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Staff Paper 82-119

POLICIES ON SAFETY IN THE FOOD SYSTEM: WHAT ARE THE ISSUES?

by

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Paper presented at the American Agricultural Economics Association meetings, August, 1982. Research support provided by the Economic Research Service, U. S. Department of Agriculture. Michigan State University, Dept. of Agricultural Economics Staff Paper #82-119.

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I. Introduction

Our food system is exposed to and makes use of a variety of technologies which may pose risks to human health. Production, transport, processing, and storage activities may result in the exposure of food and workers to man-made and natural toxins. The formation of aflatoxins in grain, the consumption by fish or livestock of water containing chemical wastes, the utilization of agricultural chemicals in farming, and the development of bacteria in food processing and preparation are examples.

These problems and the policies that regulate them have important and numerous impacts on participants in the food system. Agricultural economists have not given sufficient attention to evaluating these impacts and to providing information and analysis to decision-makers in this area of social choice. The objective of this paper is to outline some of the major issues involved in policies on safety in the food system in hope of stimulating more scholarly research in this area.

II. Policy Decisions

The basic goal of safety regulation is to reduce the health risks to humans posed by technologies. The health risks posed by technologies may affect people through their living environment, their work roles, or the products they

consume. Regulatory policy on risky technologies includes environmental or use controls, occupational controls, and controls on various characteristics of products and how they are made. In the food system, these policies include controls on pesticides, animal drugs, animal diseases, food-borne toxins, food additives, and environmental contaminants in water, soil and air.

The health risks posed by food system technologies may be reduced by a variety of regulatory strategies. One set of strategies for reducing health risks is to forego or curtail some types of consumption or resource use patterns. For example, certain uses of the environment or certain products may be prohibited or limited, such as the use of DDT.

Another way to reduce health risks is to require expenditures on prevention of risk-related outcomes. One approach is to reduce exposure of persons to risk, but does not involve doing away with the risky technology. Examples include protective suits for pesticide applicators and safety instructions on products used by consumers. A second type of expenditure involves modifications of technologies to reduce the incidence of risk. Good manufacturing practices, for example, can reduce the growth of bacteria in food processing.

In a very general sense, decisions to set safety standards in the food system involve balancing the health risks posed and benefits created by technologies. This statement

reflects the fact that the act of reducing health risks means foregoing some things we value either through reduced use of the risky technologies or increased expenditures meant to make those technologies less risky.[1] The process of balancing the health risks and benefits of technologies potentially involves the following issues.

III. Major Issues

(1) What priorities should we have with respect to risky technologies? Since resources are limited and health risks are many, some way of developing priorities is needed. This is equally true for policies on standard setting and enforcement. Presently, there is no common unit in which health risks are measured.[2] Risks vary in terms of their health effect, their voluntariness, the population groups affected, and our ability to measure them. The latter problem is probably the most serious and involves two types of issues: the measurement of health effects from exposure to risky technologies and the measurement of exposure of people to those technologies.

(2) What health risks and benefits of technologies should be considered in setting standards? From a toxicological point of view, all health effects of risky technologies are important and should be considered in standard setting. But analyses of exposure routes, say through studies of food consumption patterns among the population, are also important in developing regulatory options for dealing with risks and setting standards. Exposure data

used in regulatory proceedings is often crude, reflecting the need for making simplified assumptions in the face of data constraints. Economists can make an important contribution to improving exposure analyses.

Economists have an important role to play in assessing what must be given up in order to reduce risk. This involves evaluating the benefits of technologies, the impacts of reducing the use of these technologies, or the impacts of modifying them to reduce risk. Statutes sometimes limit the extent to which this kind of analysis can be used in regulatory proceedings, but it is still important to food system participants.

(3) <u>What types of data should be used in assessing health risks and benefits, how it should be interpreted, and who should provide it?</u> As mentioned previously, data on exposure is often crude and simplifying assumptions are often used in place of data. For example, when evaluating the health effects of pesticides due to exposure through foods, the EPA assumes that pesticide residues in foods are equal to the tolerances they have set rather than gathering actual residue data. The FDA uses the food consumption averages for male teenagers to assess population exposure to some substances in food.

The same problem occurs in estimates of the benefits of risky technologies. For example, the EPA has assumed zero benefits for some "minor" uses of some pesticides

because no outside parties provided information in defense of those uses.[3]

Interpretation of data is also a problem. For example, pathologists examining experimental slides often differ in terms of the number of tumors they detect, and, of these, tumors, how many are malignant.[4] These differences in interpretation are dealt with by using several data analysts and peer review of scientific studies. But there is little evidence that any similar precautions are taken with respect to economic data.

Gathering and interpreting data is expensive. Various estimates of these costs to private parties for the Toxic Substance Control Act, for example, run into millions of dollars annually.[5] More of these estimates are needed for different policies. These estimates are important for developing budgets of agencies which provide such data and for participants in the food system who must adjust to policy requirements or who want to have an input to the policy process. These costs affect who will participate.

(4) <u>How should the magnitude of health risks and benefits be assessed?</u> Constraints on our ability to measure health effects and exposure often mean that risks are not quantified. A substance may be labeled as a carcinogen, but we may not be able to estimate with confidence the likely number of cancers produced annually by current exposure to the substance. This problem is not just due to data constraints, but to our lack of knowledge about how

carcinogens produce health effects. Different models can be used reflecting different assumptions about tumor promotion, but each model produces results that vary by several orders of magnitude. For example, estimates of the number of lifetime cases per million people exposed to saccharin vary from .001 to 1,000.[6] Unfortunately, such estimates have been used by economists in developing point estimates of the value of risk reduction without any apparent understanding of the range of uncertainty in quantitative risk assessment.

Benefit estimates also vary substantially.[7] However, few studies have been done to check data quality, assumptions and estimates. Peer review is lacking. Clearly, more work is needed in this area to subject estimates to scholarly review and to develop guidelines for acceptable practice.

(5) <u>What regulatory options are available?</u> Two broad strategies for regulatory approaches to reducing health risks posed by technologies were presented earlier. Within each of these, several strategies are possible.[8] However, agencies have sometimes been limited in developing workable options because of limited statutory authority and limited information about the structure of the food system. For example, FDA's usual strategy for dealing with residues of animal drugs has been to set tolerances which are enforced by the USDA Food Safety and Quality Service. In the case of sulfa, the strategy did not work. An interagency task force was formed to investigate the problem and a program

of producer education was undertaken. This education program did succeed in bringing down sulfa residues dramatically. Nonetheless, the residue problem remains. An independent study suggested, however, that if sulfa were produced in pellet rather than powder form, residue problems could be substantially diminished.[9] Why was this option overlooked in the first place?

Some people might object to the idea of developing process standards based on knowledge of the food system on the grounds that performance standards are preferable.[10] But if a lack of knowledge about process standards results in banning some technologies, is this a reasonable position? Perhaps the process versus performance standards argument needs a re-examination, and, along with that, a better understanding of how existing technologies work to produce health risks.

(6) How should the health risks and benefits associated with different regulatory options be weighed? Ideally, legislative intent should reveal the weights to be attached to various pieces of evidence. Unfortunately, legislative intent is not always clear. Yet careful statutory construction can reveal implicit policy preferences. With few exceptions, economists have made little use of the tool of statutory construction.[11] Instead, they and others often advocate such methods as benefit-cost and risk-benefit analysis, leaving it to others to sort out implicit policy weights. The result of this advocacy has been a spate

of articles denigrating these analytical methods as being contrary to the original intent of many safety laws and a great deal of misunderstanding about what they involve or how they may be used.[12] Advocates of these methods wave their hands and say that agency mandates should be made clearer. Perhaps this is true, but in many instances, better substantive understanding would eliminate such accusations. In short, more work is needed in linking substantive policy preferences to methods.

Another aspect of this issue concerns the decision-making process itself. As with methods, different decision-making processes, such as generic rulemaking versus adjudication, can affect factual accuracy, public participation, implicit policy choices, and policy outcomes. Several studies have started to sort out these issues and their impacts, but more work is needed.[13]

(7) <u>How should a chosen regulatory option be enforced?</u> The usual method of enforcement of safety standards is to raise the expected cost of violating laws by increasing the probability of detection and the level of fines imposed when a violation is detected.[14] There is some evidence, however, that people may underestimate the true probabilities of being detected, especially in structurally unconcentrated economic sectors.[15] This needs to be investigated. Furthermore, expected costs are only partly accounted for by fines. Another important cost is declining consumer confidence in products which have experienced contamination. These

costs and the impacts of various enforcement strategies should be investigated if effective enforcement is to be achieved.

(8) What are the benefits of regulations designed to reduce health risks? Techniques for estimating the value of the reduction of health risks to people are still being developed.[16] Empirical estimates using these techniques are few, especially those dealing with safety in the food system. Those that do exist have ignored uncertainty in risk estimates and have typically assumed one hundred percent compliance. Better estimates are needed if these techniques are to be of practical use.

IV. Conclusions

This paper has raised some issues of policy on safety in the food system. There are many more. These issues merit attention because of their impacts on food system participants. Existing studies of these issues are few. Unpublished studies developed for regulatory decision-makers on these issues need peer review. Some standards for analytical practice should be developed. Finally, it is vitally important that economists working in this area be aware of the uncertainties of scientific data on health effects in developing their own assessments about risky technologies and the cost and benefits of regulations designed to reduce health risks.

Footnotes

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2. Richard C. Schwing, "Longevity Benefits and Costs of Reducing Various Risks," Technological Forecasting and Social Change (1979) Vol. 13, pp. 333-345.

3. From the research results of Patty T. Skelding on pesticide policy decisions, Department of Agricultural Economics, Michigan State University, 1982.

4. Thomas O. McGarity, "Substantive and Procedural Discretion in Administrative Resolution of Science Policy Questions: Regulating Carcinogens in EPA and OSHA," Georgetown Law Journal (1979) Vol. 67, pp. 729-811.

5. George S. Dominguez, The Business Guide to TOSCA, New York: John Wiley and Sons, 1979, p. 57.

6. Bert N. LaDu, Jr., "Analysis of the National Academy of Sciences Food Safety Report," Food Technology (November, 1979) p. 54.

7. One study revealing variance in benefit estimates is: National Research Council, Committee on Pesticide Decision-Making, Pesticide Decision-Making, Washington, DC: National Academy of Sciences, 1978.

8. Granger Morgan, "Choosing and Managing Technology-Induced Risk," IEEE Spectrum (December, 1981) pp. 53-60.

9. Carol S. Kramer, "An Economic Analysis of Food Safety Regulation: The Case of Sulfa and the Swine Subsector," Ph.D. Dissertation, Department of Agricultural Economics, Michigan State University, 1982.

10. Robert W. Crandall, "Pollution Controls and Productivity Growth in Basic Industries" and "Regulation and Productivity Growth," Brookings General Reprint Series, No. 375, Washington, DC: The Brookings Institution, 1981.

11. Two excellent examples of the use of statutory construction to identify policy weights are: John A. Haigh and John J. Krutilla, "Clarifying Policy Directives: The Case of National Forest Management," Policy Analysis (Fall, 1980) Vol. 6, No. 4, pp. 409-439, and Thomas O. McGarity (see footnote 4 above).

12. Examples include: Michael S. Baram, "Cost-Benefit Analysis: An Inadequate Basis for Health, Safety, and Environmental Regulatory Decision-Making," Ecology Law Quarterly (1980) Vol. 8, pp. 473-529; Stephen H. Hanke, "On the Feasibility of Benefit-Cost Analysis," Public Policy (1981) Vol. 2, pp. 147-157; Steven Kelman, "Cost-Benefit Analysis - An Ethical Critique," Regulation (January/February, 1981) pp. 33-40.

13. Giandomenico Majone, "Process and Outcome in Regulatory Decision-Making," pp. 235-258, and Dorothy Nelkin and Michael Pollack, "Problems and Procedures in the Regulation of Technological Risk," pp. 259-280, in Making Bureaucracy Work, Carol H. Weiss and Allen H. Barton (eds.), Beverly Hills, CA: Sage Publications, 1979. Also see Thomas O. McGarity (footnote 4 above).

14. Colin S. Diver, "A Theory of Regulatory Enforcement," Public Policy (Summer, 1980) Vol. 28, pp. 257-299.

15. This idea comes from observations of variance in violation rates in the poultry and swine subsectors and the results of psychological studies of bias in the formation of expected probabilities of events by people. See: D. Kahneman, P. Slovic, and A. Tversky (eds.), Judgement Under Uncertainty: Heuristics and Biases, New York: Cambridge University Press, 1982.

16. Allen R. Ferguson and E. Phillip LeVeen (eds.), The Benefits of Health and Safety Regulation, Cambridge, MA: Ballinger Publishing Co., 1981; J. Steven Landefeld and Eugene P. Seskin, "The Economic Value of Life: Linking Theory to Practice," American Journal of Public Health (June, 1982) Vol. 72, No. 6, pp. 555-565.