1980edb14804.

Wright, K.E., J.E Lucero, J.K. Ferguson, M.L. Granner, P.G. Devereux, J.L. Pearson, and E. Crosbie. 2021a. "The Influence of Cultural Food Security on Cultural Identity and Well-Being: A Qualitative Comparison between Second-Generation American and International Students in the United States." *Ecology of Food and Nutrition* 60(6):636–662.

Wright, K.E., J.E. Lucero, J.K. Ferguson, M.L. Granner, P.G. Devereux, J.L. Pearson, and E. Crosbie. 2021b. "The Impact That Cultural Food Security Has on Identity and Well-Being in the Second-Generation U.S. American Minority College Students." *Food Security* 13(3):701–715. doi:10.1007/s12571-020-01140-w.

Xu, X., and Y. Huang. 2019. "Restaurant Information Cues, Diners' Expectations, and Need for Cognition: Experimental Studies of Online-to-Offline Mobile Food Ordering." *Journal of Retailing and Consumer Services* 51:231–241. doi:10.1016/j.jretconser.2019.06.010.

Ye, C., J.J. Cronin, and J. Peloza. 2015. "The Role of Corporate Social Responsibility in Consumer Evaluation of Nutrition Information Disclosure by Retail Restaurants." *Journal of Business Ethics* 130(2):313–326. doi:10.1007/s10551-014-2230-8.

Zenith Optimedia. 2019. "Global Daily Internet Minutes per Capita 2021." *Statista*. https://www.statista.com/statistics/1009455/daily-time-per-capita-internet-worldwide/.

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Case Study

Applied Economic Models of Commodity and Input Markets to Assess Prices, Quantities, Farm and Other Input Supplier Impacts, and Consumer and Taxpayer Costs

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Abstract
The impacts of exogenous market and policy developments reverberate up and down the farm to the retail marketing chain, affecting consumer prices, farm input prices, and the economic well-being of many people. Applied economists have developed analytical tools that trace how developments at one point in the supply chain may affect prices and quantities at other points. The particular analytical tools proposed here aim to provide students with hands-on experience in using market models and real data to simulate relevant policy and market scenarios. We start with a simple model representing only the supply and demand for corn and end with a vertically integrated model that links corn, hog, and pork markets. Each phase of model development gives a chance to build and test economic intuition about how price effects come about and their impacts on various market participants: who benefits and who pays—the winners and losers.

1 Introduction

Many people follow agricultural commodity markets: farmers and ranchers, firms that sell farm inputs and marketing services, livestock feeding operations, grain and meat processors, food processors and wholesalers, and futures market analysts. All these agents can be impacted by market developments induced by changes in agricultural policies, crop yields, animal productivity, and trade. Monthly commodity market outlooks in the World Agricultural Supply and Demand Estimates, otherwise known as WASDE (U.S. Department of Agriculture, Office of the Chief Economist 2023), are closely observed to see how changes in supply and demand factors affect price outlook. Yet, analysis can be complicated as shocks in one part of the agriculture sector spill up and down the supply chain and across borders. Often such effects defy simple explanation. Theoretically, possible outcomes may seem paradoxical as when, for example, increased productivity transforming agricultural inputs into consumer goods cause lower farm commodity prices and reduce farm income or when prices at wholesale or retail levels in the marketing chain may rise at the same time as farm prices fall.

Economists use supply and demand models to study market interactions, yet these tools are not always made accessible in agricultural economics classes or business education. Such omissions are failures: skills to define winners and losers are of broad use to farmers, the agri-food industry, and government. Agribusiness decision making can be improved if supported by an intuitive understanding of how a shock in one commodity or input market can affect outcomes in other markets.

The next section provides the background and motivation for the proposed approach. Section 3 describes the general features of the particular economic model we chose and our motivation for choosing it. In section 4 we present the empirical versions of the models and hands-on simulation experiments using them. We begin with a simple supply and demand model of the U.S. corn market and

then progressively move to more complete models and simulation experiments to show applicability to real-life market developments and policies. The final section summarizes the value of these lessons to various potential audiences.

2 Background and Motivation

The models that economists use to represent agricultural commodity and input markets enable them to study how policies or market shocks may impact farm prices, taxpayer costs, and trade. Results illustrate how the impacts of higher output prices may be distributed unequally among input suppliers and how the negative impacts of higher input prices are distributed unequally among output markets. Policy simulation experiments can reveal how the impacts of government policies critically depend on the nature of the associated policy intervention.

We think that it is possible to equip students with the tools they need for doing this type of analysis using readily accessible economic models and the means to employ them in applied economic analysis. The applications of the model we propose evolve in stages, commodity by commodity, to facilitate learning. At each stage, the model presented is an incremental step forward and yet remains appropriate for analysis focused on certain questions. The final model explicitly represents U.S. markets for corn, hog, and pork and their input markets. Models are based on actual market and production cost data. Parameters are drawn from applied models in use today or relevant articles. Guided hands-on experiments reveal how a shock or policy causes vertical and horizontal interactions throughout these markets, the sensitivities of these shocks to parameter assumptions and market structure, and the benefits and costs to various agents in the farm to retail marketing chain. These lessons have both narrow and broad applications. The scenarios we develop relate directly to the particular case study presented, yet the intuition can be applied to other cases.

3 Equilibrium Displacement Model

A wide variety of economic models exist for agricultural market and policy analysis. The range of options extend from simple, one-commodity supply-demand graphical analysis to general equilibrium analysis wherein markets of all goods and services are explicitly represented, for example, the Global Trade Analysis Project (2023) model. Another popular option is multi-market, partial equilibrium (PE) models used to track year-by-year dynamics of crop and livestock markets (Westhoff et al. 2022). Such models are used in developing the baseline projections for the U.S. Department of Agriculture (USDA); Organization for Economic Cooperation and Development (OECD); Food and Agriculture Organization (FAO) of the United Nations; and Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU). There is no one best model for any let alone for all purposes, but some models are more appropriate for addressing a problem than others.

The type of economic model chosen for our purposes sits in the range of alternative specifications just somewhat above the simple supply-demand graphical model found in introductory economics textbooks and somewhat below multi-market partial equilibrium models. It is most often referred to as the Equilibrium Displacement Model (EDM). The Policy Evaluation Model (PEM) was a version developed and maintained by the OECD (Organization for Economic Cooperation and Development 2001, 2005, 2021). An important precedent to its application in agricultural policy analysis was in an analysis of housing and urban land economics by Muth (1964). The development of the model more specifically for analysis of agricultural markets is generally credited to Floyd (1965), with important further elaborations by Gardner (1987), Hertel (1989), and Wohlgenant (2011). Piggott (1992) used his presidential address to the annual conference of the Australian Agricultural Economics Society to promote the use of equilibrium displacement modelling , or comparative static analyses of general function models, as a research tool in agricultural price and policy analyses. He emphasizes that despite its shortcomings, equilibrium displacement modelling is a research tool that can provide useful

qualitative and quantitative insights with few assumptions. Brester, Atwood, and Boland (2023) contains a comprehensive review of the conceptual basis for the model and its implementation in analyzing policy.

An EDM typically represents supply and demand in a relatively small number of interconnected input and output markets. The system of output supply and factor demand relationships are derived explicitly from first order conditions of a profit or cost function and a generalized production function. Following precedents established in prior work using these types of models, we adopt a constant elasticity of substitution (CES) production function for these purposes. Students might find it helpful to review how to derive factor demand equations for a CES production function in Chapter IV, pages 89–93, of Gardner's textbook (Gardner 1987). For our purposes, we adopt his derived equations almost exactly.

Commodity demand equations relate the quantity demanded for each use to prices via demand elasticities. All behavioral equations in the models are in log-log, percentage change form with elasticities and factor shares as explicit parameters. Supply and demand parameter values, including factor shares, factor substitution elasticities, and demand elasticities, are drawn from published studies. Subsidy or tax wedges in price equations constitute the main ways for implementing market or policy simulation experiments. Initial values of producer subsidies for corn output and some categories of inputs were taken from the OECD (2022). Impacts of exogenous developments in policy or markets are modeled as changes in those wedges. Model results estimate changes in prices and quantities in all markets that arise when the system's equilibrium is displaced due to these exogenous shifts. The resulting impacts on producer and consumer surplus estimate welfare changes to agents. This approach has proven popular in academic work and to help decision makers understand market impacts of policies or other factors. See Table 1 for some examples showing the diversity of applications of the model in published analyses.

Table 1: Selected Studies that Use Equilibrium Displacement Models

Study	Topic
Salhofer and Sinabell 1999	Market effects of the EU countryside stewardship policies
Zhao et al. 2000	Public research and development effects on Australia beef
Dewbre, Anton, and Thompson 2001	Estimate and rank order the transfer efficiency and trade effects of various forms of farm support
Brester, Marsh, and Atwood 2004	Impact of country-of-origin labeling on U.S. beef, pork, and chicken markets
Martini 2011	Long Term Trends in Agricultural Policy Impacts
USDA, Office of the Chief Economist 2015	Economic effects of U.S. country-of-origin labeling
Lee, Sumner, and Champetier 2018	Pollination services and honey in a multiple input, multiple output, two season model
Hahn, Sydow, and Preston 2019	Estimation of damages to Mexico and Canada's livestock market associated with country-of-origin labeling
Lusk, Tonsor, and Shultz 2020	COVID-19 effects on U.S. beef and pork marketing margins
OECD 2021	Market impacts of agricultural and food policies in Norway

4 Empirical Models and Their Applications

There are eight files supplementing the information provided in this section. The one labeled "Overview of Models" compares the equation structure of each of the EDMs and provides data and parameter definitions. Five are devoted to documentation of each of the models individually, Model 1 to Model 5. The one labeled "Model Instructions" explains how to execute model simulations. Finally, the one labeled "Database" documents raw data sources used to construct the models.

The supplemental file, Overview of Models, contains an Excel workbook with two sheets. One of the sheets presents, in column-wise sequence, the equations comprising each one of the five models showing the progression from Model 1, representing interaction of just the aggregate supply and demand for corn, through to Model 5, a representation of the vertically related corn, hog, and pork markets together with their associated input markets. The other sheet contains the variable and parameter names, and their definitions.

The supplemental files "Model 1" to "Model 5" each contain: (a) model descriptions, (b) the empirical versions of each of the market models formatted for solution using the Excel Solver application, and (c) a worksheet for tabulating simulation results for producer, consumer, and taxpayer welfare. The supply and demand for corn in Model 1 implicitly contains the details that are given explicitly in subsequent model versions. Model 2 relates output quantity to inputs used, replacing the first model's supply function with a system of input demands, supplies, and prices. Similarly, where in Model 2, aggregate corn demand *implicitly* includes corn exports, food use, and feed uses, these are made explicit in Model 3. Model 4 distinguishes that part of feed use that goes to hogs and includes equations representing the demand and supply of hogs and the associated non-feed inputs of hog production. This theme continues in Model 5, which represents how the demand for hogs is derived from the interaction of retail demand and supply of pork. While some of these models are simpler than others, none are inherently wrong—it would be incorrect to assume that a model with more equations is always more accurate or more useful.

The overall structure of the following sections corresponds to model versions and experiments. Each section begins with a flow chart illustrating a model followed by a general description of that model and the motivation behind it. The sub-sections contain the simulation motivations and lessons. Each subsequent section provides a version of the model with more details of up- and down-stream markets.

The discussions of scenarios in the following sections will refer to numerical results of model simulations to be undertaken by students. Detailed instructions to implement each of the scenarios for each model version are made available in the supplemental Model Instructions file. In each exercise, students are invited to shock the model out of its initial equilibrium, usually by changing a wedge or gap between buyer and seller prices of an output or input, and then solve the model to find the new equilibrium. The students can see how the shock they implement affects all explicitly modeled prices and quantities of inputs and outputs, as well as the welfare impacts on consumer, producer, and taxpayer surplus. Key lessons from these experiments are summarized in each of the various sub-sections below.

4.1 Model 1: Corn Supply and Demand

This first and most elemental model of corn supply and demand corresponds closely to comparative static graphical analysis taught in introductory economics classes. It aims to explain and analyze prices and quantities traded in a single competitive market. The market behavior is represented in total market supply and demand equations (to the left and right in Figure 1). The supply-inducing price is the market price adjusted for any producer price support or wedge, and the demand-side price can also be adjusted to reflect any subsidy or tax to consumers. The market price (in the middle of Figure 1) will adjust to clear the market, with equal quantities of supply and demand.

Figure 1: Interaction of Aggregate Corn Supply, Demand, and Market-Clearing Prices

Model 1 thus comprises five equations. The key parameters are the elasticities of supply and demand.

4.1.1 Model 1 Scenario: Corn Producer Subsidy

Here the model is used to simulate the effects of a new 10 percent output subsidy to corn producers. (We say "new" because base data we used already has some support for corn producers.) The output subsidy is based on producer support estimate (PSE) data and includes support that is tied to income or revenue.[1] The time frame of simulated results in this and all subsequent scenarios is intended to reflect the outcome after a medium-term adjustment process, so we ignore changes in stock levels and gradual adjustments in behavior. Results of the policy shock are measured by the induced changes in market prices and quantity outcomes, and producer and consumer welfare.

This scenario is a good starting point for those who are not familiar with structural economic models. Figure 2 traces the changes in supply, demand, and market price induced by the output subsidy.[2] The supplemental file, Model 1, presents the numerical version of that process. Market equilibrium before the hypothetical increase in the output subsidy is depicted in Figure 2a. The key requirement is that the quantity supplied, $Qs = f_s(Ps)$, at the supply-inducing price, $Pd\_ / (1 - op\_)$, must equal quantity

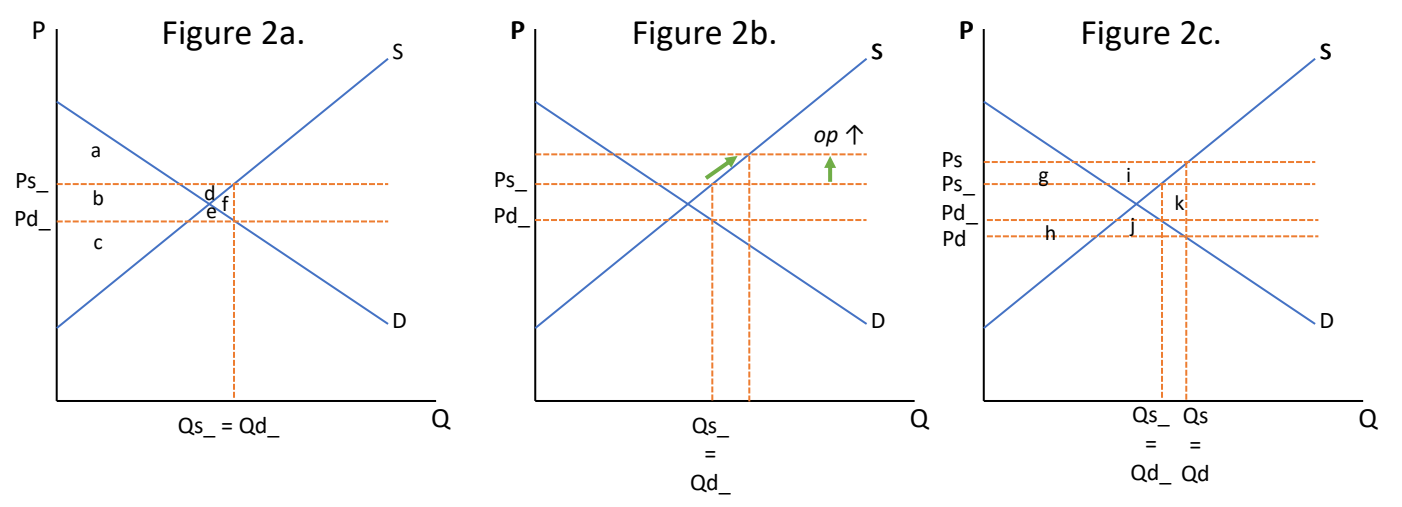

Figure 2: Market Diagram and Model Simulations

[1] Later, U.S. programs that pay on a historical base area will be included in these models. The methods used here are introductory and set aside findings of a vast literature about the production impacts of payments not tied to output (or decoupled). Before doing serious analysis of U.S. payments not tied to output, particularly payments tied to a historical base area, it is useful to look at this so-called decoupling literature. Although that step is important for being precise about the sizes of impacts, the directional and distributional effects presented here should be reliable.

[2] The simplicity of Model 1 lends itself to straightforward graphical analysis. Other versions, not so much. We use that graphical analysis here to illustrate key concepts that apply generally for all the models.

demanded, $Qd\_ = f_d(Pd)$, at the market-clearing price $Pd\_$. (The naming convention we adopted utilizes an underscore '_' at the end of all initial values of variable names. To designate solved values, we omit that underscore.) The model allows for consumer prices to differ from market prices, such as in the presence of consumer subsidies or taxes, but this complication is omitted from the figure. The diagram relates initial consumer surplus ($a + b + e$), producer surplus ($b + c + d$), taxpayer costs ($b + d + e + f$), and deadweight loss (f).

Figure 2b depicts the situation after the increased subsidy (op - $op\_$) is introduced but before a new market equilibrium is established. The numerical counterpart to this situation can be seen by comparing price and quantity outcomes shown in Model 1, after the introduction of the subsidy but before the model is solved (using Excel Solver).

In Figure 2b, the subsidy is shown to cause movement along the supply curve—producers are willing to supply a larger quantity as the subsidy pushes the supply price higher. However, quantity demanded by consumers has not yet changed; $Qd\_$ remains the same until the new equilibrium is found, thus creating a situation wherein the market-clearing requirement that the quantity supplied must equal the quantity demanded is not met ($Qs > Qd\_$ in Model 1). This imbalance is something which a competitive market will not put up with! Nor is this the case in reality: the additional quantities produced cannot just vanish rather than being sold, used, stored, or accounted for in any way. Something has to give. That something is the market-clearing price.

This fundamental role the market price plays in clearing the market is made evident when the model is solved for the new price with the new subsidy, depicted graphically in Figure 2c and numerically in Model 1. The solved model will give the new, lower market-clearing price (Pd) with greater quantities supplied and demanded. The new price plus producer subsidy will map to higher effective producer price (Ps) than before the new policy was introduced. However, that increase will be somewhat less than the initial producer price plus subsidy due to the induced reduction in the market-clearing price.

The Results sheet in Model 1 tabulates gains and losses caused by the subsidy. Higher effective prices for producers lead to higher producer surplus (Figure 2c, $g + i$). Lower market-clearing prices increase consumer surplus (Figure 2c, $h + j$). The final incidence will depend on the relative supply and demand elasticities—a point we do not explore here, but more advanced students could implement the same scenario with different elasticities to compare price and surplus impacts. The subsidy creates a tax burden (Figure 2c, $g + h + i + j + k$) greater than the sum of producer and consumer surplus gains, leading to an overall deadweight loss (Figure 2c, k).

4.2 Model 2: Corn Model with Inputs

Simulation results obtained with the basic corn supply and demand model discussed above confirm intuition regarding the directional effects of output subsidies on prices and welfare, and provide "back of the envelope" insights into quantitative magnitudes of those changes, but not much else. More importantly, that model permits us to only measure consumer and producer surplus at a highly aggregated level. The estimated change in consumer surplus is an aggregate of the changes for domestic buyers of corn for food, feed, and other uses. Moreover, that aggregate incorporates the consumer surplus accruing to agents who buy corn for export. Similarly, the estimated change in producer surplus implicitly adds together changes in surplus accruing to all the agents that supply factors of production to farmers. One question that dominates discussions of farm policy and market developments is, "What will this or that change do to farm income?" However, farm income accrues only to those factors owned and supplied by farmers, principally farm-owned land and labor.

To answer the question about what happens to farm income one needs to know how returns to non-farm-owned inputs change due to the market or policy development of interest. Answering such questions requires a model in which supply and demand for production factors are explicit. We start with such a model, deferring for the moment the disaggregation on the demand side. The demand-side

model structure is consequently identical to the previous case and the relationship of corn producer and buyer prices to the market-clearing price is also the same. However, the corn supply quantity is replaced by explicitly representing input markets that were implicitly part of the supply equation before (lower left part of Figure 3). Corn is produced using a multitude of individual human, land, chemical, and mechanical inputs. For our purposes and without much sacrifice in precision relative to our objectives, we create just three aggregate categories: land, other farm-owned (mainly own labor), and purchased inputs. In making farm income calculations, we further distinguish between land owned by farmers and that which we assume is rented from non-farmers. There are three inputs and consequently three input demands as functions of target output level and the relative input prices. We end with three market-clearing change variables: the domestic market price of corn and the demand prices for two factors of production—farm-owned inputs and purchased inputs. Notice that the model will actually calculate not three but *four* prices (the yellow price boxes of Figure 3). To obtain the fourth—the demand price of land in our case,[3] we exploit the condition implied by profit maximization in a competitive market that in equilibrium the sum of factor payments must equal total revenue—the zero-profit condition. That is to say, factor payments to any one of the factors of production can be obtained as the difference between total revenue and the sum of factor payments made to the other two factors.

The elasticity of demand remains a key parameter, but also important are the supply elasticities of cropland, farm-owned inputs, and purchased inputs, and factor demand own- and cross-price elasticities. The market context is important in terms of the cost shares of land, farm-owned inputs, and purchased inputs. The policy context includes the initial input support for purchased inputs, and land planted to a specific crop, or land planted tied to historical base, as well as support to all output and consumer price policies.

There are other steps that have proven useful in applied economic analysis of this type. First, we calculate initial factor payments to each input as the product of that input's factor share and output

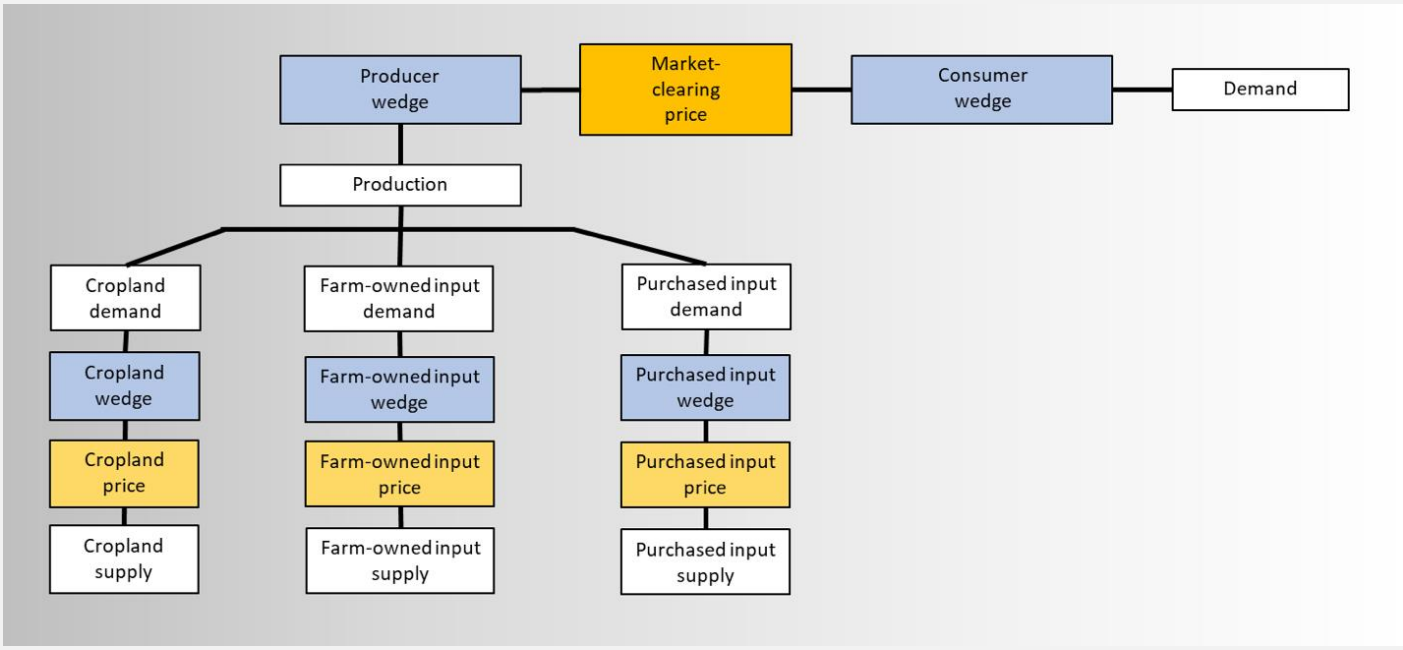

Figure 3: Interaction of Corn and Associated Input Markets and Market-Clearing Prices

[3] The choice of which one of the input categories to be determined residually is arbitrary.

market revenue. For example, initial factor payments to, say, land is equal the input share of land times that market revenue. Second, the focus on percent changes allows us to abstract from numerical input quantity and price levels. That is, since all behavioral equations are in percent change form, we need percent change in factor prices, not actual factor prices. Indeed, it can be difficult to obtain prices for these factors, not least because they are aggregates of many different inputs. Instead, we create an index for each factor quantity equal to the expenditures on the input in the base period. That way we can set initial demand prices at unity (or equal to 1). The model data are consistent with the market data we collect and respects the requirement that factor payments equal the product of their quantities and prices. We reproduce these steps in all subsequent models.

4.2.1 Model 2 Scenario: Corn Producer Subsidy

The decomposition of commodity supply into its input demands, supplies, and markets is critical to applied price analysis. This exercise helps to clarify that producer surplus associated with crop supply is not the same thing as farm income or farmer well-being. Results presented here will show how the output price, quantity impacts, and the commodity producer surplus effect are related to input market and input supplier outcomes. Net farm income is calculated along with aggregate producer surplus, so the implications of a crop supply subsidy for farm income can be highlighted. Comparing taxpayer costs to farm income impacts might be a way to highlight, for some audiences, the importance of understanding what part of the producer surplus goes to different input suppliers. More advanced exercises could be envisioned with different assumptions about input supply elasticities that link these key parameters to producer surplus decomposition as well as to crop output supply.

4.3 Model 3: Corn Model with Inputs, Food, Feed, and Export Demand

This is the last model that focuses exclusively on corn and corn inputs. It differs from the last version in only one respect. Here, we separate aggregate demand for corn into export, feed, and food demand categories (at right of Figure 4). This is accomplished by adding simple own-price demand equations for each one of those aggregates. The food demand category combines domestic buyer demand for corn to be used in food products, for ethanol production, and seed uses. We will return to a more detailed look at the feed demand category when we move to the corn-hog version of the model next. As mentioned above, the demand for corn to be sold to corn importing countries can be thought of as sort of excess demand combining the residual between domestic production and consumption in all countries importing U.S. corn.

This model can be used to assess the impacts of policies on different buyers and also the effects of policies that affect buyer prices differently. Some experiments might seem unconnected to current U.S. corn policies, but being able to test the relative impacts of policies that affect domestic and foreign buyers of a commodity can give important insights into how trade policies affect markets, producers, and consumers (see supplemental material).

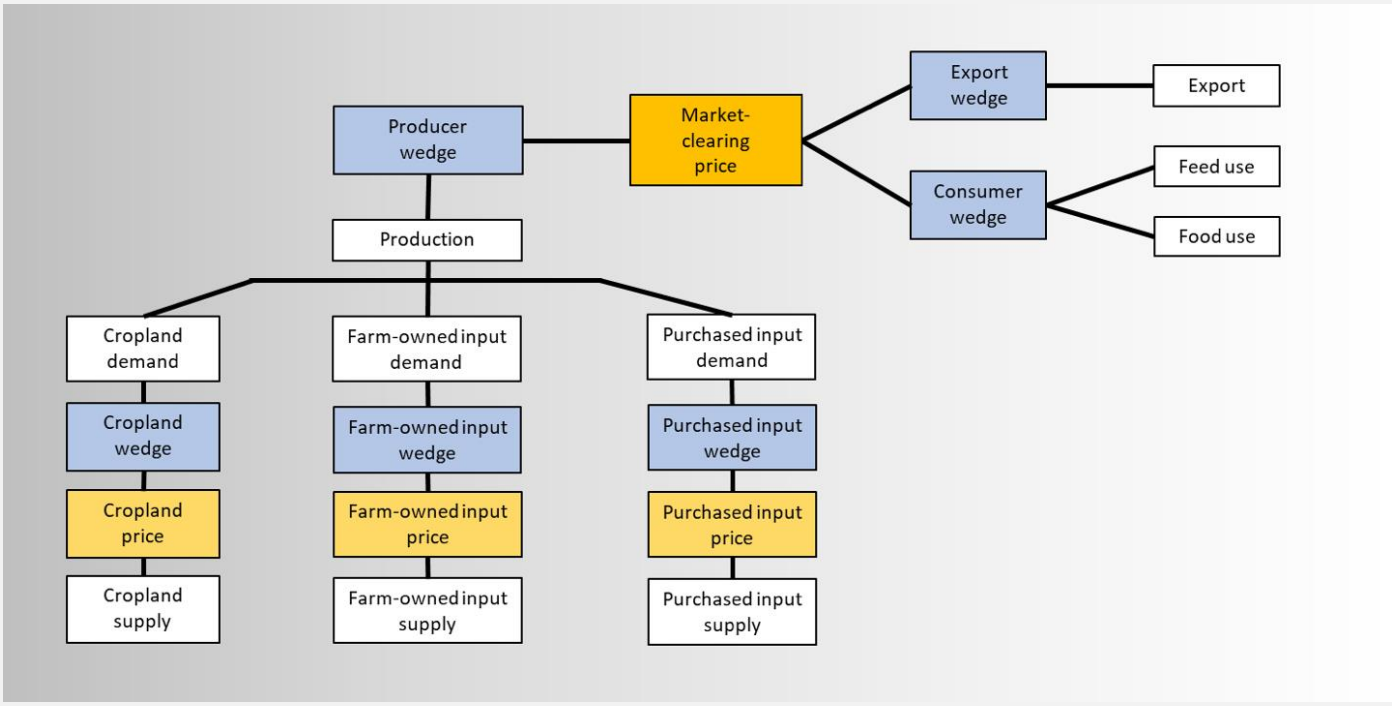

Figure 4: Corn Model with Inputs and Demand Disaggregation

4.3.1 Model 3 Scenario: Corn Producer Subsidy

The impacts of an output payment on consumer prices and surplus are assessed explicitly here. The decomposition of consumer surplus among domestic users and export buyers alone can be an important aid to understanding how supply-side policies affect key constituencies. Advanced students can go farther to assess the role elasticities of demand play on market price outcomes, quantity impacts, and producer and consumer surplus. Moreover, the impact of changing the elasticity of one demand on outcomes for the other two demands can be used to highlight their interactions and the implications for consumer surplus by demand type.

4.4 Model 4: Corn and Hog Model

In order to create the corn-hog model, we append a model representing equilibrium in the U.S. hog market (Figure 5, right hand side). As for the corn model with inputs, hog supply is represented by a system of supply equations corresponding to the first order conditions obtained by maximizing profit given a hog production function. Key parameter estimates were obtained from MacDonald and Ollinger (2000). We distinguished four input categories: (1) farm-owned labor, (2) feed grain, (3) feed protein, and (4) purchased inputs (supplemental Overview of Models file). The corn and hog components are tied together via two linkages: (1) the price of feed grain used in the hog production module equals the market price of corn from the corn module, and (2) the demand for corn for use in hog rations is determined in the hog module. To achieve the latter, we further distinguished corn feed demand in the corn module between that used for hog production and that used for other animals.

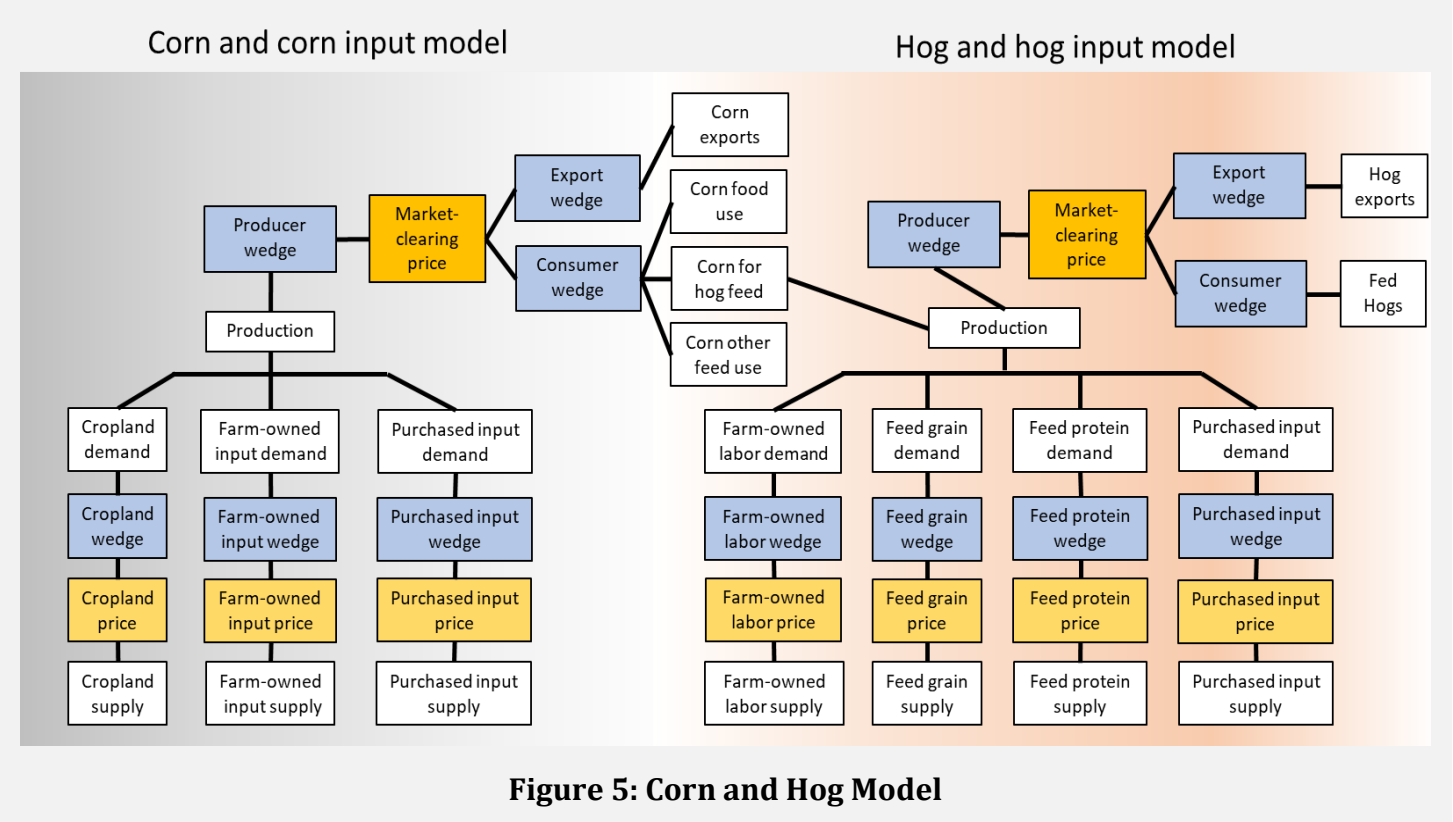

Figure 5: Corn and Hog Model

4.4.1 Model 4 Scenario: Corn Producer Subsidy

The layering of corn and hog models with their respective input markets makes explicit a variety of interactions. The corn output subsidy scenario continues to generate the preceding results for corn input suppliers and other corn buyers, domestic and export, yet the model now elaborates how the hog sector is affected. The subsidy to the production of corn, one input of hog production, can be seen to shift out the supply of hogs with a lower feed price. The hog price is reduced, and other input prices are bid higher given the elasticities used here. Further experiments with the same shock and different elasticities for hog input demands or other hog input supplies can illustrate these interactions further.

4.5 Model 5: Corn, Hog, and Pork Model

In similar fashion as when creating the corn-hog model, we append a model representing equilibrium in the U.S. pork market (Figure 6, right hand side). Following the procedure employed in the two previous versions, pork supply is represented by a system of supply equations corresponding to the first order conditions obtained by maximizing profit given a pork production function. Key parameter estimates were obtained from the USDA Economic Research Service (2011). We distinguished four input categories: (1) hired labor, (2) capital services, (3) hired labor, and (4) purchased inputs. The hog and pork components are tied together via two linkages: (1) the price of hogs used in the pork production module equals the market price for hogs from the hog module, and (2) the demand for hogs for slaughter in the hog module is determined in the pork module.

4.5.1 Model 5 Scenario (1): Corn Producer Subsidy

The first application of this model repeats the ongoing exercise of a corn output subsidy in order to track the impacts up- and down-stream, including explicitly the impacts on markets of different inputs to corn, hog, and pork production. The implications for corn and hog commodity and input market prices and quantities are unchanged. Outcomes for pork and pork input markets are now explicitly represented in

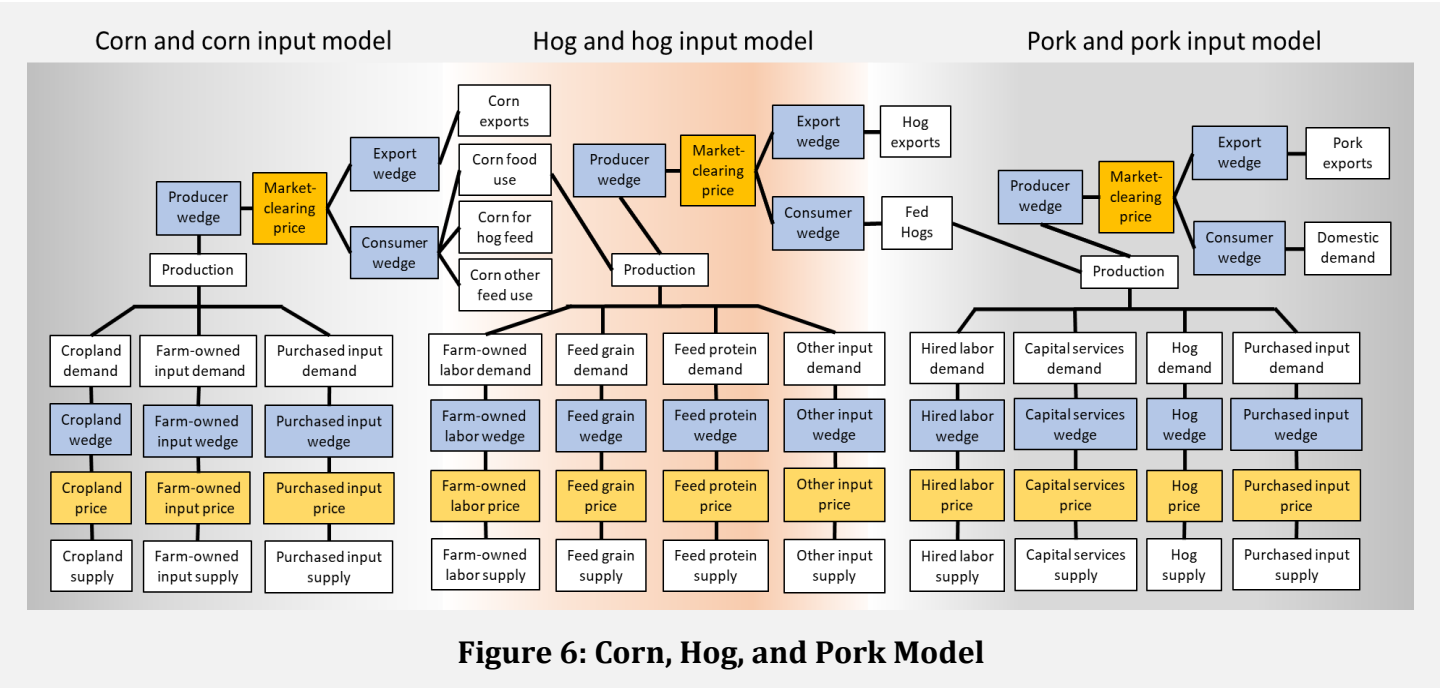

Figure 6: Corn, Hog, and Pork Model

the model, not implicit in the hog demand. The corn output subsidy shifts out hog supply, and the hog market impacts shift out pork supply. The hog price falls, driving up purchases of this input to produce more pork. Other input demands are determined by the combination of expansion effects (as pork production rises) and substitution effects (when comparing the prices of other inputs, including less expensive hogs). An important consideration is the high share of hog costs in total pork production costs according to our source data (see factor shares data in Model 5). The demand quantity effects seen in the results are not the initial demand shifts alone, but instead a combined result of the demand shifts and the changes in equilibrium prices. The final impacts on other pork inputs, like labor, and pork price might be compared to the initial subsidy to corn production.

4.5.2 Model 5 Scenario (2): Hog Export Tax

This scenario tests what would happen if a policy targets hog exports. This scenario might represent the implications of a hypothetical subsidy, but it also could be used as a step toward analyzing the impacts of a trade deal or dispute, an animal disease, or a regulatory change. These alternatives would not have the same taxpayer impacts or welfare impacts more broadly if the policy relates to animal or human well-being that cannot be included in the market analysis provided here. Nevertheless, the directional impacts on market quantities and prices, consumers, producers, and input suppliers are likely the same.

The export tax leads to lower hog exports with the exact effect depending on the size of the tax, the equilibrium price change, and export demand elasticity. The overall impact is less hog demand in aggregate and a falling hog price. That reduction in hog demand causes a movement along the hog supply curve, which takes the form of falling hog input demands, as seen in their falling prices and quantities. The corn market details can also be seen: less demand for hog feed means less overall demand, so there is also a movement along the corn supply curve with consequently lower corn input prices and quantities.

The lost hog feed demand is partly offset by price-induced increases in other corn uses. Likewise, the hog export tax effect is mitigated by responses of other hog demands, including for domestic pork production. The effect of lower hog price is made clear in the pork market representation and, in fact, these pork market effects can be seen as perfectly analogous to the impacts of the corn output supply

impact. In both these scenarios, the driving force that causes pork market response is a lower hog price, so the directional impacts of the pork and pork input prices and quantities—and even magnitudes in this case—are mostly quite similar in these two scenarios.

This scenario can be used to illustrate how an intermediate product trade policy, whether tax or other measure, has up- and down-stream impacts. In this case, the implications of such a trade policy for farm (corn) income and food (pork) consumer can be estimated.

4.5.3 Model 5 Scenario (3): Pork Purchased Input Price

This scenario tests the impact of something that causes the costs pork processors pay for inputs to rise. The policy used here is a tax, but the same scenario for market outcomes might relate to a variety of shocks to productivity, regulations, or other factors—although the assessment of distributional impacts on well-being might be different if the motivation is not a tax.

The directional impacts of an increase in other purchased input prices on pork, hog, and corn sectors should be mostly predictable. The effects on input markets throughout the system will tend to be dominated by expansion—or, in this case, contraction—effects at most levels given the cross-price elasticities of factor demands. The sizes of impacts might appear small relative to the outcomes of earlier scenarios or even to preliminary expectations. However, the share of these purchased inputs in pork production costs is small (as seen in the value of *Sbpk*), so the tax impacts will tend to be modest. Pork and hog market interactions tend to be strong, but the role of hog feed in total corn demand is similar in magnitude to the share of other purchased inputs in pork production costs, so the corn market impacts are further diminished in terms of magnitude. More advanced students might embark on a sequence of variations in this scenario. As ever, input supply elasticities could be changed. Going farther, however, initial pork cost shares could be artificially changed (as long as the shares sum correctly) or the tax could be applied to other pork inputs, like labor, or to more than one class of pork inputs. Each additional permutation will explore how a different set of market conditions or tax implementation will affect the product market and then spill upward to the intermediate good market and crop market.

5 Discussion

Economic models such as those employed here are useful, not because they provide perfect descriptions of reality—no model can. Rather, they are useful because they force analysts to formalize their views about how agricultural commodity markets work and to think through first order and knock-on effects of market developments systematically. They are meant to augment, not replace, intuition for thinking about how exogenous shifts in supply and demand play out in prices, and the economic costs and benefits to various agents. When confronted with a policy change, new demand or use, or supply shortfall, economic models may provide useful insights into how impacts may show up along the marketing chain from farm gate to consumer plate. As revealed in the results from simulation experiments discussed above, the effect of a subsidy or tax in market equilibrium will almost never equal the impact on the price first affected. For example, simulation analysis with even the simplest of our models could show, somewhat counterintuitively, that producers lose more from a consumer tax than consumers do, all depending on the relative elasticities. In similar vein, students can see that final supply-side benefits or costs of a commodity market policy or change go to the input suppliers who are least responsive to price (so most inelastic) and the smallest share often goes to the input suppliers whose response is most responsive to price (most elastic). Cropland supply in the United States evolves slowly over time with only limited response to price, such that developments in corn, soybean, and other crop markets will tend to have their largest impacts on land prices.

Do these lessons matter to students? If their career or passion leads them to consider market implications of proposed real changes in agricultural policy in the United States or elsewhere, technological innovations, new demands for agricultural products, long-run drivers of weather patterns

and income, or any other market shock, then developing their ability to formalize analysis of responses can be valuable. When they read the news about a disruption in wheat markets on the other side of the world, trade negotiations between countries, or biofuel policy changes, the concepts they covered here might be key tools for thinking about what that news means for them as voters and consumers, for their communities or countries, and their employers or business decisions.

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References

Brester, G., J. Atwood, and M. Boland. 2023. *Equilibrium Displacement Models: Theory, Applications, and Policy Analysis.* Minneapolis: University of Minnesota Libraries Publishing.

Brester, G., J. Marsh, and J. Atwood. 2004. "Distributional Impact of Country-of-Origin Labeling in the U.S. Meat Industry." *Journal of Agricultural and Resource Economics* 29(2):206–277.

Dewbre, J., J. Anton, and W. Thompson. 2001. "Direct Payments, Safety Nets and Supply Response: The Transfer Efficiency and Trade Effects of Direct Payments." *American Journal of Agricultural Economics* 83(5):1204–1214.

Floyd, J.E. 1965. "The Effects of Farm Price Supports on the Return to Land and Labour in Agriculture." *Journal of Political Economy* 3:148–158.

Gardner, B. 1987. *The Economics of Agricultural Policies.* New York: Macmillan.

Global Trade Analysis Project. 2023. "GTAP Models: Current Model." www.gtap.agecon.purdue.edu/models/current.asp.

Hahn, W., S. Sydow, and W. Preston. 2019. "Revisiting U.S. Country of Origin Labeling Trade Damage Estimates: How Does an Equilibrium Displacement Model Perform Under Different Scenarios." *Canadian Journal of Agricultural Economics* 67:349–361.

Hertel, T.W. 1989. "Negotiating Reductions in Agricultural Support: Implications of Technology and Factor Mobility." *American Journal of Agricultural Economics* 71:559–573.

Lee, H., D. Sumner, and A. Champetier. 2018. "Pollination Markets and the Coupled Futures of Almonds and Honey Bees: Simulating Impacts of Shifts in Demands and Costs." *American Journal of Agricultural Economics* 101(1):230–249.

Lusk, J., G.T. Tonsor, and L.L. Shultz. 2020. "Beef and Pork Marketing Margins and Price Spreads During COVID-19." *Applied Economic Perspectives and Policy* 43(1):4–23.

MacDonald, J.M., and M.E. Ollinger. 2000. "Scale Economies and Consolidation in Hog Slaughter." *American Journal of Agricultural Economics* 82(2): 334-346.

Martini, R. 2011. "Long Term Trends in Agricultural Policy Impacts." *OECD Food, Agriculture and Fisheries Papers* 45. Paris, France.

Muth, R.F. 1964. "The Derived Demand for a Productive Factor and the Industry Supply Curve." *Oxford Economic Papers* 16:221–234.

Organization for Economic Cooperation and Development. 2001. *Market Effects of Crop Support Measures.* Paris, France.

Organization for Economic Cooperation and Development. 2005. *The Six-Commodity PEM Model: Preliminary Results.* Paris, France.

Organization for Economic Cooperation and Development. 2021. *Policies for the Future of Farming and Food in Norway.* Paris, France.

Organization for Economic Cooperation and Development. 2022. *Agricultural Policy Monitoring and Evaluation 2022.* Paris, France. www.oecd.org/publications/agricultural-policy-monitoring-and-evaluation-22217371.htm.

Piggott, R. 1992. "Some Old Truths Revisited." Presidential address, 36th Annual Conference of the Australian Agricultural Economics Society, Department of Agricultural Economics & Business Management, The University of New England, Armidale NSW 2351, Canberra, 10–12 February.

Salhofer, K., and F. Sinabell. 1999. "Utilising Equilibrium-Displacement Models to Evaluate the Market Effects of Countryside Stewardship Policies: Method and Application." *Die Bodenkultur [Austrian Journal of Agricultural Research]* 50(2):143–153.

U.S. Department of Agriculture, Economic Research Service. 2011. "U.S. Feeder Pig-to-Finish Production Cash Costs and Returns." Washington DC. Accessed at www.ers.usda.gov/data-products/commodity-costs-and-returns/commodity-costs-and-returns/#Historical%20Costs%20and%20Returns:%20Hogs,%20farrow-finish.

U.S. Department of Agriculture, Office of the Chief Economist. 2015. *Economic Analysis of Country of Origin Labeling (COOL). Report to Congress.* Washington DC, April.

U.S. Department of Agriculture, Office of the Chief Economist. 2023. "World Agricultural Supply and Demand Estimates." Available at www.usda.gov/oce/commodity/wasde.

Westhoff, P., M. Rosenbohm, J. Whistance, J. Binfield, S. Chiuchiarelli, B. Maltsbarger, W. Thompson, and F. Malakhail. 2022. "Baseline Update for U.S. Agricultural Markets." FAPRI-MU Report 4-22.

Wohlgenant, M.K. 2011. "Consumer Demand and Welfare in Equilibrium Displacement Models." In J.L. Lusk, J. Roosen, and J.F. Shogren, ed. *Oxford Handbook of The Economics of Food Consumption and Policy*. Oxford UK: Oxford University Press, pp. 292–319.

Zhao, X., J.D. Mullen, G.R. Griffith, W.E. Griffiths, and R.R. Piggott. 2000. "An Equilibrium Displacement Model of the Australian Beef Industry." *Economic Research Report* No. 4, NSW Agriculture, Orange.

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Case Study

Unraveling the Reintroduction of Hemp in the United States: A Case Study of the Supply and Demand During the (Re)Birth of an Industry

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JEL Codes: Q10, Q11, Q12, Q13
Keywords: Demand, hemp, policy, supply

Abstract
The reintroduction of hemp as a legal enterprise in the United States has been one of the largest-scale exercises in applied agricultural economics in recent history. Hemp has a long and storied past in the United States. The economic forces behind the ups and downs of hemp production, coupled with varying legal status throughout time, make hemp an exciting case study to understand how policy influences the forces of economics. The evolution of this reintroduction provides a real-world opportunity to understand and apply core microeconomic and marketing concepts amid uncertainty and government interventions. This hemp case study explores economic concepts including supply and demand, elasticity, price discovery, government intervention and policy, and agricultural marketing and production contracts on the backdrop of hemp production.

1 Introduction

The Nine Days Wonder Farm (NDWF) is a medium-sized central Kentucky farm that saw hemp production as a potential profit center for its central Kentucky farming operation. NDWF produces corn, soybeans, and tobacco. They shifted ten corn acres to hemp production in 2019. NDWF's production model was to grow floral hemp destined for the Cannabidiol (CBD) market. Unbeknownst to NDWF, they and other producers and processors were engaging in one of the largest-scale exercises in applied agricultural economics in recent history. To understand why NDWF's entrance into hemp production was different from entering into other agricultural production, some background is needed about the evolution of hemp production in the United States and the impact that it has had on the development of hemp markets. With this background, this case study allows the examination of how contracts affected price discovery for NDWF's crop and why participation in the emerging hemp market has not yet developed a transparent supply chain. Unfulfilled contracts and opaque supply chains left NDWF in a position no producer desires: an abandoned contract and a product in storage with no clear buyer or timeline for its sale.

This case study features five interconnected student learning objectives:

1. **Enhance Understanding**: Develop a deeper grasp of supply and demand dynamics and characteristics at various marketing levels for an emerging market with limited market information and competition.
2. **Incorporate Supply and Demand Curves:** Introduce and differentiate primary and derived supply and demand curves into the analysis to see how various shifts and slopes impact market prices and quantities.
3. **Introduce Price Discovery:** Explore the concept of price discovery in thin markets with limited competition.

4. **Examine Government Intervention**: Analyze the impact of government policies on developing agricultural markets.
5. **Introduce and Explore Contracts:** Investigate how production and marketing contracts can affect price discovery in the early stages of emerging markets.

2 History of Hemp Production and Legislation in the United States

Hemp has a long and storied history in the United States, ranging from being an essential resource pre-industrial revolution and during World Wars I and II, to becoming embroiled in drug legislation that outlawed production. Historically, hemp in the United States followed a relatively "normal" existence consistent with standard economic principles and political influence. Before the most recent interest in the reintroduction of hemp production, almost all hemp was grown primarily for its fiber, which was used to produce things such as rope and textiles. However, hemp fiber demand decreased as shipping moved from predominantly wind-driven modes requiring hemp rope and sails to steam-powered methods. Globally, hemp rope demand decreased further as trade increased and access to cheaper substitute goods, primarily abaca, sisal, and jute, became available (Bell 2020). In addition to decreases in demand for hemp, the outlawing of hemp production was due to a changing opinion of marijuana consumption in the United States and subsequent legislation to make it illegal. It is essential to point out that marijuana and hemp are the same plant, Cannabis sativa. The only difference between the two is at the chemical level. THC (Delta-9-tetrahydrocannabinol) is the regulated psychoactive chemical that produces the mind-altering effects of Cannabis sativa consumption. Hemp is defined, legally, as a Cannabis sativa plant that is below 0.3 percent THC content. It does not have psychotropic properties, but it was regulated in the same way as its THC-containing relative.

The U.S. perception of marijuana consumption changed significantly during the 1930s. The Marihuana Tax Act of 1937 made the recreational use of marijuana illegal. It increased the cost of hemp production, decreasing hemp supply while also further decreasing the demand for hemp and hemp products. However, during World War II, the Japanese controlled many areas where the abaca and jute were produced and imported (Bell 2020). This disruption in supply prompted the U.S. Department of Agriculture (USDA) in 1942 to produce a propaganda film, "Hemp for Victory." The intent was to help influence farmers' decisions to plant hemp to support the war effort. The Marihuana Tax Act of 1937 was not repealed, but certain U.S. government agencies seemingly "looked the other way" for those producing fiber to help the war effort (Dwyer 1998). The farm that NDWF now operates once had hemp grown on it for the war effort. Local historical records showed that the very land that NDWF was going to plant floral hemp once grew hemp for fiber and sold it to Kentucky River Mills for processing into supplies for the U.S. Navy (Figure 1).

Once the war was over and trade reestablished, hemp fiber's support again fell victim to cheaper import substitutes. Finally, in 1970, hemp was caught up in the Controlled Substances Act of 1970, resulting in hemp being categorized with marijuana as a Schedule 1 narcotic.

3 Reintroduction of Hemp production in the United States

Just as changing public perceptions helped formulate the law that outlawed hemp production, the pendulum of public perception started to swing in the other direction in recent years. In 2014, Congress passed a Farm Bill allowing hemp to be produced for research. This was the first time hemp was legally grown in the United States since the Controlled Substance Act of 1970 passed. When hemp was first relegalized to be grown in the United States via the 2014 Farm Bill, it was done under a State Pilot Program framework. Hemp was touted as another alternative enterprise that could help boost a somewhat depressed agricultural commodity market at that time and help revitalize rural economies. Further, there was existing demand for hemp products in the United States. Even though hemp was illegal to grow in the United States, hemp products were still legal to possess and consume. This created

Figure 1: Historical Marker.

Note: Photo sourced from http://www.kentuckyhemphighway.com/index.php/franklin/.

an environment where domestic consumption of hemp products was solely dependent on imports. By September 2019, the United States had imported $66.6 million of hemp products in that year. Canada accounted for 89 percent of those imports (Hudock 2019). Replacing, at least in part, the imports of raw hemp with domestic production was a political motivator for some politicians promoting the re-legalization of hemp for U.S. production. It was also touted as a potential replacement for other crops that have been subject to decline, such as tobacco. Hemp seemed perfect for Kentucky and other tobacco production states. This was largely because of existing infrastructure (tobacco barns used for drying harvest floral material), and experienced growers of high management and labor intensity crops such as tobacco. Hemp production methodology mirrored closely that of tobacco. In fact, Kentucky Senator Mitch McConnell stated, "We all are so optimistic that industrial hemp can become sometime in the future what tobacco was in Kentucky's past" (Angel 2018). Hemp can also be grown to make products that traditionally rely on other fibers such as wood and cotton, and it can be used as a renewable energy source for biofuels. Hemp grain (seeds) and seed oil can be used in many food and personal care products. Many media reports indicate more than 25,000 items can be produced from hemp material (Johnson 2018).

While the 2014 Farm Bill removed the illegality of hemp production, potential hemp producers were not given carte blanche. Instead, each state had to develop a pilot program that dictated the specifics of hemp production in that state (Falkner et al. 2023). Not all states simultaneously came online in hemp production, nor was there regulatory consistency across states (Mark et al. 2020).

Hemp production falls into three main categories—fiber, grain, and floral material (Hill et al. 2023). In the early years after the passage of the 2014 Farm Bill, most hemp production was focused on fiber and grain production. For example, Kentucky's fiber and/or grain production accounted for more than 50 percent of all hemp acres planted in 2014 and 2015. By 2019, the acreage planted to produce hemp floral material destined for CBD production accounted for 92 percent of planted acres (Kentucky Department of Agriculture 2023). This was not just a Kentucky phenomenon. Instead, similar shifts to CBD production were present in almost all states where hemp was being produced. Like other hemp producers in Kentucky, NDWF decided to produce varieties suitable for hemp floral production destined for the CBD market.

In the 2018 Farm Bill, hemp was removed from the scheduled narcotics list. However, CBD remained on the schedule list, making it a grey area of hemp production. However, hemp production under the 2018 Farm Bill required additional oversight. Producers of hemp still had to obtain licenses from the states where they produce and were subject to THC level testing and crop destruction if they were over legal THC limits (currently 0.3 percent by dry weight). Many inexperienced people saw hemp as a gold mine. The passing of the 2018 Farm Bill nationalized hemp production to other states in the United States, which dramatically increased potential supply and arguably was a factor in the overproduction of hemp realized in 2019. In addition, experienced farmers were looking for a new income source to offset declining farm income nationwide. Suddenly, there was a lot of interest in producing hemp for CBD channels all across the United States. Potential hemp producers, including NDWF, signed contracts and were promised by buyers and investors (many new to agricultural markets) lucrative farm-level returns and media reports of a rapidly expanding consumer market for CBD products. CBD was touted as a substance, absent of psychedelic effects, but potentially some of the purported health benefits of the Cannabis sativa plant (MacKeen 2021). In other words, CBD was the answer to potentially better health and pain relief without getting "high." Not surprisingly, interest in hemp production for CBD dwarfed hemp fiber and grain production for other purposes from 2018 to 2020.

As seen in Figure 2, hemp production (farm-level primary supply) increased from 2016 to 2019 and then decreased in 2020. Many producers/farmers and investors got caught up in the CBD hype. They suffered significant adverse financial consequences as farm-level prices plummeted by 90 percent or more, contract promises were not fulfilled, and marketing infrastructure was not developed (Figure 3).

Economic principles can be utilized to analyze the reintroduction of hemp in the United States, the hype surrounding CBD, and how it affected the decisions of NDWF to step into hemp production. NDWF, like many other producers, learned the hard way that, despite media, producer, and political hype, hemp is still bound by the principles of economics.

4 The Economics of Hemp Production

4.1 Profitability

NDWF experienced difficulty determining the estimated profit potential for hemp production because there was a lack of quality information about the trend of future harvest prices and contract guarantees. This misinformation led NDWF to believe the hype touting large profits associated with floral hemp production. In addition, given its newness as a reintroduced U.S. crop, standard production practices have not been established for hemp, increasing the uncertainty around production and yield. Unlike other commodities where variances in production methods are minimal and have minimal impact on profitability, hemp production methods potentially vary significantly and potentially have very different cost structures (Shepherd and Mark 2019). Floral hemp production primarily followed a tobacco production model or production practices more closely related to field tomato production (i.e.,

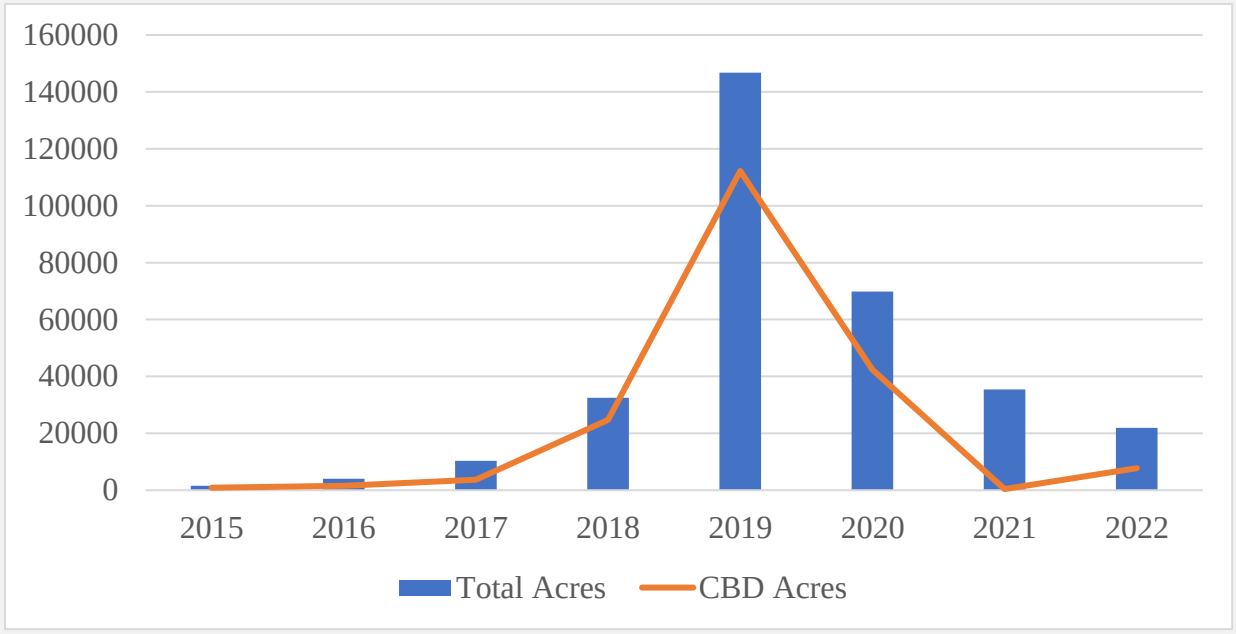

Figure 2: USDA FSA Hemp Crop Acreage Data 2015–2022.

Note: Data sourced from USDA Farm Service Agency (2023) "Crop Acreage Data"

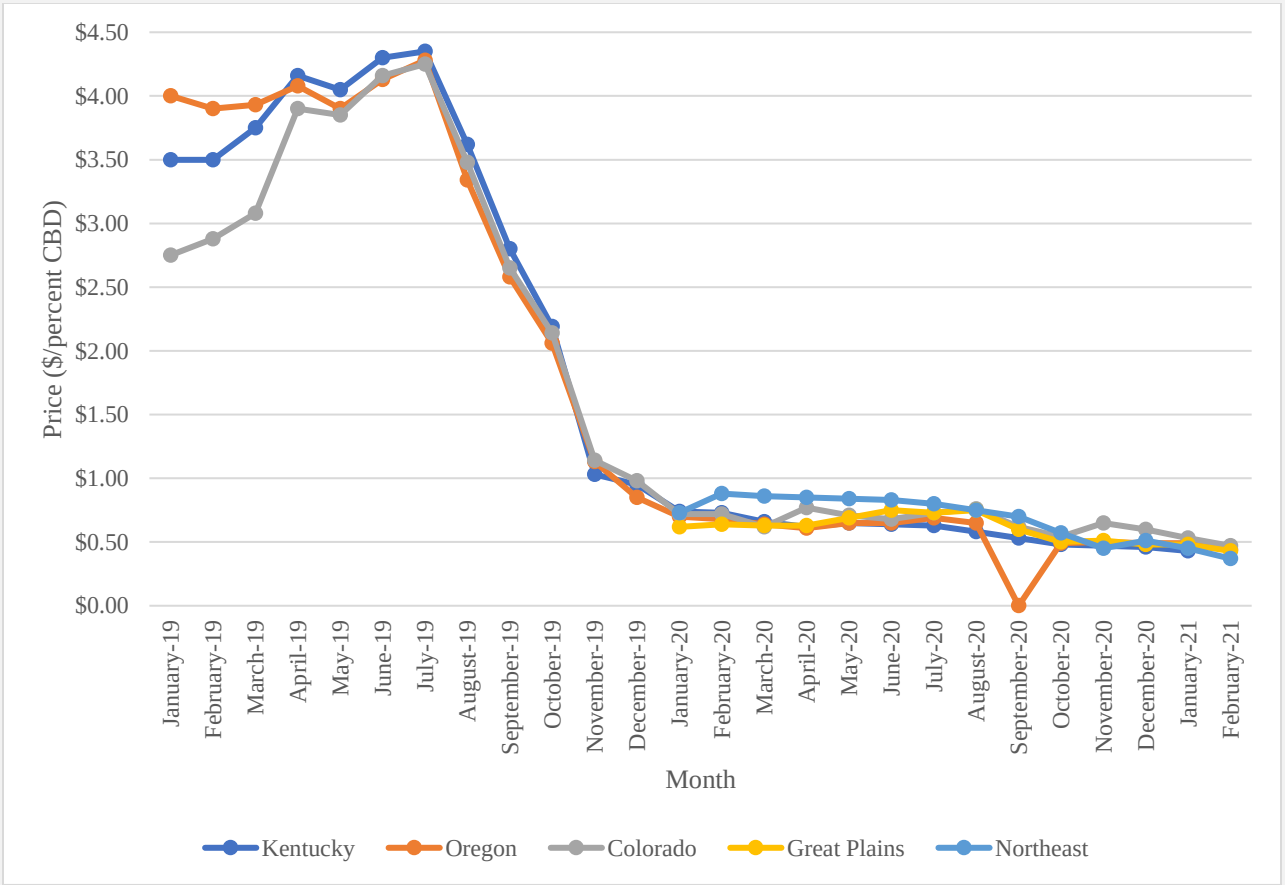

Figure 3: PanXchange Reported CBD Prices Jan 2019–Feb 2021.

Note: Data sourced from the PanXchange hemp price report

plasticulture). However, there were still production methodology variances within these models. Following the floral hemp production boom, hemp fiber and grain returns above variable costs were often estimated at minimal return per acre or negative (Mark and Shepherd 2019). For the same period, returns above variable costs for substitutes in production, such as corn and soybeans in Illinois, were projected to be low, around $200 per acre before consideration of land costs, and negative when an average land cost was accounted for (Schnitkey 2018). This indicates that hemp fiber and grain prices would need to increase significantly (or costs of hemp production decline considerably) to attract acreages away from corn, soybean, and wheat production. NDWF had been interested in producing hemp as soon as it became legal. However, it knew that profit potential was not significantly high enough to justify the risk of trying a new enterprise and taking away resources from other profit centers in their business.

But in 2019, floral hemp production for CBD was a different story, and NDWF saw this as a potential opportunity to turn a large profit. CBD production on a mass scale and the public availability of the product for retail sale was new. The U.S. media and political interest in the product grew exponentially, and after hearing about the potential for considerable profits, producer interest in floral hemp production grew as well. NDWF chose to shift production to hemp for CBD from corn acres and entered the market to produce floral hemp. Lacasse and Kolodinsky (2022) found that internet searches and articles written about hemp peaked in 2019. Hemp for fiber had been grown in the past, albeit a lot of technical knowledge and plant genetics had been lost to the annals of time. But CBD was a new frontier that seemingly had endless promises and possibilities. While noting the challenges of arriving at accurate profitability estimates for hemp production, the 2019 CBD budgets the NDWF used for planning showed returns above variable costs ranging from $3,000 per acre to over $25,000 per acre (Shepherd and Mark 2019). These were unheard-of returns for agricultural products, and NDWF wanted a piece of this profit pie. Despite the uncertainty of the data behind these profitability projections, NDWF and many other producers assumed that even with significant unknowns, profit projections could adjust downward significantly and still be relatively more profitable than traditional commodity crops. Furthermore, the profit potential per acre was supposedly so great that even a few acres were attractive to potential producers new to agriculture. Unfortunately for NDWF and other producers who decided to enter floral hemp production, most producers did not realize the hype and promise of large profits. Let us investigate why using economics.

4.2 Price Discovery, Thin Markets, Oligopsony, and the Role of Contracts

In markets, prices are traditionally determined by buyer and seller interactions through price discovery. These interactions can be in person or via electronic exchanges. Commodity markets provide examples of how the price discovery process works. In the agricultural context, commodities are products with little product differentiation. Corn and soybeans are two examples of agricultural commodities. Price discovery is more straightforward in the commodity markets because goods are not differentiated. Commodities are often traded daily through futures markets that exhibit a competitive marketplace with many buyers and sellers. Here, buyers and sellers of commodities interact, and the settled price is viewable worldwide, providing valuable information on the market price for the commodity. Commodity markets are often used as an example of perfect competition because there are many buyers and sellers and transparent and accurate market signals for price and quality. Under perfect competition, producers are price takers and do not have the market power to influence prices received. In addition, the marketplace exhibits ease of entry and exit, resulting in zero economic profits in the long run as producers receive a competitive return on their land, labor, and other resources. Price discovery is much more complicated for hemp production than other agricultural products traded in greater volumes and intervals, and price information is not readily available, as described below. NDWF had experience growing corn and soybeans, which were traditional commodities, so they were accustomed to the breadth of information detailed above when projecting the future price of their product.

Unlike traditional commodity markets with many buyers and sellers, hemp markets are relatively thin, with few buyers and/or sellers. Thin markets are one in which there are "few buyers" and "low trading volume" (Adjemian et al. 2016). In Kentucky, NDWF only had two companies in their area offering contracts to potential growers. Without more potential buyers, the uncertainty of future prices was increased for NDWF and other producers as competition among processors was limited. The reintroduction of hemp has seen market characteristics closer to oligopsony than perfect competition. Oligopsony is the term used to describe a market with only a few buyers and many sellers (Adjemian et al. 2016). Tobacco production in the United States is one example of oligopsony. According to the 2017 Ag Census, there were 6,237 tobacco farms in the United States (U.S. Department of Agriculture 2019). In 2015, two tobacco manufacturers controlled 81 percent of the tobacco retail market (Levy et al. 2019). There are many tobacco producers, but the number of buyers for tobacco product manufacturing is small. The consequences of thin markets include a lack of competition and imperfect market information, which lead to enhanced price volatility. While NDWF understood that the thinness of the hemp market had the potential to result in price volatility, they still chose to contract with a processor in their area.

In agriculture, both marketing and production contracts are common. Simply defined, a production contract is between the farmer and the buyer in which the buyer dictates most of the production requirements of the agricultural good (Shepherd, Goeringer, and Mark 2021). In return, the buyer agrees to buy the product at a specified price and retains ownership. A marketing contract is an agreement between a producer and buyer where the buyer offers to purchase a specified quantity of certain quality at a given price and time. Under a marketing contract, the producer retains ownership of the product, the buyer is not obligated to buy, and the seller has the ability to sell to a different buyer (MacDonald and Burns 2019). Contracts between hemp processors and producers served as a price discovery tool for floral hemp production. NDWF entered into a production contract with their processor that explicitly dictated the variety of hemp to be produced (provided by the processor as they owned the genetics) when the crop had to be planted, the crop management protocol (fertilization rates, cultivation schedule, etc.), and when the crop was to be harvested and price to be paid upon delivery of the harvested material. However, NDWF's contract and many other of these production contracts and the associated prices were not honored for various reasons. The most prominent reason was the overproduction of floral hemp for the CBD market. As the 2019 hemp growing season approached harvest, it was clear to investors in hemp processing facilities that supply would outstrip demand. While production exceeded 140,000 acres, the Chief Executive Officer at PanXchange estimated that less than 3,000 acres were needed to supply the U.S. CBD market (Reed 2021). Unfortunately, NDWF received a letter from their processor right after harvest that the company was seeking bankruptcy protection and would not take delivery of the hemp that NDWF had produced. NDWF was now in a position with no buyer for their raw floral hemp product. Still, they were not alone, as many producers had no outlet for their product and turned to storing their unsold hemp instead of selling it for a low price in hopes of better market conditions. In the long run, producers exited the hemp CBD market, which can be seen in the decrease in acreage in Figure 2.

4.3 Derived Demand and Primary Supply

To better understand the economics behind how NDWF found itself in this situation, we explore the concepts of supply and demand. The demand for hemp produced for the grain and fiber markets resembles a "typical" demand in other commodity markets. These substitutes for hemp fiber include wood fibers, abaca, jute, etc. Substitutes for hemp grain include flax, chia, and pumpkin seeds. Often, these substitutes are cheaper and provide similar product attributes, which could largely explain the current lack of hemp for grain and fiber production in the United States. Unlike many other agricultural products, actual demand and supply for the emerging hemp market are unknown and an area of ongoing research.

Figure 4: Understanding Demand for Floral Hemp in 2019.

In contrast, NDWF did not produce hemp for grain or fiber. They produced floral hemp for CBD. Retail-level demand for CBD, which is made from floral hemp, does not currently have close substitutes. For many consumers, no alternative substitutes offer the same attributes they get out of CBD products. For example, if someone is using a CBD tincture for pain relief, the only alternative may be prescription-based products with adverse side effects. It may also be that CBD products are considered more natural and fit into a person's lifestyle better than synthetic options.

Here we focus on farm-level (primary) supply and (derived) demand of floral hemp destined for the CBD retail market, which are the market conditions that NDWF faced when trying to sell their product after their contract was not honored. Derived demand (farm level) is the demand for inputs used to make a final product, in our case the demand for the raw hemp at the farm gate (Tomek and Robinson 1990). Figure 4 shows the relationships between primary and derived demand. Primary supply is the relationship between prices and quantity at the producer level (farm level). Hemp floral material is harvested from the hemp plant (farm gate market), further processed into CBD, and then marketed as a product containing CBD (retail market). While the processes are certainly different, we can compare this to beef production for ease of illustration. What the farmer sells at the farm gate level (a live bovine animal) differs greatly from what the consumer purchases at a grocery store (some type of processed and packaged beef product). Supply and demand conditions vary at the farm gate (derived demand/primary supply) and the retail (primary demand/derived supply) levels. Even though actual primary or derived supply and demand are unknown for any hemp products, some assumed known characteristics coupled with standard supply and demand framework can help us think about what supply and demand would look like hypothetically in the floral hemp markets.

4.4 Simulated Primary Supply and Derived Demand Curves for Floral Hemp During the 2019 Boom

Figure 5 shows expected farm-level supply (primary) and demand (derived) curves for floral hemp during the boom of floral hemp production in 2019 at the farm gate level.

In this figure, DF1 is the hypothetical demand curve for floral hemp NDWF is expected to see when making planting decisions for the 2019 crop. This derived demand was broadly signaled to producers by the hemp processing companies soliciting producers and offering contracts. The supply curve, SF1, is the hypothetical primary supply curve for floral hemp expected when NDWF was making 2019 planting decisions. Price, PF1, and quantity Q1 is the equilibrium price and quantity, representing the expected price floral hemp producers were facing when deciding to plant floral hemp in 2019.

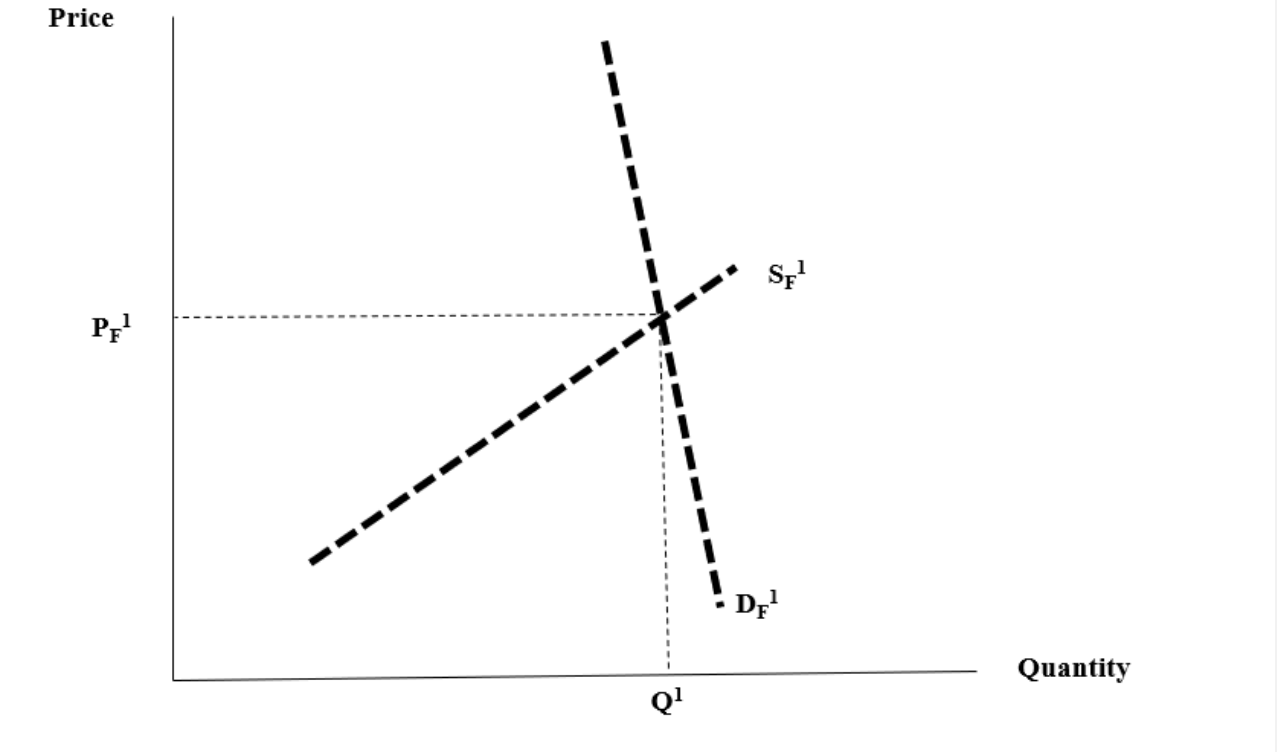

Figure 5: Expected Primary Supply and Derived Demand for Floral Hemp.

Figure 6 shows the actual primary supply of SF2 that was seen in the 2019 floral hemp market. More floral hemp producers entered the floral hemp sector in 2019 than had been anticipated. While many producers had contracts to grow with processors, there were still non-contracted acres planted as well. Further, given the novelty of this reintroduction, true production yields were estimates at best. This uncertainty potentially resulted in more hemp being produced by contracted growers to ensure contracted amounts were met in addition to the non-contracted amounts grown. As a result, the actual primary supply in the floral hemp market is represented by SF2. Under this shift in supply, the equilibrium quantity would shift to Q2 and the price at PF2. However, demand expectations were highly exaggerated at the farm gate level, processing facilities could not process at their projected capacities, and many processors began to shutter their businesses. The demand for floral hemp at harvest resembled DF2 and not DF1, and both had a lower equilibrium price at PF3 and quantity at Q3 than NDWF anticipated when making cropping decisions (Figure 7).

Processors started experiencing financial difficulties with cash flow as venture capital investment dried up. At the same time, some processors could honor their contracts (at the price of PF1), but many contracts, like that of NDWF, were not honored. This led to an excess supply as shown in Figure 8.

Producers who were able to sell their product sold at the much lower price of PF3, and those producers like NDWF who were not able to sell their product or wanted to hold off in hopes of future price increases put it into storage for future sales, increasing the supply of floral hemp in future periods. NDWF decided to return to corn production in 2020 and sold the hemp in storage from 2019 for a loss in 2020.

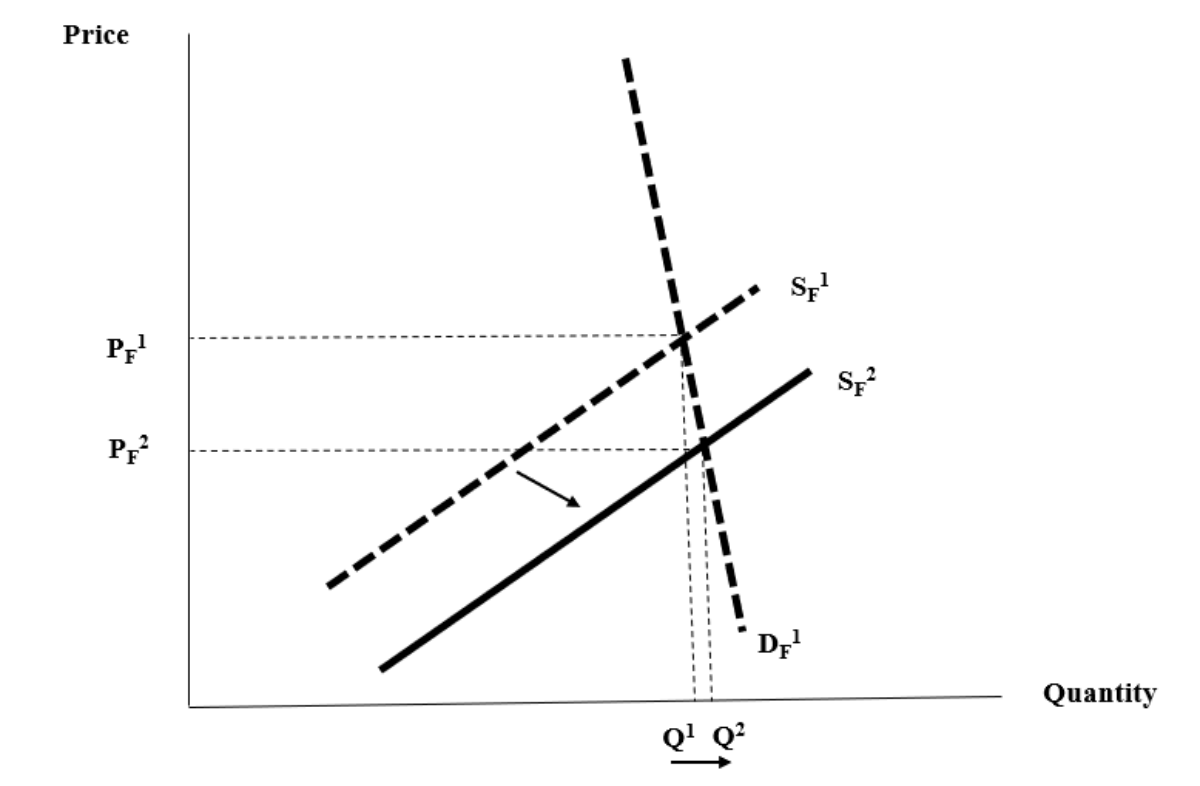

Figure 6: Expected Primary Supply Shift for Floral Hemp 2019.

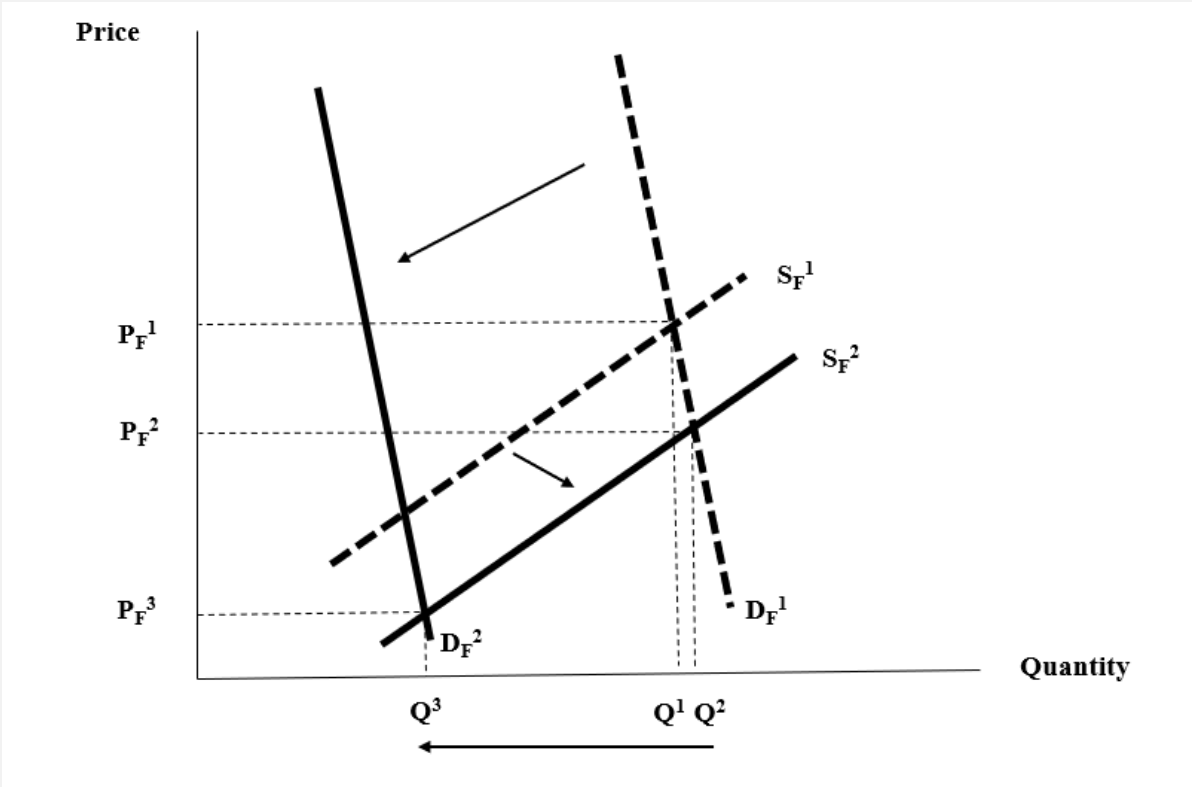

Figure 7: Expected Primary Supply and Demand for Floral Hemp 2019.

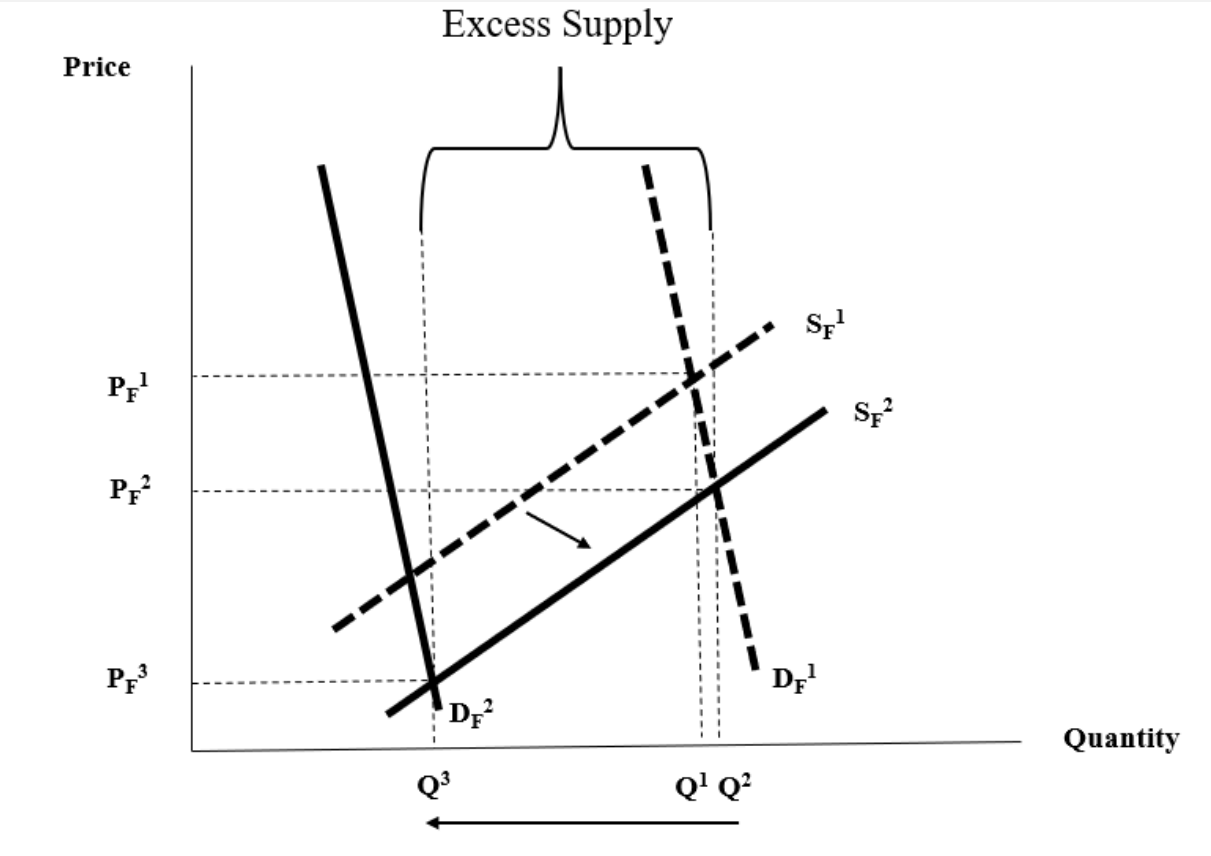

Figure 8: Excess Supply of Floral Hemp 2019

It is important here to realize that what was happening at the farm gate level differed significantly from what was happening at the retail level at the same point in time. The events of derived supply and primary demand are not depicted in Figure 5 because the supply and demand curves for the retail sector would look different and move differently than the shifts depicted here. At the retail level, demand for CBD products was increasing, and as a result, retail prices were also increasing for CBD products. This is the opposite of what producers at the farm gate level were experiencing. Given the novelty of the reintroduction of hemp, primary demand and derived demand were seemingly decoupled in 2019. How could it be that the retail-level demand was increasing for products containing CBD while the demand decreased at the farm level? The answer to this question is that market signals (i.e., growing contracts and generalized interest from the farming public and entrepreneurs alike) motivated the production of floral hemp in great excess of demand. DF1 was really the demand at planting time. However, as the "hemp space" evolved between planting time and harvest time, the real demand for floral hemp resembled DF2. Quite simply more hemp was grown for CBD purposes than the retail market needed, even with increasing demand for CBD products at the retail level. In reality, farmers such as NDWF contributed to significantly oversupplying floral hemp for CDB. NDWF, along with thousands of other farmers, experienced how markets develop and evolve. In the case of floral hemp, the evolution was quick and drastic.

5 Conclusion

Hemp is an emerging agricultural market in the United States and provides a canvas to examine the complexities of equilibrium when introducing a new product. The uncertainty surrounding this crop has led to wide swings in farm gate prices, with a high of $4.25 per percent CBD in 2019 and a low below

$0.50 per percent CBD in 2021 (Figure 3). In this case study, we explored, through a supply and demand analysis framework, the situations that led to these drastic price swings and how these were seen on a larger scale at the farm gate instead of the retail markets for CBD. This case study also highlights the importance of the intersection of policy and politics in an applied economic sense. Studying basic supply and demand under the umbrella of hemp production provides many exciting aspects for discussion and grasping these concepts. Unlike many other commodities, the newness of hemp and the regulatory framework surrounding the good adds to what producers and retailers are experiencing and provides teachable concepts that are not readily available in the commodity markets. The hemp industry is still evolving as it works toward stability and commoditization. As a result, research is needed to fully understand and illustrate some of the concepts discussed in this paper. However, with the information reasonably known about the hemp industry in the United States, using it as the basis for understanding applied agricultural economics is a perfect fit.

6 Discussion Questions

1. Put yourself in the shoes of NDWF. You are one of the owners and are interested in producing hemp floral material for CBD production. It is right before the big CBD boom. How would you determine price expectations and profit potential in a market with limited market information?

2. Does the existence of contracts available change your opinion on how NDWF could/should engage in the price discovery process?

3. Given the lessons learned during the height of the CBD boom, discuss the risk(s) associated with contracts in agricultural production.

4. What is the term for a market with only a few buyers but many sellers? Is this state of the market system a concern for producers? Why? Does the market's maturity change your response regarding this market system?

5. Assume the Food and Drug Administration (FDA) publicly announces support of CBD and its purported health benefits. What would happen to supply and demand in the short term? Graph the changes in supply and demand.

6. Assume the FDA outlaws CDB for over-the-counter purchases. What would happen to supply and demand? Graph the changes to the supply and demand curves.

7. In Figures 5 and 6, there are farm-level supply and demand curves. Is the demand curve elastic or inelastic? What about the supply curve? Discuss the implications that the elasticity of supply and demand have on the farm gate floral hemp market and how it impacts price changes with the shifts described in this case study.

8. If you were a policy maker and you read this case study, what policy changes would you recommend if your goal was to support hemp farmers and ranchers in the future?

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References

Adjemian, M., B. Brorsen, W. Han, T. Saitone, and R. Sexton. 2016. *Thinning Markets in U.S. Agriculture: What Are the Implications for Producers and Processors?* (Economic Information Bulletin No. 148). Washington DC: U.S. Department of Agriculture, Economic Research Service.

Angel, T. 2018. "Here's Mitch McConnell's New Hemp Legislation Bill." *Forbes,* April 12. https://www.forbes.com/sites/tomangell/2018/04/12/heres-mitch-mcconnells-new-hemp-legalization-bill/?sh=7938bc85b5bf.

Bell, C. 2020. "The Long and Winding History of Industrial Hemp." *Times Recorder,* May 31. https://www.zanesvilletimesrecorder.com/story/news/local/2020/05/31/long-and-winding-history-industrial-hemp/5255671002/.

Dwyer, S.D. 1998. "The Hemp Controversy." *Kentucky Law Journal* 86:1143–1181.

Falkner, A., J. Kolondinsky, T. Mark, W. Snell, R. Hill, A. Luke, J. Shepherd, and H. Lacasse. 2023. "The Reintroduction of Hemp in the USA: A Content Analysis of State and Tribal Hemp Production Plans." *Journal of Cannabis Research* 5(17):1–12.

Hill, R., B. Jablonski, L. Van, M. Wang, B. Patalee, J. Shepherd, M. LeRoux, T. Mark, D. Mooney, and D. Thilmany. 2023. "Producers Marketing a Novel Crop: A Field-Level View of Hemp Market Channels." *Renewable Agriculture and Food Systems* 38:E22. doi:10.1017/S1742170523000145.

Hudock, C. 2019. "Ask Our Experts: How Much Hemp Does the U.S. Import Every Year?" *New Frontier Data,* November 29. https://newfrontierdata.com/cannabis-insights/ask-our-experts-how-much-hemp-does-the-u-s-import-every-year/.

Johnson, R. 2018. *Hemp as an Agricultural Commodity* (CRS Report RL32725).

Washington DC: U.S. Congressional Research Service.

Kentucky Department of Agriculture. 2023. "Goals and Growth of the Hemp Program." https://www.kyagr.com/marketing/hemp-overview.html.

Lacasse, H. and J. Kolodinsky. 2022. "Chapter 14-Consumer Trends and The Consumption of Industrial Hemp-Based Products. *Industrial Hemp* : 367-381. https://doi.org/10.1016/B978-0-323-90910-5.00011-7

Levy, D., F. Chaloupka, E.N. Lindblom, D.T. Sweanor, R.J. O'Connor, C. Shang, and R. Borland. 2019. "The U.S. Cigarette Industry: An Economic and Marketing Perspective." *Tobacco Regulatory Science* 5(2):156–168. https://doi.org/10.18001/trs.5.2.7.

MacDonald, J., and C. Burns. 2019. "Marketing and Production Contracts Are Widely Used in U.S. Agriculture." *Amber Waves Magazine,* July 1. https://www.ers.usda.gov/amber-waves/2019/july/marketing-and-production-contracts-are-widely-used-in-us-agriculture/.

MacKeen, D. 2019. "What Are the Benefits of CBD?" *New York Times,* October 16. https://www.nytimes.com/2019/10/16/style/self-care/cbd-oil-benefits.html.

Mark, T., and J. Shepherd. 2019. "University of Kentucky Industrial Hemp Budgets." University of Kentucky. https://agecon.ca.uky.edu/files/hemp_and_cdb_enterprise_budgets_6_18_2019.xlsx.

Mark, T., J. Shepherd, D. Olson, W. Snell, S. Proper, and S. Thornsbury. 2020. *Economic Viability of Industrial Hemp in the U.S.: A Review of State Pilot Programs* (Economic Information Bulletin No. 217). Washington DC: U.S. Department of Agriculture, Economic Research Service.

PanXchange. Hemp Price Report. Subscription Data. 2022

Reed, D. 2021. "How Much U.S. Farmland Should Be Dedicated to Hemp Crops?" *CBD Today,* March 2. https://www.cbdtoday.com/how-much-u-s-farmland-should-be-dedicated-to-hemp-crops/.

Schnitkey, G. 2018. "Corn and Soybean Budgets for 2018 and 2019: Low Returns Ahead." *Farmdoc Daily* (8):146. Urbana-Champaign IL: Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign.

Shepherd, J., P. Goeringer, and T. Mark. 2021. "Hemp Contract Considerations." *Economic and Policy Update* (21):3. Lexington KY: Department of Agricultural Economics, University of Kentucky.

Shepherd, J., and T. Mark. 2019. "The Economics of Hemp Production in Kentucky." *Economic and Policy Update* (19):3. Lexington KY: Department of Agricultural Economics, University of Kentucky.

Tomek, W., and K. Robinson. 1990. *Agricultural Product Prices,* 3rd. ed. New York: Cornell University Press.

U.S. Department of Agriculture. 2019. *2017 Census of Agriculture. U.S. Summary and State Data. Vol 1.* Washington DC: U.S. Department of Agriculture, National Agricultural Statistics Service.

U.S. Department of Agriculture. 2023. "Crop Acreage Data." Washington DC: U.S. Department of Agriculture, Farm Service Agency. https://www.fsa.usda.gov/news-room/efoia/electronic-reading-room/frequently-requested-information/crop-acreage-data/index.

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