

YANAN JIA

Michigan State University

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EDUCATION

Michigan State University, East Lansing, MI *Aug. 2017 - Expected May 2022*
Ph.D. in Agricultural, Food, and Resource Economics
Ph.D. in Economics (Dual Major)

Committee: Robert Shupp (Chair), Hongli Feng, David A. Hennessy, Benjamin Bushong, Jeffrey M. Wooldridge.

Guanghua School of Management, Peking University, China *Aug. 2015 - Jun. 2017*
M.S. in Finance

Yuanpei College, Peking University, China *Aug. 2011 - Jun. 2015*
B.S. in Economics,

FIELDS OF INTEREST

Agricultural Economics, Environmental Economics, Biological Economics, Health Economics, Behavioral Economics

WORKING PAPERS

“Will Tests Lead to More Informed Antibiotics Use? An Application in Veterinarian Diagnostic Decisions” **Jia, Y.**, H. Feng, and D.A. Hennessy

“Economics of Informed Antibiotic Management Under the Veterinary Feed Directive” **Jia, Y.**, D.A. Hennessy, and H. Feng

WORK IN PROGRESS

“Bt Corn, Insecticide Use, and Resistance Time Trend in the United States” **Jia, Y.**, H. Feng, and D.A. Hennessy

“Do Large Dairy Farms Use More Antibiotics?” **Jia, Y.**, H. Feng, and D.A. Hennessy

PUBLICATIONS

“Dairy Sector Consolidation, Scale, Automation and Factor Biased Technical Change: Working through Get Big or Get Out.” Feng, H., D.A. Hennessy, **Y. Jia**, M. G.S. McKendree, and C. Wolf. *Choices*, 33(4th Quarter 2018).

SELECTED PRESENTATIONS

(* indicates other presenting authors)

“Will Tests Lead to More Informed Antibiotics Use? An Application in Veterinarian Diagnostic Decisions” (with H. Feng*, D.A. Hennessy) Center for Behavioral and Experimental Agri-environmental Research 2022 Virtual Seminar Series, expected March 2022.

Chongqing University Young Scholars Forum, Virtual Conference, November 21, 2021

“Will Tests Lead to More Informed Antibiotics Use? An Application in Veterinarian Diagnostic Decisions” (with H. Feng, D.A. Hennessy) 2021 AERE Summer Conference, Virtual Conference, June 2 - 4, 2021

“Assessing the Efficiency of Veterinary Feed Directive in Reducing Antibiotics Use” (with H. Feng*, D.A. Hennessy) 2021 AERE Summer Conference, Virtual Conference, June 2 - 4, 2021

“Bt Corn, Insecticide Use, and Resistance Time Trend in the US” (with H. Feng, D.A. Hennessy) 2021 AAEA Annual Meeting, Austin, TX, August 1 - 3, 2021

“Assessing the Efficiency of Veterinary Feed Directive in Reducing Food Animal Antibiotics use.” (with H. Feng, D.A. Hennessy) International Society for Economics and Social Sciences of Animal Health, Virtual Conference, November 11 - 13, 2020

“Do large dairy farms use more antibiotics?” (with H. Feng, D.A. Hennessy) 6th World One Health Congress, Virtual Conference, October 30 - November 3, 2020.

“Bayesian Information Processing and Livestock Sector Antibiotics Administration” (with H. Feng, D.A. Hennessy) AAEA annual meetings, Virtual Conference, August 10-11, 2020.

“Test or Treat? Understanding Demand for Antibiotics in Dairying.” (with H. Feng, D.A. Hennessy) AAEA annual meetings, Atlanta, GA, July 21 - 23, 2019.

“Alternative to Managing Antibiotics Demand in Dairying” (with H. Feng, D.A. Hennessy*) One Health and Food Safety conference, Bonn, Germany, September 18 - 19, 2018.

“Toward Understanding On-Farm Demand for Antibiotics” (with H. Feng, D.A. Hennessy*) ERS & Farm Foundation Workshop on Challenges to Changing Antibiotic Use in Food Animal Production, Thursday, National Press Club, Washington, DC, September 6, 2018.

“What Drives Dairy Farmer Antibiotic Treatment Decisions” (with H. Feng, D.A. Hennessy) AAEA annual meetings, Washington, DC, August 5 -7, 2018.

“Alternative Approaches to Managing Demand for Antibiotic Treatment in Dairying.” (with H. Feng, D.A. Hennessy*) One Health and Food Safety 5th International One Health Congress, Saskatoon, Canada, June 22 - 25, 2018.

“What Drives Dairy Farmer Antibiotic Treatment Decisions?” (with H. Feng, D.A. Hennessy) Graduate Research Symposium, Department of Agricultural, Food, and Resource Economics, Michigan State University, March 29 - 30, 2018

TEACHING EXPERIENCE

Guest Lecturer, *Applied Microeconomics I (AFRE900A)* Feb. 2021

This lecture introduces Bayesian Learning Model and Deviations from Standard Bayesian Updating with a real-world example of clinical diagnosis.

FIELD WORK

A Survey of Veterinarians Decision Making in Animal Disease Management 2020-2021
Main contributor to survey design and distribution, participants recruitment, and data analysis.

China Health and Retirement Longitudinal Study(CHARLS) Jun. 2013-Aug. 2013
Interviewer

WORK EXPERIENCE

Research Assistant at Michigan State University for Dr. Hongli Feng and Dr. David Hennessy
Fall 2017-Summer 2021

Research Assistant at Renmin University of China for Dr. Zhong Tang Jun 2016-Aug. 2016

Research Assistant at Peking University for Dr. Shuanglin Lin Mar. 2014-Aug. 2014

AWARD AND FELLOWSHIP

Dissertation Completion Fellowship	Spring 2022
Research Assistantship from Department of AFRE	Fall 2017-Summer 2021
AAEA Conference Travel Grant from Department of AFRE	2018, 2019
Pass with Distinction in Econometrics qualified exam	2018
Top Prize Winner of the 21st Challenge Cup of Peking University.	2013

TECHNICAL STRENGTHS

Stata, ArcGIS, Mathematica, Nlogit, Ngene, Gauss

REFERENCES

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RESEARCH ABSTRACT

Economics of Informed Antibiotic Management Under the Veterinary Feed Directive.

Regulations restricting on-farm antibiotic use have expanded over the decades to preserve antibiotic effectiveness, a biological common good. Commencing 2017 the U.S. Veterinary Feed Directive (VFD), a command-and-control regulatory instrument, has mandated veterinarian oversight of medically important antibiotic administrations in animal agriculture with intent to promote more informed antibiotic use and surveillance and likely reduce the amount used. We assess the effectiveness and efficiency of VFD with a modelling framework of antibiotic administration choices. When a farmer is faced with a suspected infection case, in the absence of VFD, she has three choices 1) administer without information, 2) call a veterinarian first, or 3) perform a self-test before doing either. Now with VFD, the first is forbidden and a veterinarian must decide whether antibiotics are appropriate. We show that although VFD may reduce the farmers antibiotic use it may not support social optimum. Whether VFD results in antibiotics overuse or underuse depends on context. VFD may cause knock-on distortions in test markets such as excessive demand for veterinary services. We also consider alternative incentive-based policies. Noteworthy is that the impact of self-test subsidies on antibiotic consumption depends on antibiotic cost. Antibiotic demand decreases (increases) with a self-test subsidy given low (high) antibiotic cost. The context-dependent effect of this subsidy arises because tests are information goods and more information can have varied consequences. A subsidy on the other information good, veterinary services that include test information as well as professional advice, unambiguously decreases antibiotic demand.

Will Tests Lead to More Informed Antibiotics Use? An Application in Veterinarian Diagnostic Decisions.

Effective in 2017, the U.S. Veterinary Feed Directive (VFD) requires that a veterinarian must decide whether medically important antibiotic treatment is appropriate. VFD places antibiotic stewardship largely into the hands of veterinarians, relying on their understanding of the animal disease, resistance biology and implications for animal welfare. This paper investigates the assumption underpinning VFD regulation. Specifically, we focus on how effectively veterinarians manage information

when making antibiotic recommendations. We model a diagnosis as a belief updating process where veterinarians form their initial probabilistic beliefs (priors) about animal health conditions based on initial inspections and revise their beliefs in response to test results (new information). Bayes rule prescribes efficient information management, while deviations from Bayesian updating are well documented in literature. We set up experiments in veterinary clinical settings in a survey and asked 241 veterinarians to make probabilistic assessments of animals having diseases. Consistent with findings in lab economic experiments, veterinarians are biased in managing information in diagnosis. They underuse both priors and test information. In addition, veterinarians respond asymmetrically to test results that confirm their priors and test results that contradict their priors. Antibiotic prescriptions based on biased diagnoses may be inefficient and contribute to antibiotic resistance development. These findings point to opportunities for antibiotic stewardship promotion through information and education programs directed at healthcare professionals. Furthermore, the training program should be heterogeneous for veterinarians in different practice areas. Large animal veterinarians who underuse priors more severely should practice placing more weights on priors, while small animal veterinarians who underuse information from test results should receive intensive training in that regard. Given the evidence that experienced veterinarians deviate further from efficient information management than their less experienced colleagues, regular training may be necessary and beneficial for promoting diagnosis accuracy and antibiotic stewardship.

Bt Corn, Insecticide Use, and Resistance Time Trend in the United States.

This project investigates the impact of biological control decisions in corn production on chemical insecticide use in the United States. Genetically engineered crops that produce Bt (*Bacillus thuringiensis*) toxins can control some key pests and have been adopted widely. Specifically, Cry3Bb1 toxin was first commercialized in 2003 as an effective control for a key pest in maize in the United States. Using a unique dataset, we investigate how Cry3Bb1 toxin adoption can affect chemical insecticide use by adopters and non-adopters over years. The identification strategy is generalized difference-in-difference. The empirical results show that adopters substitute away from chemical insecticides which are targeted at corn rootworm. However, applied chemicals intended for rootworm on Cry3Bb1 corn gradually increases in the years after adoption. The upward trend in insecticide use is consistent with insect resistance development. For non-adopters, the amount of corn rootworm targeting insecticide use decreases as well, suggesting that non-adopters also benefited. This finding is consistent with the well-known conclusion in literature that Bt adoption brings a suppression effect on local pest population. Furthermore, insecticide use by non-adopters decreases over years and finally arrives at a plateau, suggesting that non-adopters learned slowly that there was less need for applied insecticides. The findings should be of interest to those concerned with the ecosystem services provided by insects, integrated pest management (IPM) regulators and practitioners, as well as others interested in the stewardship of biological resources.

Do Large Dairy Farms Use More Antibiotics?

Global milk production has undergone drastic change in recent years. Smaller farms have been under severe stress, squeezed between low milk prices and high feed prices. The resulting shakeout has led to high exit rates among smaller farms. However, overall production has expanded modestly as a few larger farms have taken advantage of scale economies to expand sharply. Animal agriculture sector structure is both very important and poorly understood as a factor in determining how the sector links with society at large, including consequences for One Health outcomes. In this project, we conducted a survey to ask about antibiotic usage patterns in three U.S. Great Lakes Region states (Wisconsin, Minnesota, Michigan) and explore how ongoing structural changes in the dairy sector affect the aggregate antibiotic use. Among farms which use antibiotics, the growing larger farms seem to be more efficient at antibiotic management. However, larger farms are less likely to be operated without antibiotics. Also, farms which have expanded in recent years or intend to expand in the near future, are more likely to use antibiotics for therapeutic purposes (i.e., non-organic farms). Therefore, to determine the aggregate effect of current structural changes in the dairy sector, future research is

warranted.