

Research Statement

Jared Hutchins

My research focuses on microeconomic questions relevant to the agricultural sector as well as the role and formation of cooperatives. My research on these topics opens up new and exciting possibilities for follow-up research important to academic audiences and the stakeholders of Land-Grant Universities. Three specific areas for my future research agenda include dynamic decision making in agriculture, technology adoption and gains from genetic improvement, and the role of cooperative institutions in rural development.

Dynamic Decision Making in Agriculture

In my job market paper, **"Milked for all they are worth: Analyzing livestock mortality costs in a dynamic discrete choice model,"** I analyze cow culling behavior as an asset replacement problem using a structural econometric model to explain early replacement rates. I use this model to estimate the cost of "unplanned mortality" and the parameters of the dairy cow production function from the data. I find early replacement is explained by both large mortality costs, about 1,300-1,400 dollars, and a steeper cow production function than traditionally assumed. My paper is one example of a growing literature studying dynamic decision making with agriculture data sets at a finer level than previously available. I also used this novel dataset to analyze short- term supply response in dairy in my working paper with Brent Hueth, **"Supply response in dairy farming: Evidence from monthly, cow-level data."** While the literature often finds a very small short-run supply response, our results show a larger short-run supply response than found in previous studies. Our results suggest that small elasticities from previous, farm-level studies can be explained by observing milk production at the herd level rather than the animal level. Rapidly expanding use of "precision agriculture" technologies (e.g., remote real-time sensing, drone reconnaissance, robotics) opens many exciting new opportunities to study dynamic decision making in agriculture at a level not previously possible. Tools and techniques used in my dissertation research have prepared me well to research this area. For immediate future research, the model in my job market paper would be extended to include the extensive decision, that is the decision to increase or decrease capacity, as well as a more formal model of technological progress. This would also allow the model to analyze counterfactuals such as how changes in price would change the size distribution of dairy farms together with their replacement policies. Similarly, I plan to extend my research on animal-level supply response to explore some of the interesting patterns of price expectation formation our analysis uncovered.

Technology Adoption and Genetics

My work has also addressed technology adoption in agriculture, with a specific emphasis on genetic technology and the emerging literature on heterogeneous returns to technology adoption. I have co-authored a paper with Brent Hueth, an economist, and Guilherme Rosa, an animal scientist, **"Quantifying heterogeneous returns to genetic selection: Evidence from Wisconsin dairies,"** which is forthcoming as an NBER conference book chapter. Our paper aimed specifically to estimate the distribution of returns to adopting genetics with higher fat or protein. We found that there is significant heterogeneity in the returns to the adoption of higher protein or fat genetics across farms and animals, with some groups even receiving a very low return; these low returns are below what is predicted from quantitative genetics models, suggesting that herd environment

and management may confound the returns to this technology. Similarly, I looked at technology adoption in the context of Senegal with my joint work with animal scientists Karen Marshall and Ayao Missohou, **“Willingness to pay for breeding technology: Evidence from a survey of Senegalese dairy farmers.”** We analyzed a willingness-to-pay survey of Senegalese farmers to determine barriers to adoption of artificial insemination, and found respondents valued AI less when it was provided by the government rather than the private sector. Following up on my paper on heterogeneous returns, I have been building a relationship with the Animal Genetics Improvement Laboratory (AGIL) of the USDA and the Council on Dairy Cattle Breeding (CDCB) to delve more into how technology adoption of genetics has influenced farm productivity. A natural extension of my current work is to develop a model of farmer technology adoption to study the behavior of farmers choosing technology that has multiple traits (productivity, health, fertility, etc.), as is the case in livestock genetics. My work studying genetic technology adoption on livestock operations has amply prepared me to expand research on this particular topic. Research into how farmers choose animal and plant genetics is most often done using stated preference methods, whereas my work has made vital in-roads to analyzing these topics using revealed preference, a crucial contribution to this literature.

The Role of Cooperative Institutions

I am interested in exploring the role of cooperatives in rural development, especially using cliometric techniques. I have found in my research that understanding the historical roots of our own country’s cooperative institutions has greatly expanded my understanding of the role of cooperatives. I have produced a working paper with Brent Hueth on the Farm Credit System, **“Production credit associations and agricultural productivity change in the United States, 1920-1940”** where we study the effect of expanding production credit by the Farm Credit System on agricultural productivity. Our work showed that counties near these cooperative banks experienced growth in crop yields and tractor adoption. Previously, no work had documented any effects the Farm Credit System had on agriculture productivity or adoption of inputs. To continue understanding the role of the Farm Credit System in rural development, my co-author and I have digitized more than 1,000 annual bank reports of these associations from the National Archives and aim to study the formation and operation of these banks. The Dairy Herd Improvement Associations (DHIA) have similarly been important to the U.S. economy, but have not been studied as an economic institution. In my work with AGIL and CDCB, one of our goals is to be able to analyze the value-added of the Dairy Herd Improvement Associations to demonstrate their importance to the development of the dairy sector. This research is particularly important in determining whether current investments in cooperatives are justified from a public policy perspective.

In my future research, I will continue to study these historical examples while also expanding into research addressing the role of cooperatives more generally. For example, marketing cooperatives have also been of critical importance to the development of Californian agriculture; these cooperatives, in particular, are a result of Asian immigrants in the early 20th century who brought human capital and institutional knowledge which facilitated their formation. The story of marketing cooperatives in California is important to both economic history and labor economics, two areas that I aim to grow in.