

Beasts of the Field?

Ethics in Agricultural and Applied Economics*

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Abstract

Ethical issues in scientific research are neither new nor unique to agricultural and applied economics. Ongoing changes to research practices and recent media attention to the profession have raised new ethical problems, but also created opportunities for new solutions. In this paper, we discuss ethical issues facing the field of agricultural and applied economics and propose potential ways in which the profession can address these issues. We divide our discussion into two topics. First are ethical issues that arise during the collection, management and analysis of data. Second are ethical issues faced by researchers as they formulate, fund, and disseminate their research. We pay special attention to issues of data dredging or *p*-hacking and potential ethical issues arising from interaction with the media.

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A man without ethics is a wild beast
loosed upon this world.

Albert Camus

1 Introduction

In the nearly three decades since Breimyer (1991) reviewed the history of scientific practice within the discipline, agricultural and applied economists continue to see themselves as scientists, “diverse and... disputatious,” but fundamentally devoted to the scientific principle (Breimyer, 1991, p. 243). However, the field lags behind other scientific disciplines in addressing both “science and formal scientific practice” (Breimyer, 1991, p. 251), meaning both the what and the how of scientific inquiry. Peterson and Davis (1999) raised this concern two decades ago, yet only a few departments have followed their recommendation to include research ethics as a part of applied economics training. The recent media attention to the profession has provided a useful reminder that agricultural and applied economics is not immune from the ongoing credibility crisis in science.¹ The coverage suggests that those of us in the profession need to provide greater consideration of the issue of ethical research practices, scientific misconduct, and our responsibilities to ethical behavior in our work.

In this paper, we focus on ethical issues arising from the scientific practice of agricultural and applied economics research. Competing interests within the field, over tenure, promotion, publication, funding, etc., create incentives for researchers to engage in scientific misconduct.² Though, as individuals, one might adhere to the guidelines regarding research misconduct, as a profession we do relatively little to train future generations, or discuss the intricacies of misconduct, or the ways in which economists must make ethical decisions in research every day. Our objective is to formalize the ongoing discussion of the ethical issues facing the profession and to propose potential ways in which the profession can address these issues.³ In this our objective is similar to Kennedy

¹That said, the credibility crisis seems to have been going on since 1971, when the phrase first shows up in the academic literature (Schick, 1971). Recent examples of popular media coverage of the crisis in the profession can be found on [Slate](#) and [Buzzfeed](#), among others.

²Scientific misconduct, as defined by U.S. governmental science agencies and most research universities, includes acts of wholesale fabrication of experimental or survey data, falsification of data, and plagiarism (Wible, 2016).

³DeMartino and McCloskey (2016b) have recently edited a handbook on ethical issues in economics. While we find the handbook an extremely useful resource, the editors have targeted a broad audience, and thus many of the ethical issues specific to agricultural and applied economists are only briefly touched on.

(2002), who attempted to formalize behavior in applied econometrics. Many of these topics are not new, nor are we the first to propose some of the recommendations that follow. The re-examination of the state of research ethics in agricultural and applied economics is motivated by the current cultural climate, but such periodic reflections are necessary, regardless of contemporary headlines. Since the inception of what is now known as the Agricultural and Applied Economics Association (AAEA), there has been acknowledgment that establishing ethical norms for the profession is an important component of the organization's mission (Breimyer, 1991). The purpose of this article is to contribute to that mission and to again bring to mind the ethical challenges that agricultural and applied economists face at every stage of research.

We begin by reviewing the existing conversation regarding research ethics as it exists in journals affiliated with the regional, national, and international associations of agricultural, applied, and resource economists. We then discuss ethics and ethical behavior under two main topics. The first topic is data collection and analysis, including study design and implementation, data management and cleaning, and data analysis and econometrics. Increased computing power has reduced the marginal cost of running additional regressions, necessitating self-censorship of the results a researcher presents, and does not present, to the world. The second topic is the funding and findings of research, including the dissemination of results in both academic publications and mainstream media settings. Research dissemination has changed rapidly in recent years and little has been published regarding the ethical implications of these changes for the profession.

While we endeavor to provide a thorough discussion of current ethical issues, our coverage is far from exhaustive. We take as given the arguments of Breimyer (1991) and Peterson and Davis (1999) that ethics is a relevant concern to agricultural and applied economists. We also do not cover issues of plagiarism as there seems to be little disagreement within the profession regarding this topic.⁴ As a further note of caution, we do not claim to have the solutions to all the issues which we raise here, nor do we claim to be arbiters of ethical behavior in the profession. While we address several sensitive issues and provide suggestions for dealing with them, we present these ideas as a stimulant for discussion in the profession, not the final word. The hope is that this

⁴ RePEc tracks incidences of plagiarism and deals with them accordingly.

paper, like those before it, serves to encourage economists to engage in a more open discussion of the ethical principles and practical guidelines for conducting research. For without such principles, we are just beasts of the field.

2 Current Views and the Ongoing Conversation

Agricultural and applied economics has had its own conversation regarding research ethics, tailored to the unique research questions of agricultural, resource, and other applied fields within economics.⁵ Conversations regarding research ethics frequently take place on blogs, such as the [blog maintained by Marc F. Bellemare](#) and the blog maintained by Andrew Gellman. They also occur as part of the scientific program at association meetings, among journal editors, and association board meetings.⁶ Ethical issues have also been part of external reviews of social science research within the Consultative Group on International Agricultural Research (CGIAR) (CGIAR, 2004; Barrett et al., 2009). While this conversation has been active in a variety of settings, the published record of late is dormant.

To gain a sense of the present state of formalized discourse on research ethics in the field, we conducted a systematic search of the 14 journals affiliated with one of the regional, national, or international associations (see Table 1). We divided the process into three phases: searching, screening, and coding. The first phase involved searching the databases containing issues of the journals going back to inaugural issues.⁷ We conducted a Boolean search using the following terms: “ethic*”, “research practice*”, and “research misconduct*”.⁸ Phase two involved screening the positive results from the search. The screening strategy was to read through titles, abstracts, and keywords, and to apply inclusion and exclusion criteria to determine whether or not the article

⁵Latsis (1980), Maki (2008), and Sen (1999) are instructive examples of the broad ranging discussion of ethics in social science and economics, though this is not an exhaustive list. The *Review of Social Economy* recently dedicated an entire special issue to the topic of “Scientific misconduct and research ethics in economics.” For more information on this special issue, see Yalcintas and Wible (2016).

⁶As examples, the 2019 AAEA sessions at ASSA will include an invited paper session on “Ethics in Agricultural and Applied Economics Research” and the 2015 annual meeting of AAEA saw a track session on the topic of “Incorporating Ethics in Economic Analysis.”

⁷Given the frequent changes in publisher and the (slightly) less frequent changes in journal name, not all back issues of a journal are accessible within the same database.

⁸We also tested terms including “research” AND “practice” and “research” AND “misconduct”.

was within the purview of our investigation. In the final phase, we read papers that passed the screening and coded these as either related or relevant.⁹

The term “ethic*” appears in 657 articles across all 14 journals. Most articles containing variations on the word ethic refer to work ethic or ethical issues around food.¹⁰ Many articles mentioning “ethics” discuss ethical behavior within the population being studied, such as Burness et al. (1983) on the ethics of allocating water rights. Forty-two articles were coded as related and these tended to discuss ethics within field work and experiments (Barrett and Carter, 2010; Colson et al., 2016; Ehmke and Shogren, 2010; Rousu et al., 2015). Some articles simply mention that the study has received approval from an ethical review board but do not discuss the nature or necessity of ethical review. Both Barrett and Carter (2010) and Goetz et al. (2018) discuss “researchers’ ethical” obligations to research subjects in an experimental setting and when using data from corporations such as Facebook and Google. Some presidential addresses in *AJAE* touch on the topic of ethics broadly, including Pinstруп-Anderson (2005), Goodwin (2015), McCluskey (2016), and Swinton (2018).

Only three of the 657 articles were coded as relevant. They include Breimyer (1991) and Peterson and Davis (1999) in *AJAE* and Debertain et al. (1995) in *JARE*. Breimyer (1991) examines agricultural economics in the context of science, scientific investigation, and the scientific method. The focus of the paper is on moral decisions within the research process and the ethical implications of work, rather than the ethical process of work itself. Similarly, Peterson and Davis (1999) criticize “modern” applied economists and the belief that economic research can be value-free, having little to do with ethics. The authors observe that “ethics might be defined as the search for the right thing to do given the relevant facts of the matter...Applied economic analysis is often central in shedding light on the facts of the matter” (Peterson and Davis, 1999, p. 1174). Both articles build a strong case for economics as a science that should be guided by ethics, but offer few suggestions regarding what those guiding principles should be. Finally, Debertain et al. (1995) does more to offer guiding principles in research, addressing guidelines to specific research situations faced by

⁹ *Relevant* indicates direct relation to our topic of interest while *related* indicates an indirect or tangential relationship to our topic of interest.

¹⁰ One seems to include a typo, in which the authors refer to “ethic” origin.

agricultural economists. The authors issue a call for action in the profession, to generate a dialog among agricultural economists about the need for additional, appropriate methodological guidelines in research. We affirm and reissue that call.

Searching for terms related to “research practice” produced nine results of which only one was related: a case of approval by an ethics board for the research (McCorkle, 2007). There was also only one paper deemed relevant, an article by Ruttan (1983), which discusses the moral responsibility of agricultural research. His focus is primarily on the ethical implications of scientific research, such as improving the productivity of tobacco cultivation or employment displacement from technical change.

Terms related to “research misconduct” returned no results. We revised our search to find articles containing ““research” AND “misconduct””, which yielded six results. In all cases, these articles discuss misconduct among the population being studied, not misconduct by the researcher. Examples include misconduct among members of community forest programs (Das, 2012), misconduct among sharecroppers (Kassie and Holden, 2007), misconduct among sheep farmers (der Merwe et al., 2017), or misconduct related to price fixing (Smith, 1990). No agricultural and applied economics association seems to have ever published an article in any of the 14 journals that contains reference to research misconduct.¹¹

These searches, and their somewhat limited results, suggest the need for a formalization of the conversation and a re-examination of ethics in the profession, both to provide guidance for ongoing work, as well as to give reference to future scholars in field.

3 Data: From Design to Management to Analysis

Ethical concerns regarding quantitative analysis have culminated in a replication crisis.¹² As De-wald and Anderson (2014) argue, replication failure may be the most significant research ethics issue facing social science. Agricultural and applied economists need to consider how serious the repli-

¹¹We also searched [AgEcon Search](#), which acts as a repository for back issues of a number of association journals plus smaller, unaffiliated journals, conference papers, and student theses and dissertations. No papers were found from searching for “research misconduct” nor ““research” AND “misconduct””.

¹²Like the credibility crisis, the replication crisis has been going on for years; at least since Leamer (1983).

cation crisis is within the discipline. Compared to the past, researchers now face greater scrutiny of their work, but also have a larger suite of tools to identify, document, and verify their results.

3.1 Study Design and Implementation

Following revelations regarding the Tuskegee Syphilis Study, the U.S. Congress established the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research in 1974.¹³ In 1978, the Commission issued the Belmont Report, which defined the basic principles underlying the U.S. system of ethical research. The report was designed to address mistreatment of human subjects in the process of research and summarizes ethical principles and guidelines, focusing on respect for persons, beneficence, and justice (United States, 1978).

While the Belmont Report does not directly specify rules for application in economics research, the profession has adopted many of the rules and regulations. The presence of Institutional Review Boards (IRBs) or Research Ethics Boards (REBs) at universities have ensured the *de jure* application of the ethical principles of the Belmont Report in economics research. Following these regulations, it is now common practice for applied economists within Western universities to obtain approval of study design and survey instruments prior to fieldwork and obtain informed consent from study participants. Less formally, there are a number of field guides written to assist economists, and social scientists in general, in designing research projects in accordance with review board standards and broader ethical research behaviors (Burgess, 1984; Barrett and Cason, 1997; Oliver, 2003; Israel and Hay, Israel and Hay; Comstock, 2013; Alderman et al., 2016; Duflo and Banerjee, 2017). As a result of the Belmont Report and ethical review board standards, study design and survey implementation are perhaps the most discussed ethical issue in economics.

Beyond adhering to the basic principles laid out in the Belmont Report, economists have made several innovations upon these standards. We differ from medical and psychological fields in notable ways, including avoiding deception in experiments (Colson et al., 2016). Further, many economists are concerned about potential and indirect harm that may arise when individuals are

¹³The Syphilis Study at Tuskegee refers a United States Public Health Service survey, in which unethical practices were conducted in a long-term study of “untreated” syphilis in a group of black men. The researchers withheld effective treatment from these men and many died as a result.

randomly denied access to a program. There is an ongoing conversation within agricultural and applied economics on experimental design and ethical behavior, including papers from Barrett and Carter (2010), Colson et al. (2016), Ehmke and Shogren (2010), and Rousu et al. (2015).¹⁴ As a result of institutional regulations there is general consensus regarding a set of best practices among economists.

However, limits exist to the current state of ethical review of study design and implementation. First, review boards remain primarily an institutional innovation of Western universities, meaning that a significant percentage of economists engaged in research have no requirement to obtain ethical approval of new studies.¹⁵ The lack of review boards is particularly acute within the CGIAR system. Just eight of the 15 CGIAR centers require research involving human subjects to be cleared by an ethical review board.¹⁶ Second, the *de jure* adherence to ethical principles does not imply the *de facto* existence of ethical behavior. The falsified, and subsequently retracted, LaCour and Green (2014) study regarding attitudes towards marriage of same-sex couples highlights that the ethical considerations of social science researchers does not stop with clearing ethical review. The retracted LaCour and Green (2014) study was published in *Science* in December of 2014 and was retracted five months later when it emerged that the data used was “not collected as described” (Broockman et al., 2015, p. 2). As Broockman et al. (2015) demonstrate, the lead author, Michael LaCour, claimed to have hired a survey company to collect data and pay participants, though the survey company denied ever conducting the work and no organization ever claimed to have provided the necessary funding. Ultimately, it emerged that LaCour engaged in large scale data falsification by introducing random noise into an existing data set and then manipulating the data to produce the desired results. This blatant falsification occurred despite certification by Donald Green, the senior author, that he had examined the raw/original data, in accordance with the *Science/AAAS*

¹⁴See Glennerster (2017), Alderman et al. (2016), and Glennerster and Powers (2016) for a wide discussion of the current ethical issues facing economists running field experiments.

¹⁵Economists working within the government, at least within the federal governments of Canada and the United States, are subject to stringent ethical review, although the mechanisms differ from those within universities.

¹⁶These include the International Center for Tropical Agriculture (CIAT), the Center for International Forestry Research (CIFOR), the International Maize and Wheat Improvement Center (CIMMYT), the International Food Policy Research Institute (IFPRI), the International Institute for Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI), the International Water Management Institute (IWMI), and WorldFish.

Authorship Form and Statement of Conflicts of Interest.¹⁷

While unethical behavior cannot be completely eliminated, it is possible to incentivize ethical behavior. In order to increase the probability that agricultural and applied economists adopt the basic principles of the Belmont Report, all professional associations should require that manuscripts submitted to their journals involving human subjects obtain approval from ethical review boards. Presently, of the 14 journals affiliated with one of the regional, national, or international associations, only five explicitly require ethics approval or have an acknowledgment of human subject research ethics (see Table 2).¹⁸ To further facilitate ethical review of all projects in the field that involve human subjects, the CGIAR System Management Board should standardize ethical review procedures and establish a review board to be used by all CGIAR centers. This would allow for substantial economies of scale over individual centers hosting their own review boards. As an added assurance, one of the associations should establish an ethical review board. The board would operate as a standing committee and provide ethical review, on a fee-for-service basis, to association members who work at institutes that do not provide the service.¹⁹ Finally, funding organizations should insist on ethical review of all their studies involving human subjects and provide funding, where necessary, to cover the costs of obtaining ethical review.

Table 3 includes these, and other recommendations suggested in this article. These recommendations can further shift the norms in the profession regarding study design and implementation. However, these recommendations, like all recommendations in this article, are only incentives for ethical behavior. Ultimately, ethical behavior relies on trust and an adherence to an imperfectly enforced social contract.

3.2 Data Management and Cleaning

Data collected ethically may still be subject to unethical behavior in their handling and management. Unlike clearly defined principles in the Belmont Report, ethical consideration about the

¹⁷For a synopsis, consider the [New Yorker's 2015 piece](#) (Konnikova, 2015).

¹⁸Three journals which have no such mention do reference the [Committee on Publication Ethics \(COPE\)](#).

¹⁹A reviewer astutely pointed out that the incentives for ethical review boards affiliated with a professional association would be very different from review boards at universities or CG-centers. At the later, the institution's funding is always on the line if review boards "go rogue." For a review board at an association, social and reputational incentives would need to be relied on to ensure ethical standards are followed.

process of cleaning data is, like the process itself, often messy. While the ethical problems of the behavior behind the retracted LaCour and Green (2014) are clear cut, the practicalities of working with data can present fuzzier ethical questions. Replication is often championed as a solution to the problem of inconsistent or unethical data cleaning choices. Yet, “replication failure is common to both honestly conducted science and to episodes of misconduct” (Wible, 2016, p. 27).

A simple case in point is that of rounding numbers. In their seminal study, Diaconis and Freedman (1979) demonstrate how rare it is that a table of rounded percentages will sum to 100. As the authors note, “failure to add to 1 occurs so frequently that if many sums of proportions add to exactly 1 in a reported set of tables, one begins to suspect the reporter of forcing the proportions to add to 1” (Diaconis and Freedman, 1979, p. 359). Tables frequently summing to one is highly unlikely to occur naturally, yet we doubt that many economists would accuse authors of “offending” tables of research misconduct or demand a retraction or even a correction of the associated paper. The question then is, in the absence of a bright-line rule regarding what is and is not ethical in the cleaning and presentation of data, how should the profession decide upon and communicate to its members what qualifies as acceptable behavior?

We propose three complementary approaches to clarifying the ethical issues in data cleaning that contribute to the replication crisis. First is the creation of a journal for replication studies in agricultural and applied economics. Debertain et al. (1995) proposed such a journal for the field in 1995. While we believe that replications should be published in the journal that published the original study, given the reluctance of flagship journals to create space, a replication journal could create competition among journals for these studies.²⁰ A replication journal sponsored by a coalition of associations would defray costs and provide the largest possible pool for potential support. Such a journal would communicate that our field continues to be at the forefront of empirical economic research. And, the prospect that any given study could be subject to replication would incentivize researchers to maintain better records from study design to data cleaning to final regressions. Further, and most importantly, in order to incentivize researchers to undertake replication studies,

²⁰Currently the on-line only *International Journal for Re-Views in Empirical Economics (IREE)* is the only journal dedicated to publishing replication studies. *The Replication Network* maintains a list of all journals that explicitly state they publish replication studies. These include, relevant to agricultural and applied economists: *Empirical Economics*, *Experimental Economics*, and the *Journal of Applied Econometrics*.

journals should enforce a norm of citing replication studies alongside the original study. As Coffman et al. (2017) write, such a citation system would “provide an incentive to produce replication work through the currency of our industry: citations” (Coffman et al., 2017, p. 43).

The second approach to addressing these ethical issues is the teaching and training of students. While an MSc or PhD econometrics course may include a conversation about data manipulation, most graduate students, and present day professionals, do not receive formal training in ethical treatment or cleaning of data sets. This contrasts to the hard sciences, where research ethics courses are frequently a prerequisite to lab or field work. We reviewed the course requirements for 25 departments in the United States and Canada that grant PhDs in agricultural, applied, environmental, or resource economics.²¹ Only two departments, Applied Economics at Oregon State University and Agricultural Economics at Purdue University, requires a course in responsible conduct of research.²² A third department, Agricultural and Applied Economics at University of Georgia, requires that students complete an online IRB training course before they are granted a degree. An additional nine departments have some course on the books that covers research methods. A review of the catalog descriptions of these courses leads us to believe that their primary purpose is not to teach ethical practice but rather to instruct students on how to identify and structure good research questions and to develop relevant research approaches.²³ That leaves 14 of 25 departments without any apparent formalized ethical training at the departmental level.

Based on this evidence, a clear way in which the profession can address potential ethical misconduct

²¹We selected the top ranked departments in the U.S. and Canada, based on the current ranking by [IDEAS at RePEc](#) as of April 2018. The departments include: Alberta, UC-Berkeley, UC-Davis, Colorado State, Connecticut, Cornell, Florida, Georgia, Guelph, Illinois, Iowa State, Kansas State, Kentucky, Maryland, Michigan State, Minnesota, North Carolina State, Ohio State, Oklahoma State, Oregon State, Purdue, Texas A&M, Utah State, Virginia Tech, and Wisconsin. The review of degree requirements and course catalogs was completed in March of 2018.

²²The course at Oregon State is GRAD 520: Responsible Conduct of Research. The catalog description states that the course “covers 10 topics in responsible conduct of research: ethical decision making; human subjects; animal welfare; data acquisition, sharing and ownership; research misconduct; conflicts of interest; authorship; peer review; mentor/trainee responsibilities; and collaborative science. Weekly writing assignments. Useful to all students who conduct scholarly activity. Provides transcript-visible training in research ethics relevant to the Graduate Learning Outcome established by Faculty Senate to be able to conduct scholarly and professional activities in an ethical manner.” The course at Purdue is AREC 692: Workshop in Applied Economics. The catalog states that the course is “designed to help prepare students for PhD-level applied economic research. The goal is to explain what constitutes a desirable research program for a PhD student and to provide guidance on research design, ethical conduct of research, and preparation of the PhD prospectus document and presentation.”

²³These nine departments are at UC-Berkeley, UC-Davis, Minnesota, Purdue, Ohio State, Kansas State, Colorado State, Oklahoma State, and Guelph.

in the treatment and cleaning of data is to require graduate students to receive training on research ethics prior to undertaking research. These could either be new courses taught in the department, revisions to the curriculum of existing courses on research methods, or requirements to take research ethics courses already on offer in the college or university.

Our third and final proposal to address unethical or unscrupulous data cleaning is normalizing the preservation of data and code. With current versions of statistical software, the preservation of such information is simple. Economists should treat their R-script, m-file, do-file, or other code like a lab notebook, as in biology or chemistry. These files should record and preserve the details of decisions made from the reading in of the raw data to the production of tables and graphs for the final paper. This information could also be submitted during the publication process, similar to the existing requirements at many journals to submit final data and the code to produce the published results. We again reviewed the 14 journals in Table 2 for replication requirements stated in submission guidelines. Of these, only two (ERAE and JAERE) have a strict requirement of data and code submission. Seven journals do not require but “encourage” submission of data and code. The remaining journals do not mention relevant policies.

These proposals, similar to the mandate for ethical review, will not eliminate research misconduct. In particular, the submission of “lab notebooks” to demonstrate adherence to ethical practices can generate informational overload, and in the extreme could actually be used to hide misconduct among the tens of thousands of lines of code. The process of cleaning messy data is itself messy, precluding any hard and fast rules. Rather, the goal of our proposals, and the goal of the profession, should be to establish a set of best practices and ethical norms in regard to the cleaning and treatment of data as a way to minimize the opportunity and to reduce the incentives to engage in research misconduct.

3.3 Data Analysis and Econometrics

The rapid advancement of computing and technology has left ethical considerations behind: many regressions and statistics are now completed at nearly zero marginal cost (Mayer, 2016). The economic researcher must then decide which subset of results to present to the world. This necessary

self-censoring makes it difficult for those outside the process to determine where along the spectrum of sloppy to disingenuous to unethical any given questionable choice lays. Ultimately, what constitutes unethical behavior in data analysis can be even more obtuse than what constitutes unethical behavior in data cleaning.

The main ethical issue in data analysis and econometrics is that of data dredging or *p*-hacking. This is the practice of combing through data to uncover patterns that can be presented as statistically significant, without first devising a specific hypothesis as to the underlying causality. Recent popular press coverage of economic research practices has been censorious. BuzzFeed News (Lee, 2018) critically quotes a social scientist at Cornell encouraging a colleague to “work hard [and] squeeze some blood out of this rock.” In an equally critical passage, the article describes a graduate student who “analyzed the data over and over until she began ‘discovering solutions that held up.’” The BuzzFeed article, and other articles in the popular press, view both approaches to data as invalid science and potentially unethical. While there is an overwhelming impression within the field that *p*-hacking is not an appropriate practice, as researchers called upon to review the work of others, it can be unclear where what Leamer (1978) calls “*ad hoc* inference” ends and *p*-hacking begins.

It is also unclear, despite the jeremiads within the popular press, just how big the problem of data dredging is within economics.²⁴ As Olken writes, there is the impression that researchers “...are inherently biased and data mine as much as possible until they find results” (Olken, 2015, p. 74). In a recent study, Brodeur et al. (2016) attempted to quantify the problem of specification mining, as represented in papers published in the *American Economic Review*, the *Journal of Political Economy*, and the *Quarterly Journal of Economics*. The authors found that between 10 and 20 percent of all tests that produced *p*-values in the range of 0.0001 to 0.05 were inflated, and actually fell within the range of 0.10 and 0.25. While the percentage of inflation bias was non-negligible, Brodeur et al. (2016) characterized the size of the bias as relatively circumscribed (1.4

²⁴In a recent opinion piece published in *PNAS*, Fanelli (2018) argues the problem is minor, at least within the quantitative sciences as a whole. A number of recent papers in the *AER P&P* discuss replication issues in a number of economic sub-fields. See Anderson and Kichkha (2017); Berry et al. (2017); Chang and Li (2017); Coffman et al. (2017); Duvendack et al. (2017); Hamermesh (2017); Höfler (2017); Sukhtankar (2017).

to 2.2 standard deviations).²⁵ How should agricultural and applied economists contextualize these numbers? Should researchers be concerned at their magnitude, and, if so, how should p -hacking be addressed?

An increasingly common solution to data dredging and p -hacking is pre-registration or pre-analysis plans (Casey et al., 2012). These plans require researchers to prepare in advance a detailed description of primary and secondary outcome variables to test, precise variable definitions, criteria for including or excluding observations, model specification, covariates, and sub-group analysis. The AEA maintains a [social science registry](#) in which researchers can submit pre-analysis plans for randomized control trials.²⁶ Typically, a researcher would register his or her plan and then carry out the study. Data is analyzed in accordance with the registered plan and whatever results are found are reported. Interested parties can check the pre-registered plan and see that the final results were not p -hacked.

Pre-analysis plans are a simple solution to a difficult to identify problem. However, there are several limitations. First is that the existing registries are designed for lab and field experiments. As Brodeur et al. (2016) and Vivalt (2017) note, lab and field experiments suffer from the least inflation bias in the set of papers they studied. Thus, existing registries may not be set up to accommodate pre-analysis plans for the observational studies that may need them the most (Burlig, 2018). A second limitation is that restricting analyses to pre-specified hypotheses can have large costs. The most concrete cost is simply that it is difficult and time consuming to fully specify papers in advance. This is especially true for quasi-experimental studies that rely on observational data. Potentially more costly is that pre-specifying the analysis may divert attention away from the type of exploratory analysis that often yields unexpected but valuable insights (Leamer, 1978). Olken (2015) summarizes the potential costs of relying on pre-analysis plans to reduce unethical behavior in data analysis:

This argument does not imply that researchers running any given trial would be better

²⁵Brodeur et al. (2016) are very clear that their sample of papers, coming from three of the top economics journals, may not be representative of inflation bias in economics as a whole or in sub-field, such as agricultural and applied economics. Although beyond the scope of this article, evaluating published papers in each associations' journals for ranges of statistical significance would be a valuable undertaking.

²⁶Additionally, the International Initiative for Impact Evaluation (3ie) maintains the [Registry for International Development Impact Evaluations \(RIDIE\)](#) for research to be conducted in low- and middle-income countries.

off by not pre-specifying analysis for that trial. But it does suggest that if journal editors were to restrict themselves to publishing studies based on the limited, pre-specified, confirmatory parts of analysis, and relegating exploratory analysis to second-tier status, a substantial amount of knowledge would be lost. (Olken, 2015, p. 72).

Recent work by Anderson and Magruder (2017) and Fafchamps and Labonne (2017) develop split-sample methods that allow researchers to create a pre-analysis plan while also maintaining freedom to conduct exploratory analysis.²⁷ Beyond the limits to *ad hoc* inference that pre-analysis plans impose, they may not be the most efficient way to attenuate unethical behavior.

Recognizing the inherent weaknesses of pre-analysis plans, we make four recommendations for addressing data dredging and *p*-hacking within the profession, two at the individual-level and two at the journal or association-level. First, we reiterate the need for all researchers to maintain “lab notebooks” that record and preserve the details of decisions, from reading in the raw data to producing tables and graphs for publication. These should be submitted with manuscripts as part of standard replication policies at journals. Second, researchers must be more transparent and systematic in assessing significance when results come from a search over many models. Specification search is nothing new to economists (Leamer, 1978; McCloskey, 1985; Heckman and Singer, 2017), yet recent advances in economics, probability, and statistics provide a number of new methods to account for data mining. These include corrections for testing multiple hypotheses (Romano and Wolf, 2010; List et al., 2016), loss functions to penalize incorrect predictions (Simonsohn et al., 2015; Harvey et al., 2016), and systematic approaches to supplementary analysis, pushing economists to think beyond point estimates and standard errors (Athey and Imbens, 2017; Athey et al., 2017). As the volume of data and the speed of computing continue to grow, agricultural and applied economists need to increase the transparency of the empirical analysis.

Beyond individual-level actions to attenuate data dredging, journal editors and professional associations should be proactive in addressing these ethical issues. Our third recommendation is that one of the applied economic associations establish and maintain a hypothesis registry that can accommodate both experimental and observational studies. Unlike a registry of pre-analysis

²⁷For a brief summary of both approaches, see the World Bank’s Development Impact blog (Ozier, 2017).

plans, hypothesis registries contain all attempted projects (Coffman and Niederle, 2015). Instead of limiting the number of regressions run to those defined in the pre-analysis plan, a hypothesis registry documents all regressions that are run. The goal is to solve the “file drawer problem” in which early, exploratory, or non-significant regressions are relegated to the researcher’s file drawer. Finally, our fourth recommendation is that association journals should consider accepting registered reports, a concept currently being piloted by the *Journal for Development Economics (JDE)*.²⁸ *JDE* now allows authors to submit empirical projects before results are known. The projects undergo review like any other paper and, if accepted, are published like any other paper once results are known.

The goal of these recommendations is to remove incentives and reduce opportunities for inflation bias, thereby attenuating the incentives to engage in data dredging. As quantitative social scientists, agricultural and applied economists should be on the forefront of developing, promoting, and adopting these techniques.

4 Research: From Funding to Findings to Dissemination

While research has never occurred in a vacuum, research today is increasingly available to all nature of interested parties around the world. As Hamermesh (2018) observes:

One’s research can, for better or worse, influence broad public attitudes and/or public policy, and it can affect how businesses and individuals organize their activities and make decisions. Moreover, these effects may be direct or indirect, as our research filters through others’ research and through the media. (Hamermesh, 2018, p. 117)

Throughout the research process, economists must ask themselves: what are the ethical implications not only of the research questions asked but of the answers to those questions? In a world where research in its various stages of completion can be easily accessed and quickly disseminated, the researcher may have no control over who sees the research, how it is interpreted, or how it is used.

²⁸The *Journal of Accounting Research* and the *Review of Financial Studies* have begun similar pilot projects. We thank an anonymous reviewer for bring this fact to our attention.

4.1 Funding Questions

Good research is founded upon the asking of good research questions. Ideally, researchers looking to maximize the quality of their research output want the broadest search space possible in which to look for good research questions. However few economists, whether in government, in non-government research organizations, or in the academy, face an unbounded search space. Some of these constraints are simply due to feasibility but others are political. The need for public or private monies to fund research arguably presents the biggest constraint on which questions we ask, and which questions we leave unasked. While one would prefer to think that good research questions will attract funding, incentives exist wherever research is conducted that can lead to economist capture (Zingales, 2013).

In the same way that economists discuss regulatory capture, economists themselves are subject to capture by funding agencies. This is especially true for agricultural and applied economists, who tend to engage in empirical work with direct policy implications funded by government agencies. As Zingales (2013) writes, the same forces that contribute to regulatory capture also contribute to economist capture. These include career concerns, such as publication pressure; information needs, including how we obtain data; environmental or social pressure; and relationship asymmetries, including asymmetries in information but also in power and influence. Research funding, regardless of its source, always presents an opportunity for economist capture. The agendas at government agencies change with the political winds, determining both the budgets for broad research areas and the specific research proposals that will receive funding. More recently, as public funding has become a smaller portion of research budgets (Mervis, 2017), academics and researchers are looking more and more to public-private partnerships. While private organizations have long been a source of funding for research in agricultural and applied economics, the rising amount of private funds, and thus private interests, in the profession is of potential concern.

Currently, economists in the field have little guidance in this area. Should one only accept money when given without explicit “strings” attached? What if these “strings” are suggested? And then, what organization does not have implicit interests? Producer associations and agribusinesses surely have their own interests, but even research organizations that engage in basic science, like those in

the CGIAR, have an interest in ensuring the promotion of their mandate crops.

Conflict of interest and/or funding disclosures in publication address some of these concerns by alerting readers of potential bias in the research due to the source of funding. Nine of the 14 journals require authors to sign disclosure statements (see Table 2). Yet, more can be done. Current disclosure statements focus on positions held or financial support received by the researcher and members of her or his family. Following Zingales (2013), we suggest journals revise disclosure statements to include disclosure of the type of agreement or terms of reference with the funding agency. Additionally, disclosure statements should explicitly ask for relevant personal financial stakes in the research, such as personal or family ownership of a farm when the research concerns the Farm Bill. Submission of this broad relationship disclosure statement would be in addition to, and complementary to, mandatory submission of “lab notebooks” or data disclosure statements documenting exploratory analysis.

However, those with something relevant to disclose have an incentive to misrepresent their relationship with funding organizations. While the penalties for failing to disclose relevant information are clear at most journals, what is unclear is how journals can verify the accuracy of a disclosure statement. Disclosure statements provide only a partial solution to the problem of economist capture.²⁹ As Zingales concludes, “the most important remedy to reduce capture is awareness by economists that this risk exists” (Zingales, 2013, p. 126).

4.2 Implication of Findings

Even if there are no ethical considerations associated with the conception of a research question, the findings of the study may have ethical implications. This raises the question: to what extent should agricultural and applied economists be concerned with those ethical implications?³⁰

Peterson and Davis (1999) write that “many modern applied economists seem to see their activities as value-free objective analyses that have little to do with ethics” (Peterson and Davis, 1999, p. 1173). The economist poses a research question and brings the tools of quantitative

²⁹See Thompson (2016) for a more detailed discussion of the pitfalls and potential solutions presented by the standard disclosure statement.

³⁰Boettke and O’Donnell (2016) provide an illuminating discussion of the social responsibilities of economists. Stiglitz (2016) provides useful advice for when the economist is called on to play the role of policy adviser.

analysis to arrive at the solution. The process of arriving at the solution is then reviewed by peers in the profession and, if found acceptable, the solution is presented to the world. What the world does with that solution is not the economist's concern. While economics is quantitative by nature, that does not mean that the quantitative answers that economists produce are, as Breimyer wryly writes, "pure and their message easily read" (Breimyer, 1991, 243). Or, as Mark Twain put it: "there are three kinds of lies: lies, damned lies, and statistics" (Twain, 1906).³¹

An illustrative example of this issue is the working paper by Doleac and Mukherjee (2018) studying the impacts of Naloxone.³² The authors find that Naloxone access may unintentionally increase opioid abuse through two pathways. First, Naloxone access saves the lives of active drug users, who continue abusing opioids. Second, by reducing the risk of death per use, Naloxone makes opioid use less risky and perhaps more appealing. Though the authors do not recommend that Naloxone use should be discontinued, their results could be used to justify such a position. If communities then decided to not supply first responders with Naloxone, this would, in a real way, cost human lives. Regardless of an individual's position on the distribution of Naloxone, it is clear that the quantitative results Doleac and Mukherjee (2018) arrive at have ethical implications. Their results have no easy message and could be used to justify positions on both sides of the debate.

Should Doleac and Mukherjee (2018) refrain from sharing their findings? This seems far from the best course of action. But what should researchers do when faced with the quandary that their work could cause harm? Unlike medical professionals, upon graduation, economists take no oath to "first, do no harm." But, as researchers whose work is often an input in policy debates, agricultural and applied economists should adopt the normative position of Freeman (2016): "first, tell no untruth." At the very least, those in the profession should ask the positive question: "what harm could my work do?"

Ultimately, the ethical implications of one's research is an issue with which each individual researcher must struggle. This returns us to the discussion of Breimyer (1991) and Peterson and Davis (1999): agricultural and applied economics is a science guided by ethical considerations.

³¹Though the quote is often attributed to Mark Twain, Twain himself attributes the phrase to Benjamin Disraeli.

³²Naloxone or Narcan is a medication used to block the effects of opioids. It is often applied in cases of overdose.

Economists ask questions that affect people’s lives and livelihoods. In asking these questions, researchers must grapple with the ethical implications of their findings. We acknowledge that on this issue we do not pose any solutions and recognize that profession-wide standards may not be set, but instead, we encourage those in the field to personally and collectively grapple with these concerns.

4.3 Research Dissemination

It is important for agricultural and applied economists to consider the potential for economist capture and to grapple with the ethical implications of their research. Thoughtful reflection on these topics becomes even more essential when the incentives to publish and promote research are so strong in the profession. This incentive scheme has led to the rapid rise of predatory journals and conferences.³³ The internet and social media have also created new pathways for research disseminations which agricultural and applied economists are just beginning to exploit (and potentially be exploited by).

4.3.1 Predatory Journals and Conferences

Predatory journals, defined broadly as journals which charge publication fees to authors without providing the editorial and/or publishing services associated with legitimate journals, are almost universally condemned within the profession. Predatory conferences follow a similar logic, charging researchers registration fees without providing the scholarly interactions expected from legitimate conferences. Yet, these journals and conferences continue to proliferate, feeding on a combination of naïveté and the ever present demand to publish, edit, and review economic research.

A list of predatory journals and publications was maintained by [Jeffrey Beall](#) before he elected to shut his website down in 2017 (Basken, 2017; Silver, 2017). Though there were a number of controversies surrounding Beall’s methodology and potential conflicts of interest, the list became a starting point for many researchers when wanting to check the reputations of an open access journal. Beall’s list contained 26 journals whose titles include “economics,” two of which are cases

³³We do not touch on biases in publication. For a discussion in this area, see Hengel (2017).

of “applied economics.”³⁴ While no cases of “agricultural economics” appear on the list, of the 19 journals with some form of “agriculture” in the title, seven appear as if they could be appropriate outlets for work of agricultural economists.³⁵

More recently, there has been an explosion of predatory conferences with slick promotional material, making them frequently difficult to distinguish from their non-predatory counterparts. Grove (2017) warns that “ ‘predatory’ conferences now outnumber official events organised by scholarly societies.” These events are perhaps more egregious than predatory journals, as they ultimately provide no scholarly value. They simply charge researchers to attend what is essentially an imaginary conference. Grove (2017) investigated these events, focusing on one organization: Waset, which will hold 183 events in 2018. These events will cover almost 60,000 individual “conferences.” In one London hotel, Waset held 387 “conferences” in a single day. Researchers who show up to these events often find that they are the only one attending their “conference” and have thus been booked into a session with researchers from other disciplines ostensibly attending a different “conference.” Waset already has events scheduled nearly every day from now through 2030.

The continued existence of predatory journals and conferences relies on two factors. First, is the naïveté of researchers. Agricultural and applied economists who publish in these journals or submit to these conferences may not be aware that they will receive little benefit from paying the publication or registration fees. Those who are new in the profession, particularly graduate students, and those at institutions without adequate research libraries are particularly susceptible. Maintaining a list of predatory journals and conferences is probably no longer possible, given their rapid proliferation. Awareness campaigns, such as [Think, Check, Submit](#), which is supported by a coalition of traditional and open access publishers, is one way forward. But most importantly, the profession must have an open discussion of what it views as reputable and disreputable outlets for research. For too long the typical response to the question, “what qualifies as a predatory journal?” has been a variation on former U.S. Supreme Court justice Potter Stewart’s response

³⁴These include: *Journal of Applied Economics and Business* and *Journal of Business Management and Applied Economics*.

³⁵These include: *International Journal of Agriculture and Environmental Research*, *International Journal of Agriculture Innovations and Research*, *International Journal of Environmental and Agriculture Research*, *Journal of Food, Agriculture, and Environment*, *Journal of Global Innovations in Agricultural and Social Sciences*, *International Journal of Agricultural, Forestry, and Plantation*, and *American Journal of Advanced Agricultural Research*.

to what qualifies as pornography: “I know it when I see it” (Jacobellis v. Ohio, 378 U.S. 184, 1964). Promotion and tenure (P&T) committees need to be proactive and explicit in how they will determine if papers were published in predatory journals so that naïveté is no longer an excuse for utilizing these outlets.

A second factor that contributes to the continued existence of predatory conferences and journals is the ever growing need to find outlets for research. Researchers may find publishing in traditional outlets too demanding or too time consuming. Given the incentives to publish, a researcher may decide the personal benefits from using these outlets outweigh the personal costs. Yet externalities exist that affect the rest of the profession. Work published in these journals or presented at these conferences increase the noise to signal ratio regarding the current state of scientific knowledge, undermining confidence in scientific research.³⁶ In these cases, it is essential that the scholarly community support legitimate research and avoid supporting predatory journals and conferences. This can be done by not publishing in them, not attending them, not serving as reviewers, editors, or on the editorial boards, and by not permitting colleagues to knowingly publish in these journals or attend these conferences without consequences.

Further, Clark and Smith (2015) argue that action is needed on the demand side. This can be achieved in two ways: first, reputable publishers and journals can raise awareness by publishing work relevant to their field on the topic of predatory practices; second, editors and reviewers must work at reducing the publishing timeline at their respective journals. Publicizing turn-around times provides weak incentives to editors and reviewers. Stronger incentives could be achieved by tying a portion of compensation for editors and reviewers to the length of time manuscripts remain under review.³⁷ The field should also consider increasing competition among journals by allowing for contemporaneous submissions, something law journals have already adopted. Addressing the problem of predatory journals and conferences is the responsibility of research institutions and professional associations: they must provide clear guidelines of acceptable journals and conferences,

³⁶For more on this topics see Ferris and Winker (2017) and Gasparyan et al. (2015).

³⁷As an example, the *World Bank Economic Review* currently pays reviewers \$350 for a review returned within five weeks and \$0 after the five-week deadline. Paying for reviews within a given time frame should screen out reluctant potential reviewers at the initial stage and, conditional on accepting the invitation, encourage a greater number of reviews to be turned in on time.

publicly define the criteria that make a journal or conference acceptable, and reduce the incentives to seek alternative outlets for publication.

4.3.2 Media

The media play an increasingly important role in research dissemination. Departments, colleges, and universities, as well as governmental and non-governmental research centers, now have communications directors or departments dedicated to increasing the profile of research among non-scholars. In many cases, interactions with the media are integral parts of agricultural and applied economic research. Extension efforts at land-grant institutions benefit from television, radio, and other regular media interactions. Economists may seek out media interactions by blogging or tweeting about their research. And, ultimately, these interactions can be tremendously positive, getting important research in front of key decision-makers and raising the profile of the researcher and institution. Yet once research findings have become a “story” in the media, the originator of the research has very little control of the narrative.³⁸

Research results can undergo a metamorphosis from how they are presented in a technical paper to how they are presented in a media headline. A primary reason for this is that research is not typically targeted for wider media consumption. Research papers are traditionally written with an intended audience of colleagues and similarly trained professionals. Work can be misunderstood, misinterpreted, or misrepresented by the media, who have their own interests, often the attraction

³⁸Brian Wansink is a contemporary example of the fickle nature of media coverage. As BuzzFeed News (Lee, 2018) documents:

“We want this to go virally big time,” [Wansink] wrote... explaining why he wanted to make the chart labels for the Elmo and apples study sound “more generalizable.” Another time, he discussed playing up the quotable point of the study.

The study about mall shoppers thinking about exercising, he once wrote, “would make quite a media splash.” Another time, he proposed: “Lets think of renaming the paper to something more shameless. Maybe something like ‘Thinking about exercise makes me hungry.’” (Its published title was “Just thinking about exercise makes me serve more food: physical activity and calorie compensation.”)

Wansink told BuzzFeed News that attracting media coverage is a core part of the Food and Brand Labs mission “to be accessible and impactful.”

Wansink and the Cornell University Food and Brand Lab benefited from the media coverage, though he now, fairly or unfairly, is being tried by public jury, as well as through typical academic channels (Bauchner, 2018). At the time of this writing, Dr. Wansink has retracted eight articles, according to [Retraction Watch](#).

of internet traffic, or who may simply not understand the work.

A recent case that demonstrates this issue is the “Worm Wars” surrounding the replication of Miguel and Kremer (2004) by Aiken et al. (2015). The replication study reproduced the majority of results, though there were some discrepancies. Despite what Miguel and Kremer (2004) and Aiken et al. (2015) viewed as confirmation of the original study’s major findings, the news media chose to highlight the differences. The *Guardian* ran the headline: “New research debunks merits of global deworming programmes: Re-analysis of existing studies finds that deworming schemes may not improve educational attainment as previously claimed.” However, the original study did not claim that deworming improved educational attainment, a finding that the replication confirmed.³⁹ Yet the topic and debate reverberated through the media, ultimately distorting the answer to the original question, and the answers found in each study.⁴⁰

The “Worm Wars” is only one of many cases in which the authors of engaging research lost control of the narrative, having it misunderstood, misrepresented, or otherwise distorted in the media. There is no indication that the incentives for agricultural and applied economists to garner news media attention for their research will change. In fact, the pressures are likely to increase. What, then, can be done? How can a researcher promote her or his work to non-professionals while also ensuring that the right lessons are taken away from the work?

Bridging the “language gap” between researchers and journalists is key to reducing distortions introduced when academic stories become media narratives. Professional associations and research institutes should work to increase the media savvy of the research community. The Working with the Media Sessions at AAEA help accomplish this goal. Additionally, the AAEA has begun hosting pre- and post-conference workshops where academics can learn how to better communicate with the media. Further, there is a need to educate those in the media with whom one interacts. Departments could consider offering economic workshops for local journalists and media personalities as an initial step. Working to educate both sides of the discourse will help to ensure less information is lost in

³⁹ From Miguel and Kremer (2004): “we do not find evidence that deworming improved academic test scores.” From Aiken et al. (2015) “As in the original results, re-analysis found no effect of the intervention on examination performance.”

⁴⁰David Evans, at the [World Bank Development Impact Blog](#), provides an excellent summary of the ongoing issues of the “Worm Wars” (Evans, 2015).

translation.

5 Conclusion

Agricultural and applied economists have chosen to affiliate themselves within regional, national, and international professional associations. The purpose of these associations is not to regulate the behavior of their members but rather to foster scholarly interactions and promote the profession. Yet, from the earliest days of AAEA, there has been a recognition that establishing ethical norms for the profession is one key to fulfilling the mission of the association (Breimyer, 1991). The purpose of this article is to contribute to that mission by formalizing recent discussions of the ethical challenges agricultural and applied economists face at every stage of research.

Discussion of the role of ethics in the field is not new and many of the insights and recommendations in Ruttan (1983), Breimyer (1991), Debortin et al. (1995), and Peterson and Davis (1999) are relevant today. But, in the decades since these papers were published, new ethical problems and new solutions have emerged: economists are collecting more of their own data, exposing subjects to potential violations of privacy, however the profession has quickly made IRB or REB approval standard practice; increased computing power means that it is easier to data dredge or *p*-hack, but it is now easier to document, share, and replicate empirical work; public-private research partnerships have expanded the pool of resources economists can draw on while simultaneously highlighting the potential of economist capture; the incentives to disseminate research in the popular press has increased yet this can require surrendering control of the narrative. We have endeavored throughout this article to focus our discussion and recommendations on these emergent issues.

Conflicts of interest give rise to ethical issues in the practice of agricultural and applied economics research. Where we have made recommendations in resolving ethical concerns it has been with the goal of aligning the incentives of competing interests. Where incentive alignment is not feasible or desirable, our recommendations have sought to reduce information asymmetries. Along with DeMartino and McCloskey (2016a), we do not champion a code of ethics for the profession. But, we do believe that agricultural and applied economists can do more to consider ethical issues in their own research and to discuss those issues with colleagues. To paraphrase Peterson and Davis

(1999): bringing the discussion of the principles of research ethics more directly into agricultural and applied economic analysis is likely to improve that analysis. At the very least, attention to such principles has the virtue of clarifying the inherent ethical positions being taken by the analyst.

References

- Aiken, A. M., C. Davey, J. R. Hargreaves, and R. J. Hayes (2015). Re-analysis of health and educational impacts of a school-based deworming programme in Western Kenya: A pure replication. *International Journal of Epidemiology* 44(5), 1572–80.
- Alderman, H., J. Das, and V. Rao (2016). Conducting ethical economic research: Complications from the field. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 402–22. Oxford: Oxford University Press.
- Anderson, M. L. and J. Magruder (2017). Split-sample strategies for avoiding false discoveries. Working Paper 23544, National Bureau of Economic Research.
- Anderson, R. G. and A. Kichkha (2017). Replication, meta-analysis, and research synthesis in economics. *American Economic Review* 107(5), 56–9.
- Athey, S. and G. W. Imbens (2017). The state of applied econometrics: Causality and policy evaluation. *Journal of Economic Perspectives* 31(2), 3–32.
- Athey, S., G. W. Imbens, T. Pham, and S. Wager (2017). Estimating average treatment effects: Supplementary analyses and remaining challenges. *American Economic Review* 107(5), 278–81.
- Barrett, C. B., A. Agrawal, O. T. Coomes, and J.-P. Platteau (2009). Stripe review of social sciences in the CGIAR. Technical report, CGIAR Science Council.
- Barrett, C. B. and M. R. Carter (2010). The power and pitfalls of experiments in development economics: Some non-random reflections. *Applied Economics Perspectives and Policy* 32(4), 515–48.
- Barrett, C. B. and J. W. Cason (1997). *Overseas Research: A Practical Guide*. Baltimore: Johns Hopkins University Press.
- Basken, P. (2017, Sept. 12). Why Beall’s list died and what it left unresolved about open access. *Chronicle of Higher Education*.
- Bauchner, H. (2018). Expression of Concern: Wansink B, Cheney MM. Super Bowls: Serving bowl size and food consumption. JAMA. 2005;293(14):1727-1728. *Journal of the American Medical Association*.
- Berry, J., L. C. Coffman, D. Hanley, R. Gihleb, and A. J. Wilson (2017). Assessing the rate of replication in economics. *American Economic Review* 107(5), 27–31.
- Boettke, P. J. and K. W. O’Donnell (2016). The social responsibility of economists. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 116–36. Oxford: Oxford University Press.
- Breimyer, H. F. (1991). Scientific principle and practice in agricultural economics: An historical review. *American Journal of Agricultural Economics* 73(2), 243–54.
- Brodeur, A., M. Lé, M. Sangnier, and Y. Zylberberg (2016). Star Wars: The empirics strike back. *American Economic Journal: Applied Economics* 8(1), 1–32.

- Broockman, D., J. Kalla, and P. Aronow (2015). Irregularities in LeCour (2014). Mimeo, Stanford University.
- Burgess, R. G. (1984). *In the Field: An Introduction to Field Research*. New York: Routledge.
- Burlig, F. (2018). Improving transparency in observational social science research: A pre-analysis plan approach. *Economic Letters* 168, 56–60.
- Burness, H. S., W. D. Gorman, and R. L. Lansford (1983). Economics, ethics, and the quantification of Indian water rights. *American Journal of Agricultural Economics* 65(1), 1027–32.
- Casey, K., R. Glennerster, and E. Miguel (2012). Reshaping institutions: Evidence on aid impacts using a preanalysis plan. *Quarterly Journal of Economic* 127(4), 1755–1812.
- CGIAR (2004). How should the CGIAR handle ethical challenges? Issues and proposal for a strategic study. Technical report, Standing Panel on Priorities and Strategies (SPPS), CGIAR Science Council, Rome.
- Chang, A. C. and P. Li (2017). A preanalysis plan to replicate sixty economics research papers that worked half of the time. *American Economic Review* 107(5), 60–4.
- Clark, J. and R. Smith (2015). Firm action needed on predatory journals. <https://www.bmj.com/content/350/bmj.h210>. *BMJ* 350.
- Coffman, L. C. and M. Niederle (2015). Pre-analysis plans have limited upside, especially where replications are feasible. *Journal of Economic Perspectives* 29(3), 81–98.
- Coffman, L. C., M. Niederle, and A. J. Wilson (2017). A proposal to organize and promote replications. *American Economic Review* 107(5), 41–5.
- Colson, G., J. R. Corrigan, C. Grebitus, M. L. Loureiro, and M. C. Rousu (2016). Which deceptive practices, if any, should be allowed in experimental economics research? Results from surveys of applied experimental economists and students. *American Journal of Agricultural Economics* 98(2), 610–21.
- Comstock, G. (2013). *Research Ethics: A Philosophical Guide to the Responsible Conduct of Research*. Cambridge: Cambridge University Press.
- Das, N. (2012). Impact of participatory forestry program on sustainable rural livelihoods: Lessons from an Indian province. *Applied Economic Perspectives and Policy* 34(3), 428–53.
- Debertin, D. L., E. J. Luzar, and O. D. Chambers (1995). A protocol or a set of standards to guide agricultural economics research. *Journal of Agricultural and Resource Economics* 20(1), 82–95.
- DeMartino, G. F. and D. N. McCloskey (2016a). Introduction, or why this handbook? In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 3–10. Oxford: Oxford University Press.
- DeMartino, G. F. and D. N. McCloskey (Eds.) (2016b). *The Oxford Handbook of Professional Economic Ethics*. Oxford: Oxford University Press.

- der Merwe, M., J. F. Kirsten, and J. H. Trienekens (2017). Information sharing as a safeguard against the opportunistic behavior of South African Karoo lamb farmers. *Agricultural Economics* 48(S1), 101–11.
- Dewald, W. and R. Anderson (2014). Replication and reflection: A decade at the Journal of Money, Credit, and Banking. In M. Szenberg and L. Ramrattan (Eds.), *Secrets of Economics Editors*, pp. 199–212. Cambridge: MIT Press.
- Diaconis, P. and D. Freedman (1979). On rounding percentages. *Journal of the American Statistical Association* 74(366), 359–64.
- Doleac, J. L. and A. Mukherjee (2018). The moral hazard of lifesaving innovations: Naloxone access, opioid abuse, and crime. <https://ssrn.com/abstract=3135264>. SSRN Working Paper.
- Duflo, E. and A. Banerjee (Eds.) (2017). *Handbook of Field Experiments*, Volume 1. Amsterdam: North Holland.
- Duvendack, M., R. Palmer-Jones, and W. R. Reed (2017). What is meant by “replication” and why does it encounter resistance in economics? *American Economic Review* 107(5), 46–51.
- Ehmke, M. and J. F. Shogren (2010). The experimental mindsent within development economics: Proper use and handling are everything. *Applied Economic Perspectives and Policy* 32(4), 549–63.
- Evans, D. (2015). Worm wars: The anthology. <https://blogs.worldbank.org/impac evaluations/worm-wars-anthology>. World Bank Development Impact Blog.
- Fafchamps, M. and J. Labonne (2017). Using split samples to improve inference about causal effects. *Political Analysis* 25(4), 46582.
- Fanelli, D. (2018). Opinion: Is science really facing a reproducibility crisis, and do we need it? *PNAS*.
- Ferris, L. E. and M. A. Winker (2017). Ethical issues in publishing in predatory journals. *Biochemia Media* 27(3), 279–84.
- Freeman, A. (2016). First tell no untruth. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 651–67. Oxford: Oxford University Press.
- Gasparyan, A. Y., M. Yessirkepov, S. N. Diyanova, and G. D. Kitas (2015). Publishing ethics and predatory practices: A dilemma for all stakeholders of science communication. *Journal of Korean Medical Science* 30(8), 1010–6.
- Glennerster, R. (2017). The practicalities of running randomized evaluations: Partnerships, measurement, ethics, and transparency. In E. Duflo and A. Banerjee (Eds.), *Handbook of Field Experiments*, Volume 1, pp. 175–243. Amsterdam: North Holland.
- Glennerster, R. and S. Powers (2016). Balancing risk and benefit: Ethical tradeoffs in running randomized evaluations. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 367–401. Oxford: Oxford University Press.

- Goetz, S. J., M. D. Partridge, and H. M. Stephens (2018). The economic status of rural American in the President Trump Era and beyond. *Applied Economic Perspectives and Policy* 40(1), 97–118.
- Goodwin, B. K. (2015). Agricultural policy analysis: The good, the bad, and the ugly. *American Journal of Agricultural Economics* 97(2), 353–373.
- Grove, J. (2017). Predatory conferences ‘now outnumber official scholarly events’. Times Higher Education.
- Hamermesh, D. (2017). Replication in labor economics: Evidence from data, and what it suggests. *American Economic Review* 107(5), 37–40.
- Hamermesh, D. (2018). Citations in economics: Measurement, uses, and impacts. *Journal of Economic Literature* 56(1), 115–56.
- Harvey, C. R., Y. Liu, and H. Zhu (2016). ... and the cross-section of expected returns. *Review of Financial Studies* 29(1), 5–68.
- Heckman, J. J. and B. Singer (2017). Abducting economics. *American Economic Review* 107(5), 298–302.
- Hengel, E. (2017). Publishing while female: Are women held to higher standards? Evidence from peer review. http://www.erinhengel.com/research/publishing_female.pdf. Working Paper.
- Höfler, J. H. (2017). Replication and economics journal policies. *American Economic Review* 107(5), 52–5.
- Israel, M. and I. Hay. *Research Ethics for Social Scientists*. SAGE Publications.
- Jacobellis v. Ohio, 378 U.S. 184 (1964). Supreme Court of the United States.
- Kassie, M. and S. Holden (2007). Sharecropping efficiency in Ethiopia: Threats of eviction and kinship. *Agricultural Economics* 37(2-3), 179–88.
- Kennedy, P. E. (2002). Sinning in the basement: What are the rules? The ten commandments of applied econometrics. *Journal of Economic Surveys* 16(4), 569–89.
- Konnikova, M. (2015). How a gay-marriage study went wrong. <https://www.newyorker.com/science/maria-konnikova/how-a-gay-marriage-study-went-wrong>. *The New Yorker*.
- LaCour, M. J. and D. P. Green (2014). When contact changes mind: An experiment on transmission of support for gay equality. *Science* 346, 1366–9. RETRACTED.
- Latsis, S. (1980). *Method and Appraisal in Economics*. Cambridge: Cambridge University Press.
- Leamer, E. E. (1978). *Specification Searches: Ad Hoc Inference with Nonexperimental Data*. New York: Wiley.
- Leamer, E. E. (1983). Let’s take the con out of econometrics. *American Economic Review* 73(1), 31–43.

- Lee, S. M. (2018). The inside story of how an Ivy League food scientist turned shoddy data into viral studies. https://www.buzzfeed.com/stephaniemlee/brian-wansink-cornell-p-hacking?utm_term=.fonZ976GV#.boYVM035d. BuzzFeed News.
- List, J. A., A. M. Shaikh, and Y. Xu (2016). Multiple hypothesis testing in experimental economics. Working Paper 21875, National Bureau of Economic Research.
- Maki, U. (2008). Method and appraisal in economics, 1976-2006. *Journal of Economic Methodology* 15(4), 409–23.
- Mayer, T. (2016). Honesty and integrity in econometrics. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 329–51. Oxford: Oxford University Press.
- McCloskey, D. (1985). The loss function has been mislaid: The rhetoric of significance tests. *American Economic Review* 75(2), 201–5.
- McCluskey, J. J. (2016). Diversify or die: How increasing diversity of people and ideas can make organizations more competitive. *American Journal of Agricultural Economics* 98(2), 351–359.
- McCorkle, B. (2007). Demographic influences on willingness to pay for cold tolerance technology. *American Journal of Agricultural Economics* 89(1), 1315–23.
- Mervis, J. (2017). Data check: U.S. government share of basic research funding falls below 50 percent. <http://www.sciencemag.org/news/2017/03/data-check-us-government-share-basic-research-funding-falls-below-50>. *Science*.
- Miguel, E. and M. Kremer (2004). Worms: Identifying impacts on education and health in the presence of treatment externalities. *Econometrica* 72(1), 159–217.
- Oliver, P. (2003). *The Students' Guide to Research Ethics*. Maidenhead: Open University Press.
- Olken, B. A. (2015). Promises and perils of pre-analysis plans. *Journal of Economic Perspectives* 29(3), 61–80.
- Ozier, O. (2017). Trouble with pre-analysis plans? Try these three weird tricks. World Bank Development Impact Blog.
- Peterson, E. W. F. and G. C. Davis (1999). Consequences, rights, and virtues: Ethical foundations for applied economics. *American Journal of Agricultural Economics* 81(5), 1173–80.
- Pinstrup-Anderson, P. (2005). Ethics and economic policy for the food system. *American Journal of Agricultural Economics* 87(5), 1097–112.
- Romano, J. P. and M. Wolf (2010). Balanced control of generalized error rates. *The Annals of Statistics* 38(1), 598–633.
- Rousu, M. C., G. Colson, J. R. Corrigan, C. Grebitus, and M. L. Loureiro (2015). Deception in experiments: Towards guidelines on use in applied economics research. *Applied Economics Perspectives and Policy* 37(3), 524–36.

- Ruttan, V. (1983). Moral responsibility in agricultural research. *Southern Journal of Agricultural Economics* 15(1), 7–80.
- Schick, E. B. (1971). The credibility crisis in higher education. *Educational Theory* 21(4), 396–405.
- Sen, A. (1999). *On Ethics and Economics*. Oxford: Oxford University Press.
- Silver, A. (2017, Jan. 18). Controversial website that lists predatory publishers shuts down. *Nature*.
- Simonsohn, U., J. P. Simmons, and L. D. Nelson (2015). Specification curve: Descriptive and inferential statistics on all reasonable specifications. Available at SSRN: <https://ssrn.com/abstract=2694998> or <http://dx.doi.org/10.2139/ssrn.2694998>.
- Smith, W. I. (1990). Antitrust enforcement: The States can do it, even if the Feds won't. *Choices* 5(4).
- Stiglitz, J. E. (2016). Ethics, economic advice, and economic policy. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 495–519. Oxford: Oxford University Press.
- Sukhtankar, S. (2017). Replications in development economics. *American Economic Review* 107(5), 32–6.
- Swinton, S. M. (2018). Why should I believe your applied economics. *American Journal of Agricultural Economics* 100(2), 381–391.
- Thompson, D. F. (2016). Professional disequilibrium: Conflict of interest in economics. In G. F. DeMartino and D. N. McCloskey (Eds.), *The Oxford Handbook of Professional Economic Ethics*, pp. 455–74. Oxford: Oxford University Press.
- Twain, M. (1906, Sept. 7). Chapters from my autobiography. *North American Review* DXCVIII.
- United States (1978). The Belmont Report: Ethical principles and guidelines for the protection of human subjects of research. Technical report, The Commission, Bethesda.
- Vivalt, E. (2017). How much can we generalize from impact evaluations? Mimeo, Australian National University.
- Wible, J. R. (2016). Scientific misconduct and the responsible conduct of research in science and economics. *Review of Social Economy* 74(1), 7–32.
- Yalcintas, A. and J. R. Wible (2016). Scientific misconduct and research ethics in economics: An introduction. *Review of Social Economy* 74(1), 1–6.
- Zingales, L. (2013). Preventing economist capture. In D. Carpenter and D. Moss (Eds.), *Preventing Regulatory Capture: Special Interest Influence and How to Limit it*, pp. 124–51. Cambridge: Cambridge University Press.

Table 1: Results of Search, Screening, and Coding Literature in Agricultural and Applied Economics Journals

Association	Journal	‘‘ethic*’’	‘‘research practice*’’	‘‘research misconduct*’’ [†]
AAAE	<i>African Journal of Agricultural and Resource Economics (AfJARE)</i>	returned: 1	returned: 0	returned: 0
AAEA	<i>American Journal of Agricultural Economics (AJAE)</i>	returned: 100 related: 14 relevant: Breimyer (1991) Peterson and Davis (1999)	returned: 1	returned: 0
	<i>Applied Economic Perspective and Policy (AEPP)</i>	returned: 43 related: 4	returned: 1	returned: 0
	<i>Choices</i>	returned: 46	returned: 0	returned: 0
AES	<i>Journal of Agricultural Economics (JAE)</i>	returned: 85 related: 3	returned: 3	returned: 0
AARES	<i>Australian Journal of Agricultural and Resource Economics (AJARE)</i>	returned: 71 related: 4	returned: 1	returned: 0
AERE	<i>Journal of the Association of Environmental and Resource Economists (JAERE)</i>	returned: 6 related: 1	returned: 1	returned: 0
CAES	<i>Canadian Journal of Agricultural Economics (CJAE)</i>	returned: 74 related: 4	returned: 0	returned: 0
EAAE	<i>European Review of Agricultural Economics (ERAE)</i>	returned: 41 related: 4	returned: 2 related: 1	returned: 0
IAAE	<i>Agricultural Economics (AE)</i>	returned: 52	returned: 0	returned: 0
IFAM	<i>International Food and Agribusiness Management Review</i>	returned: 0	returned: 0	returned: 0
NAREA	<i>Agricultural and Resource Economics Review (ARER)</i>	returned: 21 related: 2	returned: 2	returned: 0
SAEA	<i>Journal of Agriculture and Applied Economics (JAAE)</i>	returned: 48 related: 4	returned: 1 relevant: Ruttan (1983)	returned: 0
WAEA	<i>Journal of Agricultural and Resource Economics (JARE)</i>	returned: 75 related: 3 relevant: Debertin et al. (1995)	returned: 0	returned: 0

[†] Although results were found under this search, none were relevant or related. Most referred to misconduct or misbehavior of producers, such as through price fixing, incorrect labeling, or misreporting.

Table 2: Reported Policies in Agricultural and Applied Economics Journals

Association	Journal	Republication Policy?	IRB Policy?	Disclosure Policy? [†]
AAAE	<i>African Journal of Agricultural and Resource Economics (AfJARE)</i>	No	Yes	Yes
AAEA	<i>American Journal of Agricultural Economics (AJAE)</i>	Encouraged	Yes	Yes
	<i>Applied Economic Perspective and Policy (AEPP)</i>	Encouraged	Yes	Yes
	<i>Choices</i>	No	No	Yes
AES	<i>Journal of Agricultural Economics (JAE)</i>	Encouraged	No	No
AARES	<i>Australian Journal of Agricultural and Resource Economics (AJARE)</i> [‡]	Encouraged	Yes	Yes
AERE	<i>Journal of the Association of Environmental and Resource Economists (JAERE)</i>	Yes	No	Yes
CAES	<i>Canadian Journal of Agricultural Economics (CJAE)</i>	Encouraged	No	No
EAAE	<i>European Review of Agricultural Economics (ERAE)</i>	Yes	Yes	Yes
IAAE	<i>Agricultural Economics (AE)</i>	Encouraged	No	No
IFAM	<i>International Food and Agribusiness Management Review</i>	No	No	No
NAREA	<i>Agricultural and Resource Economics Review (ARER)</i> [‡]	No	No	Yes
SAEA	<i>Journal of Agriculture and Applied Economics (JAAE)</i> [‡]	No	No	No
WAEA	<i>Journal of Agricultural and Resource Economics (JARE)</i>	Encouraged	No	Yes

[†] Includes both disclosure of funding resources and / of conflicts of interest.

[‡] Journal adheres to guidance from the Committee on Publication Ethics (COPE).

Table 3: Ethical Issues and Recommendations

Topic	At Issue	Recommendations
<i>Data: From Design to Management to Analysis</i>		
Study Design	Lack of IRB/REB at some research institutes	-Establish a review board for use by those at institutions that currently lack ethical review, hosted by AAEA or IAAE -Require IRB/REB approval for publication in association journals
Data Management	Unreproducible results	-Creation of a replication journal managed by an association or co-management by several associations -Keep “lab notebooks” of data cleaning decisions for submission as part of standard journal replication policies -Require mandatory research ethics courses in graduate degrees
Data Analysis	Data dredging to ensure significant results	-Keep “lab notebook” of all regressions run in the analysis, including those not reported in paper -Ensure statistical tests account for multiple hypothesis testing or penalty functions for specification search -Establish a hypothesis registry, maintained by AAEA or IAAE, that can accommodate experimental and observational studies -Allow for authors to submit articles before results are known
<i>Research: From Funding to Findings to Dissemination</i>		
Funding	Economist capture by funding agencies	-Expand conflict of interest statements to include terms of reference and relevant personal financial stakes
Findings	Ethical issues beyond the scope of the research	-Invite open discussion to move the field towards establishing norms
Data Analysis	Predatory outlets	-Establish a list of acceptable/unacceptable outlets for use by P&T committees or departments -Reduce publishing timelines by tying editor/reviewer compensation to turnaround time and by allowing for contemporaneous submissions
	Media outlets	-Continue conference workshops to promote media interaction -Establish “media days” within academic departments and other institutions to help educate local media regarding economic research