AgBioForum, 18(3): 239-242. ©2015 AgBioForum.

Introduction: Essays in Honor of Wallace Huffman

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This introduction relates how Wallace Huffman went from a farm boy in southern Iowa to Iowa State University and the University of Chicago, and then brought the human capital approach of T.W. Schultz and D. Gale Johnson back to Iowa State. We also show how Huffman's work in human capital, rural labor markets, technological innovation, returns to research and development, and behavioral economics are influencing current research in these areas, as was evident in the papers presented in this collection.

Key words: human capital, rural labor, immigration, technology, research and development, food safety, genetically modified organisms, behavioral experiments.

Wallace Huffman grew up on a farm near Batavia, Iowa. His schooling began in a one-room schoolhouse. His parents were not highly educated, but they appreciated practical knowledge. Although his father did not have a high school diploma, Wally characterized him as someone who could figure out anything mechanical, electrical, or architectural that needed to be done on the farm. He excelled in designing and building new farm buildings and, less so, machinery. Wally excelled at school and his mother encouraged him to consider college. His father gave him enough resources for one quarter at Iowa State (ISU), so he entered a two-year program in farm operations with an aim to return to farming. He performed so well that he was given a three-year scholarship, and that is how he came to take sufficient economics, mathematics, and statistics courses to qualify for graduate school.

Encouraged by ISU Economics Professor Raymond Beneke, Wally went on to the University of Chicago where he worked with former Iowa State faculty T.W. Schultz and D. Gale Johnson. They spurred his interest in human capital and technology adoption in agriculture, topics he investigated in his dissertation and for much of his academic career. Later, Schultz spurred his interests in estimating returns to public investments in agricultural research and extension.

After two years at Oklahoma State, Wally returned to Iowa State as a faculty member in 1974. He now serves as Charles F. Curtiss Distinguished Professor of Agriculture and Life Sciences and Professor of Economics. At ISU, he supervised 28 doctoral dissertations and 14 Master's theses.

Wally was a valued advisor at ISU. Graduate students felt as if they had won a special award when he agreed to direct their thesis research. To have someone with Wally's scholarly record and academic pedigree take interest in you felt like a big step and turned out to be a career-changing event for many of his students. Wally was always generous with his time, curious about his students' topics, current on the literature, and an inspiring example of the importance of choosing a research question that matters, working hard, and pursuing your question until you learned something new. His own dedication to research and creating knowledge inspired his students to achieve more than they thought possible. His students are found in universities, research institutes, and public and private leadership positions around the world. Many of his former students, colleagues, and fellow researchers came to Ames, Iowa on August 1, 2014 to present papers in Wally's honor. This edition of *AgBioForum* presents a subset of those papers.

The articles in this special issue are compiled into three research areas in which Wally has made major contributions.

Labor Economics Applications: Rural Labor Markets and Health

As summarized in the article in this issue by Artz et al., Wally's research at Iowa State was a continuation of themes advanced by his University of Chicago mentors T.W. Schultz and D. Gale Johnson when they were on staff at Iowa State University. Even before the Great Depression, there was evidence that too many people were farming or working in rural areas, which was depressing rural incomes relative to urban incomes. Schultz and Johnson predicted that a rural-to-urban shift in population would start to equalize rural and urban incomes, a prediction that was born out over the next 70 years. Huffman (1980), Huffman and Lange (1989), and

Tokle and Huffman (1991) explored one mechanism that rural labor can access urban markets—off-farm labor. Huffman and his colleagues showed that farm husbands and wives make their decisions jointly, with the most educated farmers and wives being the most likely to use off-farm income to enhance their incomes. Off-farm labor is most common in areas with stronger nonfarm labor markets and in closer proximity to urban areas. Consequently, farm size can be smaller in regions with greater opportunities for off-farm labor.

Torok and Huffman (1986) explored the role of international trade in fresh fruits and vegetables on cross-border migration of agricultural workers. If there are no trade restrictions on these commodities, the product could be grown in Mexico with available low-cost labor. Limitations on importation of Mexican produce—whether from trade restrictions, quality regulation, poor Mexico harvests, or high costs of transport—will increase illegal migration from Mexico. Martin's article in this issue reviews the implications of increased restrictions on legal in-migration of seasonal agricultural labor from Mexico. These restrictions do not hurt grain farmers in the Midwest because their operations are capital intensive, but they do adversely affect farms in the western United States that are heavy users of farm labor. Consequently, it has been difficult to forge agreements on immigration reform because not all agricultural states are facing inadequate supplies of farm labor. Colson, Melo, and Ramirez present another difficulty for US producers in labor-intensive farm commodities—workers who start in agriculture switch to nonfarm, higher-paying jobs. Easier access to legal H2-A seasonal agricultural visas would more likely keep seasonal migrant workers in agriculture rather than risking illegal labor in other sectors.

Most recently, Huffman and his colleagues have examined how food policy affects public health outcomes such as obesity (Huffman, Huffman, Rickertsen, & Tegene, 2010). Schuring's article analyzes this question from the labor supply perspective, asking whether rising female labor supply has affected the quality of home production and the availability of healthy options. Some had suggested that children would eat more processed foods if their parents did not have the time to prepare balanced meals. Schuring finds the exact opposite—children of working women are less likely to be obese. Moreover, women in jobs with more intense time requirements are even less likely to have overweight or obese children. Women who need to manage time efficiently also manage household production more efficiently.

Production Economics Applications: Technical Change and Agricultural Productivity

Huffman showed that more educated farmers allocate resources more efficiently in response to changing yield responsiveness to fertilizer and fluctuating input and output prices (Huffman, 1977). More educated farmers are also quickest to adopt new technologies (Abdulai & Huffman, 2005; Chen, Huffman, & Rozelle, 2009), both in developed and developing countries. Across several papers, Huffman was able to show that education and extension are substitutes so that less-educated farmers will adopt new technologies more readily and will allocate resources more efficiently when they can acquire knowledge from extension agents or from nearby farmers.

Huffman and his colleagues have also studied how research and development (R&D) affects input use and output productivity compared to input and output prices (Huffman & Evenson, 1989, 2008). They found that public agricultural R&D was complementary with farm size and more specialized livestock production, but that driving the move toward capital-intensive crops was rising labor cost relative to capital and input costs. Related to the drive toward mechanization was the relative abundance of land compared to labor. Schmitz and Moss present a highly innovative and informative review of many of these instances where capital replaced labor in crop production. Smith and Kurtz demonstrate how the development of new hybrids has affected corn yields. They suggest that genetic improvements explain 75% of yield gains since 1930. They then discuss how international agreements on intellectual property will influence future yield growth. Shumway, Cowan, and Lee test whether research expenditures are allocated so as to address rising input costs. Results are particularly consistent with the hypothesis that rising relative fertilizer prices increase relative research allocations toward fertilizer.

Huffman and Evenson (2008) also addressed the issue of returns to public and private innovations. They conclude that the returns to public and private R&D in agriculture technology have been substantial. McCunn and Huffman (2000) showed that these returns are not confined to the state in which the research is based. Spillovers of benefits from agricultural research across states tend to equalize productivity growth across regions. Hence, benefits from agricultural research are spread broadly. Zilberman, Kaplan, and Wesseler examine the benefits of deploying GM technologies relative

to the risks. They compare rapid deployment to slower or more cautious adoption of GM technologies. They find that the benefits of rapid deployment far outweigh the benefits of delaying deployment.

Experimental Economics Applications: Food Quality and Safety

A paper by Melton, Huffman, Shogren, and Fox (1996) represents an early application of experimental auction markets to measuring consumer willingness-to-pay for food quality. While that study was instrumental in demonstrating how such tools could be applied to established markets, experimental markets were even more critical for evaluating consumer acceptance of new products. This is particularly true for products made from genetically modified (GM) commodities that are subject to divergent prior knowledge or opinion regarding food safety, environmental impacts, or scientific research. Huffman, Shogren, Rousu, and Tegene (2003) represents an early application to measure consumer willingness-to-pay for GM labeling, while Rousu, Huffman, Shogren, and Tegene (2007) measured the value consumers place on verifiable information regarding the safety of GM products.

Rousu's article in this special issue presents an assessment of the findings to date from the application of experimental markets to GM Foods. Chen, Alfnes, and Rickertsen show how negative information can reduce the value consumers attach to ecolabels that are supposed to reassure consumers about the environmental or food-safety standards applied to fish farming. Grebitus, Jensen, Roosen, and Sebranek show that German consumers value packaging technologies, such as treating food with carbon monoxide that extends shelf life and maintains coloration of ground beef, even though the technologies have been disallowed by German regulations aimed at benefiting consumers. Strzok and Huffman show that it is more educated, wealthier, and more environmentally conscious consumers that have a greater willingness-to-pay for certified organic labeling. Ironically, while producer education increases the adoption of new technologies, consumer education is correlated with a preference for traditional products, a puzzle that awaits future application of experimental methods to GM foods.

Acknowledgements from Wally Huffman

Wally Huffman would like to acknowledge many people involved in both the seminar and this special issue.

Wally greatly appreciates the effort made by all of those who attended the three-day event, including the paper presenters, symposium participants, and everyone who came to the reception and dinner. In addition to the articles published in this collection, there were terrific talks and papers from Mark Lange, Zhuo Chen, Gregory D. Wozniak, Awudu Abdulai, Rick Barichello, Brian D. Wright, GianCarlo Moschini, Harvey Lapan, Keith Fuglie, Yu Jin, Zheng Xu, Richard Nehring, and Eldon Ball. Thanks also to Nicholas Kalaitzandonakes and Lauren Jackson of *AgBioForum* for their help in editing and publishing these articles.

Wally extends his particular appreciation for the generous financial contributions made by Mark Lange, Michael Rahm, Peter Orazem, the ISU College of Agriculture and Life Sciences, and the ISU Department of Economics. Alan McCunn did a great job organizing an afternoon tour and lecture at Pioneer Hi-Bred at the Johnson Research Center. Georgeanne Artz, John Schroeter, Janet Horsager, and Patti Cotter served as mini-bus or airport shuttle drivers. Nicole Caviris, Janet Horsager, Kristin Senty, Zhixia Ma, and the Gateway Hotel staff helped with making sure the event ran smoothly.

Mark Freeland (a friend from college days) and his wife Diane, Greg Traxler (a former doctoral student), Wayne Fuller (a long-time colleague and friend), Connie Peterson (Wally's sister) and her husband, and Paul Peterson (Wally's nephew) and his wife attended some or all of the events. Wally's daughter Nadia delayed celebrating her birthday, which fell on the day of the main event, and his wife Sonya helped host out-of-town guests at their home for a backyard barbeque.

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