Issues in Pesticide Policy: Discussion

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The paper by Taylor has merit because it is pro- vocative, but like many things, this can be over- done. His self-described diatribe against neoclas- sical economics is in special need of a response. He appears to dismiss the notion of utility maxi- mization, but in fact there is nothing to dismiss. Although many economists do not realize this fact, the assumption of utility maximization is not test- able. Give me any pattern of behavior by an indi- vidual (or a society) and I can give you a utility function which, when maximized subject to what- ever constraints that person or society may face, yields the observed behavior. An obvious example would be $U = 1$ for the observed behavior and $U = 0$ otherwise, although more complicated exam- ples could also be constructed. The power of eco- nomics lies not in utility maximization, but in the specification of constraints on choice and in de- scribing how changes in the constraints affect be- havior. To illustrate, even a consumer who made decisions randomly would tend to have downward- sloping demand curves because of his or her bud- get constraint (Becker).

Taylor also criticizes the neoclassical approach for assuming perfect information, expected utility maximization with certainty equivalence, a mar- ginal utility of income that is constant across indi- viduals and time, the absence of altruism or other interpersonal linkages, and static/deterministic du- ality. These criticisms are at least 20 years too late. In recent years, every one of these assumptions has been relaxed, if not in the context of pesticide pol- icy, then at least in other contexts. A large body of literature has grown in each of these areas, as a glance at recent graduate economics textbooks would reveal (see, as just one of many examples, Deaton and Muellbauer).

Taylor also broadsides the mean–standard devi- ation model as a poor approximation to the ex- pected utility model, even if the latter is correct. He argues that strongly skewed probability distri- butions for pesticide risks deviate from normality and that normality is necessary for the two models to be consistent with each other. Actually, normal-

ity is sufficient but not necessary. Meyer demon- strates that the two models are also consistent if the choice set is composed of random variables that are linearly related to each other. Whether this condition holds or not for pesticide risks is unclear but is potentially testable. Bar-Shira demonstrates that violations of the expected utility hypothesis found in laboratory experiments may be an artifact not applicable to real-world situations.

My bottom line is that choices in pesticide pol- icy are inevitable. Economics can provide the theoretical and empirical tools necessary to quan- tify the benefits and costs of pesticide policies. If there are weaknesses in the economic tools being used, then better tools should be used. However, to abandon the economic approach because of lim- itations in the way that it is currently being applied makes no sense.

I really like the Cropper et al. paper. This paper, along with their earlier article in the *Journal of Political Economy (JPE)*, provides a breath of fresh air in an area filled with "we all know" isms. Examples include "we all know the EPA is run by a bunch of eco-freaks" and "we all know the EPA capitulates to industry pressure at every opportunity." However, both articles suffer from admitted weaknesses in the measurement of pro- ducer benefits from pesticides. The market-level effects of pesticide restrictions on producer prices are not considered since benefits are calculated at existing prices.

Paradoxically, producers could actually gain from pesticide restrictions if output prices in- creased enough. In this respect, pesticide restric- tions could operate like the acreage-control pro- grams that U.S. grain farmers have long used to drive up prices. James Shortle and I (1992) found that restrictions in the U.S. on agricultural chem- icals as a whole for wheat, coarse grains, and soy- beans would actually increase producer rents. This would occur regardless of whether or not there were GATT-type reforms in farm commodity pro- grams. In the European Community (EC), we found that rents would fall with existing farm pro- grams but would rise under liberalized agricultural trade. The difference arises because EC farm pro- grams involve (largely) fixed internal grain prices, preventing prices from increasing in response to

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chemical restrictions. Quantifying effects on rents on a pesticide-by-pesticide basis would admittedly be difficult and fraught with error, but it could be done.

Cropper et al. estimate in the *JPE* article that the Environmental Protection Agency (EPA), in its final decisions, trades off about $35 million in producer benefits against one applicator cancer case avoided. The present paper estimates a trade-off of $72 million in proposed decisions. Given my arguments here, these figures are too high, because producers do not gain as much from pesticides under flexible output prices as under fixed prices.

I also like the Lichtenberg paper, which does a very nice job of laying out the issues. However, one presumption is taken largely for granted: that market-based solutions to pesticide externalities are impossible. Clearly, people can respond to perceived risks from pesticides. Pesticide mixers, loaders, and applicators can refuse to work with pesticides that are viewed as unsafe. They can also demand higher wages as compensation for perceived risks, reducing the demand for pesticides. Similarly, farmers may refuse to work with unsafe pesticides or may only work with them when pesticide prices are low. Consumers may refuse to purchase goods contaminated with pesticides, as the case of Alar and apples obviously demonstrates.

The result of any of these actions will be a decrease in returns to a manufacturer of unsafe pesticides. There may also be an associated loss of goodwill, as other goods produced by that manufacturer become tainted with suspicion. Effects on goodwill can be detected by examining a firm's stock prices after it becomes public knowledge that one of its pesticides may be unsafe. Studies in a variety of other contexts have examined the effects of unsafe products on stock prices, including consumer drugs (Jarrell and Peltzman), automobiles (Jarrell and Peltzman; Hoffer, Pruitt, and Riley), and airplanes (Mitchell and Maloney; Borenstein and Zimmerman). Although results vary, most of the studies find significant stock-market losses from unsafe products, with the majority of losses coming from diminished goodwill. The studies are divided on whether market losses to producers are greater than or less than the social costs of unsafe products.

Lichtenberg argues that information about pesticide risks is presently limited, that available information is not always used, and that it would be too costly or complicated to provide more information. However, the same arguments could be made about risks from drugs, autos, and airplanes, and yet the market appears to be penalizing makers

of unsafe products in these industries. My point here is that this issue should not be taken for granted. Are there market losses to manufacturers of unsafe pesticides and, if so, how large are they in relationship to social costs? Of course, this line of reasoning does not apply to ecological damages from pesticides.

I have one final comment, and it concerns induced innovation. Both Taylor and Lichtenberg mention induced innovation as a possible, and perhaps desirable, outcome of EPA regulations. The theory is that EPA restrictions on unsafe pesticides will induce manufacturers to develop safer ones. However, even if all works as planned, induced innovation is not a silver bullet. Consider a new pesticide that, while safer, also reduces per unit costs in the production of some agricultural good. Farmers would voluntarily adopt the safer pesticide anyway to the extent that it reduced risks to their own health, but a decrease in per unit costs would provide an additional incentive for adoption.

Competition would force the reduction in unit costs to be passed along to consumers in lower output prices, which would stimulate output demand. The net impact of these two changes on producer revenue could be positive or negative. If revenue decreased, the derived demand for all nonregressive inputs would decrease, presumably including pesticides. However, if demand were price-elastic, so that revenue increased, the opposite would hold. If the increase in revenue were large enough, pesticide use could rise to the point where total health risks were actually higher, even though risks per unit of pesticides were lower. James Shortle and I (1991) found that innovation in the EC would indeed increase aggregate chemical use on grains. In the U.S., impacts would be approximately zero or slightly negative. In any case, we as economists need to be leery about viewing technology as our savior to pesticide risks or other environmental problems associated with agriculture.

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