STRESS ON PRODUCTION ECONOMICS

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This article was written at the invitation of the Editor of this *Journal.* In earlier correspondence the point was made that the author had been "having second thoughts on the decline of some departments of agricultural economics which were of a more applied nature" and that "this year will mark a decade since the emergence of Earl Heady's massive tome", *Economics of Agricultural Production and Resource Use,* Prentice-Hall, Inc. New Jersey, 1952. The suggestion was made to the author "that perhaps you could review developments in the field of production economics since the birth of the Heady *opus*".

Preferably, the article should be viewed as critical of certain developments in our profession, the origins of which extend back in history prior to the lives of any living person and horizontally in our society beyond the realms of production economics and, for that matter, far beyond the social science disciplines. The need is for criticism of a development and not for criticism of the people who participated in the development.

Historical Background

In reviews of this type, it is extremely important to establish and interpret the historical context in which the developments under review take place. Therefore, the initial pages of this paper are devoted to establishing and interpreting the historical setting in which Heady's book was produced and used.

Historically, the discipline of agricultural economics grew out of an interest in farm management on the part of agricultural technical scientists. Those scientists became interested in the overall operation of farm businesses and proceeded to develop a discipline of farm management without relating the new discipline directly to economics.[1] Later, a number of agriculturalists trained in economics became interested in transferring theoretical economics into the emerging field of study, farm management. Important among these early U.S. contributors to the emerging discipline was Henry Taylor.[2, 3] Somewhat later, John D. Black took up the case for economics in the field of farm management. Black's early contributions were made at Minnesota. Later, as a professor at Harvard, he stressed the need for more economics both in

* The paper has benefited from criticisms and suggestions received from Lowell Hardin, Sam Engene, Dale Hathaway, Vernon Sorenson, L. L. Boger, James Bonnen, Carl Eicher, Karl Wright, Robert Jones and others. The content, however, remains the sole responsibility of the author.

[1] Walter Wilcox, Sherman Johnson and Stanley Warren, *Farm Management Research 1940-41,* Social Science Research Council, New York, N.Y., Bull. 52, 1943, pp. 1-4.

[2] J. R. Currie, "A Review of Fifty Years in Farm Management Research," *Journal of Agricultural Economics,* Vol. XI, 1955 ". . . the first serious scientific studies of the economics of farming . . . started in the United States of America."

[3] Wilcox, Johnson and Warren, *op. cit.* p. 4.

farm management and in the emerging departments of agricultural economics which were beginning to address themselves to problems in marketing, agricultural policy and agricultural prices.[4]

As a Harvard professor, Black was able to make the case for more economics in agricultural economics. Workers in marketing, agricultural policy and price analysis quickly became allies of anyone propounding the use of more economics in a college of agriculture. However, workers in the field of farm management proper resisted. They had strong constituent support among the farmers they serviced well and academic support in the allied technical agricultural disciplines from whence they came. Though these workers employed very little economic theory, they contributed to the solution of many problems facing farmers with relevant information from their accounting and descriptive work and a substantial quantity of common sense. No one can deny that the earlier, non-theoretical farm management workers made real contributions to agriculture, contributions which developed much financial support for the emerging discipline of agricultural economics, a debt not yet adequately recognized.

As just noted, the early descriptive, non-theoretical work in farm management was relevant for the solution of practical problems. The philosophy of science which guided these people was expressed in Karl Pearson's *Grammar of Science* and, as such, was essentially positivistic.[5] Though positivism avoids purpose and leads eventually to difficulty in defining and solving problems,[6] the charge of irrelevance could not be levelled validly at the early farm management workers. The closeness of these workers to farmers and their problems insured that the positivistic work they did involved the determination of facts which were relevant to the solution of problems facing farmers. However, with the passage of time, the interests of these workers and their successors became introverted instead of focused on problems.[7] Much of the descriptive work began to be done for its own sake, *i.e.*, it concentrated upon repetitive estimation of certain accounting ratios and on repetitive surveys and reports. Essentially, the same pattern of facts was gathered from account keepers and cooperators in surveys, while times and problems changed violently in the 1920's and 1930's.[8] This loss of relevance disturbed those desiring to make a greater place for economic theory in farm management work.

In 1939, T. W. Schultz added to the criticism.[9] He noted that farm management work failed to use economics to focus on the problems of the post-World War I and depression years. He also noted that static

[4] J. D. Black, *Introduction to Production Economics,* Henry Holt and Co., New York, 1926; and J. D. Black and A. G. Black, *Production Organization,* Henry Holt and Co., New York, 1929.

[5] By positivistic, the author means, "the philosophic position that the highest form of knowledge is simple description." *The Dictionary of Philosophy—Ancient —Medieval—Modern,* edited by D. D. Reeves. Littlefield, Adams & Co., Patterson, N. J., U.S.A., 1961, p. 243. This position ordinarily holds that goodness and badness are not observable and, hence, not susceptible to description.

[6] Purpose is rejected as teleological and nonexplanatory.

[7] A similar situation developed in land economics when a pragmatic "problem-solving" approach competed with a positivistic approach. See L. A. Salter, *A Critical Review of Research in Land Economics,* The University of Minnesota Press, Minneapolis, 1948, pp. 39ff.

[8] Wilcox, *et. al., op. cit.* preface by T. W. Schultz, p. viii.

[9] T. W. Schultz, "Scope and Method in Agricultural Economics Research," *Journal of Political Economy.* Vol. XLVII, 1939, pp. 709ff.

economic theory, even where used, was not always appropriate and called attention to the theory of the managerial processes expounded by Frank Knight in his *Risk, Uncertainty and Profit*. Though the main impact of Schultz's work was to strengthen the case for theory in farm management, his observations about the inappropriateness of static production economic theory in solving certain problems were astute; they anticipate criticisms of production economics research to be advanced in later pages of this article. More specifically, these later pages will be concerned with lack of attention to problems not definable in terms of static disequilibria. Schultz also stressed that the work of departments and sections of farm management was vulnerable on another score. Attention had been concentrated on the individual farm firm at the expense of dynamic and more macro or aggregative studies of the agricultural economy.[10] Still further, serious questions existed about sampling technique.[11] Statistically trained agricultural economists, therefore, joined the chorus by criticizing the statistical methodologies and technique employed in both farm management survey and farm records work.

After World War II, the irrelevance of much of the positivistic farm management accounting and survey work was clearly apparent to agricultural economists and to administrators.[12] The older or "traditional" type of farm management fell in administrative esteem. Those pre-war departments of farm management, which had existed independently of departments of agricultural economics, were merged with those departments and, for the most part, lost their identity under administrators more fully committed to the use of economics in farm management.[13]

This submersion of farm management into agricultural economics continued to occur intellectually as well as administratively. In the North Central states, the Farm Foundation took steps in 1948 to organize a workshop at Land o'Lakes, Wisconsin. At that workshop, the earlier forms of farm management work were subjected to serious intellectual examination. The examination started at Land o'Lakes was continued at the Black Duck workshop a year later in Minnesota.

Though the issue at Land o'Lakes and Black Duck has often been interpreted as one between theorists and practitioners,[14] no person, to the writer's knowledge, has interpreted it as a difference between a positivistic philosophy, which tends eventually to preclude problem definition and problem solving as integral parts of the scientific method, and a more normative philosophy leading to work with value concepts, at least to the extent of assuming the existence of values in terms of which problems could be defined and solved.[15] However, it is easy to

[10] Wilcox, *et. al., op. cit.* preface.

[11] *Ibid,* p. vii and last full paragraph continuing on p. viii.

[12] Farm accounting and surveys not focused directly on problems (either practical or academic) fell off. In Michigan, for instance, the number of farm accounts was reduced from 862 in 1948 to 501 in 1953.

[13] Glenn L. Johnson, "Agricultural Economics, Production Economics and the Field of Farm Management," *Journal of Farm Economics,* Vol. 39, May 1957, pp. 441ff. Also, H. C. M. Case and D. B. Williams, *Fifty Years of Farm Management,* University of Illinois Press, Urbana, Illinois, 1957, pp. 319ff.

[14] Case and Williams, *op. cit.* pp. 359-63 and 366ff.

[15] Case and Williams, *ibid.,* come close to recognizing that the traditional approach was positivistic but do not really clarify the matter. See p. 360 for a discussion of "The emphasis on fact collection . . . inherited from the physical sciences."

find quotations in the report of the Black Duck workshop which indicate that there was a concern at that conference with failures to define and solve problems.[16] These quotations contain clear evidence of a desire on the part of the theorists to focus farm management research in a "pin-point manner" on problematic questions rather than employing "buck-shot" farm accounts and surveys which produce, repetitively, a stable pattern of data not focused on the solution of any particular problem. At the Black Duck conference, efforts were made to isolate problems which could be solved by finding the equilibria defined in static production economic theory. Such use of economic theory assumed purpose and, as compared with positivistic survey and accounting work, *increased ability both to define and recognize solutions to problems involving attainment of the assumed purposes.* This, not theory *per se*, was what was attractive to those advocating the use of more theory. Such use of theory contrasted sharply with the endless, less *purposeful*, unchanging repetitive accumulation of farm survey and record data unfocused on the changing problems of farmers and society.

Though the new orientation concentrated on problems and, in this sense, differed significantly from the immediately preceding fact-finding research in the field of farm management, it contained a serious flaw to be discussed later. The flaw involved the narrowness of the problems considered which tended to be defined in terms of the disequilibria of static, production economic theory. This concentration made farm management a narrow problem-solving subfield of production economics which, in turn, was a subfield of general economics. Thus, even the initial problematic interests of the new theoretical farm management workers were narrower than those of the early, more traditional farm management workers whose interests had ranged from the technological and institutional through accounting to the sociological.[17]

The issue was carried back to the individual experiment stations and

[16] Report of the North Central Farm Management Research Workshop, August 22 to September 2, 1949. The focus on problems is clearly discernible in the discussion of the theory of research which produced an outline containing the following:

"*Selecting the Study.* The study should be selected with a view toward: (a) solving specific, definable problems leading to purposeful action; (b) anticipating problems and discovering remedies before they arise . . .

The problem selected for study should be significant in terms of; (a) its own importance and/or acuteness and (b) its relationship to other problems . . .

Stating the Problem. The problem should be stated clearly and fully in terms of: (a) the nature and extent of the apparent situation; (b) the circumstances which give rise to it; (c) the limitations and presuppositions under which it will be pursued; (d) the application expected to be made of the results; and (e) the economic ends of the individual or society . . .

Determining the Evidence Needed. The evidence to be assembled should: (a) be relevant to the stated problem and hypotheses . . .

Presenting the Results . . . Forthright endeavours should be made to insure utilization of the findings: (a) by obtaining and maintaining contacts with press, radio, extension workers, and other outlets; (b) by presenting the findings to persons in strategic positions; (c) by sharing experiences with fellow workers through personal contacts, journal articles, correspondence, *etc.*"

[17] As evidenced by the number of rural sociology departments which grew out of the activities of administrators of the earlier, more traditional farm management departments, those departments having evolved earlier out of the technological departments.

departments. In the years which followed, the older farm management members of the North Central Farm Management Research Committee retired and were replaced by persons with greater interest in economic theory and in statistics. Eventually, the North Central Farm Management Research Committee and much of the farm management research and teaching in Midwestern agricultural experiment stations developed an initial problem-solving orientation built around a substantial injection of economic theory into the field of farm management.

Heady's Book Appears

The historical perspective provided above indicates that agricultural economics (including the somewhat attenuated farm management groups) was well prepared for and, in fact, demanding the kind of book which Heady produced. Heady sensed and filled that demand. The alacrity with which this reviewer and many others adopted it as a graduate text attests to the esteem in which it was and is still held. This alacrity also reflected the widespread concensus in the profession about the need for the book. In reviewing the book, David MacFarlane wrote, "Professor Heady has written a highly important book . . . which for the first time brings within the covers of one volume the 'revolution' that has occurred in the field of agricultural production economics over the past 15 years. A small group of able, venturesome workers in farm management and production economics, with the author (Heady) in the forefront, have brought the 'new economics' to bear on farm production problems in an original and most valuable manner."[18]

The book articulated, in a remarkably accurate way, the then prevalent mood of the members of the profession, most of whom viewed it as a means of bringing into use the powerful tools of economic theory in *defining* and *solving* the practical, important production *problems* of the agricultural economy, particularly at the individual farm level. This was the driving purpose, the *raison d'etre,* of those who eagerly adopted the text and built courses around it and the related literature.

Ten years have now passed, and it is time to ask and answer the question "Is production economics playing its proper role in agricultural economics, including farm management?"

To answer this question requires that we also outline the main developments which have taken place since the appearance of the book, that date having significance *not* because a book was published at that time *but, instead, because* it more or less marks the triumph of a point of view started by Spillman and Taylor, nurtured by Black, and brought to triumph by Heady and others.

Trends Since the Triumph—A Loss in Productivity

Since 1952, the following trends have become evident in the United States:

1. The use of economic theory in farm management *research* has expanded many fold.
2. The use of advanced statistics, mathematics, and electronic com-

[18] See David D. MacFarlane's highly complimentary review in the *Journal of Farm Economics,* August 1953, Vol. 35, p. 445.

puters in farm management *research* has expanded far beyond levels envisioned in the early 'fifties.

3. Farm management research with a "production-economics" orientation has become increasingly:
   (a) less focused on the practical problem of managing farms, and
   (b) more focused on methodological and theoretical issues of less and less relevance to the solution of practical farm management problems as exemplified by such studies as; joint input-output experiments in crop and livestock production;[19] studies of the managerial process, *per se*;[20] and budgeting and linear programming studies of farm organization.

4. The proportionate use of farm management research by extension workers has decreased as its production economics orientation has increased. This is associated with;
   (a) decreased relevance in practical farm management problem situations of much of the current production economics research in farm management; and
   (b) the failure to increase competence with respect to production economics as rapidly among extension as among research farm management workers.

5. Accompanying the above trends in farm management research toward methodological and theoretical research, at the expense of the practical, has been an expanded interest in macro and policy work on the part of the persons with specific training in production economics. There has also been an important but not comparable reciprocal interest of students of policy, prices, etc. in production economics. This macro and policy work has tended, in turn, to focus on the theoretical and methodological at the expense of the practical and applied,[21] and as such differs from a "natural" tendency of young farm management workers and others to develop an interest in policy.
6. "Production economics" oriented farm management workers have either largely ignored or been largely ignored by the editors of the Journal of Farm Managers and Rural Appraisers, whose supporting association and membership have maintained a keen interest in the practical problems of farmers.

Somehow or another, these trends are not in accord with the expectations accompanying the shift to problem-solving farm management research based on the use of more theory. There has been no major rush of farmers to obtain the results of agronomic-economic research or of

[19] Compare E. L. Baum, *et. al.* (eds.), *Methological Procedures in the Economic Analysis of Fertilizer Use Data,* Iowa State University Press. Ames, Iowa, 1955, with E. L. Baum, *et. al.* (eds.), *Economic and Technical Analysis of Fertilizer Innovations and Resource Use,* Iowa State University Press, 1957.

[20] Compare G. L. Johnson and C. B. Haver, *Decision-Making Principles in Farm Management,* Kentucky Agricultural Experiment Station Bulletin, January 1953, with G. L. Johnson *et. al.* (eds.), *A Study of Managerial Processes of Midwestern Farmers,* Iowa State University Press, Ames, Iowa, 1961.

[21] Compare E. O. Heady, *et. al.* (eds.) *Agricultural Adjustment Problems in a Growing Economy,* Iowa State University Press, Ames, Iowa, 1958, with E. O. Heady, *et. al.* (eds.) *Agricultural Supply Functions—Estimating Techniques and Interpretations,* Iowa State University Press, Ames, Iowa, 1961.

similar research in animal husbandry.[22] Production function and linear programming analyses of farm businesses have produced no major breakthrough.[23] T. W. Schultz has stated:

> "It will be said that much progress has been made in production economics. Simple, old-fashioned budgeting has been replaced by sophisticated production functions. The journals runneth over with 'results' from linear programming, a new apparatus that is turning out thus far an undigested mixture of a few insights and many 'numbers' that do not make sense."[24]

The shifts to estimating supply responses from linear programmes and to stress on Leontief input-output studies have had little impact on policy makers.[25] In short, neither public nor private decision makers have had much direct help from production economists in solving problems. Lest this conclusion dismay production economists and farm management workers to the comfort of others, it is worthwhile noting that, in 1959, a Committee of the Social Science Research Council (S.S.R.C.) drew a similar conclusion about the profession as a whole when it stated:

> "Agriculture in the United States is in a period of critical change. The forces of change include rapid technological advance, rapid growth and structural change in the industrial and commercial environment within which agriculture functions, and an accompanying intensification and realignment of political pressure impinging on agricultural policy.
>
> . . . The economic and social consequences of these changes in agriculture are far-reaching and arouse widespread concern. These consequences include serious chronic distress within major sectors of agriculture itself, in spite of public remedial programmes that have grown to unmanageable proportions, and an accelerated movement of population out of agriculture that nevertheless appears to fall short of the rate needed for economic adjustment. Among families that remain in agriculture, the income gap widens between those able to adopt progressive technology and those lacking the necessary financial resources or personal capabilities. Successive sectors of agriculture are being increasingly controlled by outside commercial interests. Areas of traditional economic leadership in agriculture are challenged by new areas of agricultural economic growth.
>
> The concern with these consequences reaches all strata of the agricultural population and all groups concerned with agricultural welfare . . . .
>
> There are, of course, no simple, easily applied, costless, yet effective remedies for agriculture's ills. But they are not beyond constructive approach. That comments are so often only doctrinaire and that arguments seem so repetitious suggest *failure on the part of agricultural economists to apply imagination, to*

[22] R. F. Hutton and D. W. Thorne, "Review Notes on the Heady-Pesek Fertilizer Production Surface," *Journal of Farm Economics,* Feb. 1955, Vol. 37, pp. 117ff. Also see G. L. Johnson, "A Critical Evaluation of Fertilizer Research," *The Economics of Fertilizer Application,* Farm Management Research Conference of the Western Agricultural Economics Research Council, Report No. 1, June 1956, pp. 33ff.

[23] James S. Plaxico, "Problems of Factor-Product Aggregation in Cobb-Douglas Value Productivity Analysis, *"Journal of Farm Economics,* November 1955, Vol. 37, pp. 664ff. Also see Earl Swanson, "Determining Optimum Size of Business from Production Functions," in E. O. Heady, *et. al.* (eds.) *Resource Productivity, Returns to Scale and Farm Size,* Iowa State University Press, Ames, Iowa 1956, pp. 133ff.

[24] T. W. Schultz, "Reflections on Agricultural Production, Output and Supply," in E. O. Heady, *et. al.* (eds.), *Economic and Technical Analysis of Fertilizer Innovations and Resource Use,* Iowa State University Press, Ames, Iowa 1957, p. 335. In this same connection see *Farm Size and Output Research—A Study in Research Methods,* Southern Coop. Series Bull. No. 56, June 1958, bottom of p. 118 and top of p. 119.

[25] See T. W. Schultz, "Output-Input Relationships Revisited," *Journal of Farm Economics,* Nov. 1958, Vol. 40, pp. 924ff., which is critical of an earlier article of Heady's published in the May 1958 issue of the same journal. Heady had, in turn, criticized a still earlier article by Schultz in the August 1956 issue of the same journal.

depart from customary thought patterns, to break down the mental barriers that restrict their formulation of problems.[26] (Italics mine.)

If we accept the truth of the S.S.R.C. committee statement and the earlier criticisms which were directed more specifically at production economists and their work, then all agricultural economists as well as production economists must ask, Why? Why has the increased theoretical and empirical competence of agricultural economists led to reduced instead of increased productivity in terms of ability "to apply imagination, to depart from customary thought patterns, and to break down the mental barriers that restrict their formulation of problems".?[27] Or more specifically, on the subject of this paper, why have the production economists' efforts to include more production economics theory and improved mathematical and/or statistical methods in farm management and in other phases of agricultural economics been accompanied by less rather than more productivity?

Why

Two explanations for the irrelevance (and, hence, reduced ability to contribute to solutions of practical problems) of much current production economics research work in farm management and other phases of agricultural economics are to be found not in production economics itself, but instead in specialization in economics and a tendency to become more positivistic.[28]

These two developments, as we saw earlier, are in part consequences of an environmental call for more emphasis on production economics and, as such, can hardly be regarded as consequences of that emphasis or as a sole responsibility of those who answered the call. It is likely that these developments explain the lack of productivity in general agricultural economics which concerned Brinegar and his co-authors in the S.S.R.C. committee report.

Specialization in economics has a tendency to result in concentration on problems of economic disequilibria to the exclusion of other kinds of problems.[29] In economic theory, disequilibria indicate that problems exist. Problems definable in terms of disequilibria are solvable with recommendations designed to establish equilibria. So long as the marginality conditions for an equilibrium are met, the problems which exist

[26] George K. Brinegar, Kenneth L. Bachman and Herman M. Southworth, "Reorientations in Research in Agricultural Economics," *Journal of Farm Economics,* Vol. 41, August 1959, pp. 600ff. Other more polite but nonetheless disturbing papers include those of W. W. Cochrane, "Agricultural Economics in the Decade Ahead,"—*Journal of Farm Economics,* Vol. 36, December 1954, pp. 817ff. and Karl Brandt, "The Orientation of Agricultural Economics," *Journal of Farm Economics,* December 1955, pp. 793ff.

[27] *Ibid.* Brinegar, *et. al. Journal of Farm Economics,* Aug. 1959, pp. 600ff.

[28] *Ibid.* Brinegar, Bachman and Southworth, advance an alternative explanation, that of compartmentalization, which some readers may want to pursue. This explanation does not seem to be a very useful explanation of the lack of productivity associated with departmentalizing (the opposite of compartmentalization) farm management by making it more a part of economics. Disagreement with the SSRC Agricultural Economics committee point of view is also found in *Management Stretegies in Great Plains Farming,* Great Plains Council Publication No. 19. Published by the University of Nebraska College of Agriculture, August 1961, p. 97.

[29] Glenn L. Johnson, Agricultural Economics, Production Economics and the Field of Farm Management, *Journal of Farm Economics,* Vol. 39, May 1957, pp. 441ff.

are not directly discernible or solvable solely within the theory and, hence, tend to be overlooked by persons concentrating on the use of such theory.

The theory, for instance, does not ask whether the equilibrium distribution of incomes resulting from a given initial asset ownership pattern constitutes a problem or not. Though the core of a Kentucky hill farmer's problem be that of getting ownership of enough property and command over enough skill to earn "a decent living," no purely "economic-problem" exists if his hill farm is organized to "equate returns at the margin in both his production and consumption activities." While there is an income problem solvable by helping the Kentucky hill farmer get control "by hook or by crook" over more property and skills, the focus of economic theory on disequilibria tends to distract its user's attention away from the really relevant problem of inadequate resources in a search for non-existent problems of disequilibria.

When the problem is one of changing the institutional structure of agriculture, problems of disequilibria, too, are likely to be present but often are not worth correcting until the institutional changes are made, at which time new disequilibria are likely to arise to render irrelevant the original problems of disequilibria. For instance, in recent decades the problems encountered in designing new farm credit institutions and in creating institutional arrangements for controlling soil erosion were not solely problems of disequilibria and were more likely to create new disequilibria than to cure old ones.

Similarly, a problem growing out of a need to discover or create new technology may exist whether or not a farm business is in equilibrium. And, the discovery or creation would, in turn, typically obviate any pre-existing equilibria or disequilibria, possibly leaving a still greater disequilibrium problem to be solved as a minor sub-consequence of the solution to the major farm management problem. The tendency to reduce farm management to a subfield of production economics, which is, in turn, a subfield of economics shows up in the work of J. D. Black who wrote in 1953, "When the economics of agricultural production is reduced to terms of the individual farm, it becomes what is ordinarily known as Farm Management. Any textbook in *real* (my italics) Farm Management is a treatise on the economics of production of the individual farm".[30]

These examples should be sufficient to make it clear that concentration on problems of economic disequilibria is not identical with concentration on important, relevant problems. In fact, it is argued here that the problems which dismayed the S.S.R.C. sub-committee were mainly of this variety and that they were being ignored by agricultural economists who had concentrated instead on problems of disequilibria.

In 1959, this author commented,

> "The tendency of farm management workers to oversimplify by concentrating on static economic analysis . . . is of recent origin. Somehow or another we have become so concerned with technique and simplicity that we fail to face up to problems either practically or methodologically . . . We do repetitive applications of mechanistic techniques sometimes using hypothetical data. In short, we play with technique and underemphasize the descriptive as a basis for isolating problems and preparing an all out attack on them . . . we fail to face up to

[30] J. D. Black, *Introduction to Economics for Agriculture,* Macmillan Co., New York, 1953, p. 120; also see Johnson, *Ibid.*

the non-Pareto-better aspects of technological advance, economic growth and uncertainty . . . and of changes in wants and preferences."[31]

We now turn to the tendency toward positivism as a second explanation of the irrelevance of much research work involving production economics. This tendency is, of course, the same one which led earlier, nontheoretical farm management away from the relevant to the irrelevant.

The *tendency toward positivism* has gone through several stages in economic investigations involving the use of theory.

Early, Pareto and Hicks recognized the problem of assessing gains conferred on some persons in terms comparable with assessments of losses imposed on others. Without such assessments, it is difficult to ascertain whether a proposed solution to a problem would result in a net gain or loss. Recognition of this measurement problem suggested the advisability of limiting conclusions about net gains to situations in which at least one person was made better off and *no-one* was made worse off. Use of "the compensation principle" made it possible to extend the conclusion to instances where compensation could be paid by those benefited to anyone damaged and still leave those benefited better off. This development reduced the number of decisions which economists were willing to make about which actions are "right" to take or recommend as solutions to practical problems. Solutions were precluded which involved the imposition of uncompensatable damages on one or more persons or groups in order to benefit others.[32] The preclusion of such solutions leads to avoidance of problems involving institutional changes, redistribution of property rights and income streams, technological advance, and education advances.

Pareto's and Hicks' recognition of the problem of obtaining interpersonally valid utility measurements prepared the ground for the acceptance of the still more drastic positivistic conclusion that nothing objective was knowable about purpose, about good and bad, or, for that matter, about right and wrong solutions to problems. The research methodologies implied by positivism were and are extremely productive in the physical sciences where normative questions are less obvious and immediate than in the applied and/or social science disciplines. In fact, animistic and teleological reasoning which are non-positivistic but, fortunately, not the only kinds of non-positivistic reasoning often hinder non-social science research by introducing purely imaginary "purpose" to distract and, hence, lower the productivity of investigators. From this point, it is easy, if erroneous, to conclude that positivistic methodologies should be embraced to the exclusion of the normative in order to gain for social science the productivity of the physical sciences.

It was a long way *from the pre-Pareto and pre-Hicksian point of view* that objective knowledge of good and bad exists and is attainable *to the positivistic point of view* that such knowledge does not exist and, hence, is unattainable. It is a road from having some confidence in an

[31] *Management Strategies in Great Plains Farming, op. cit.* p. 98.

[32] The work of the North Central Technical Committee (NC-28) on soil conservation concentrated on the Pareto-better aspects of conservation and missed the "real" problems which involve imposition of damages on the living to confer benefits on those yet unborn. See L. A. Bradford and Glenn L. Johnson, *Farm Management Analysis,* Wiley & Co., New York, 1953, p. 429, for a brief statement of this aspect of the soil conservation problem. Also see Glenn L. Johnson, *op. cit.* p. 14.

objective ability to define and prescribe the solution to problems, to making both the definition and the solution of problems matters of subjective opinion beyond the realm of objective inquiry. So viewed problem-solving research loses its dignity, and is referred to as applied (the slang term is "putting out brush fires"), while positivistic research is glorified as "basic and fundamental". Paradoxically, the probability of relevance for what is called basic and fundamental yet divorced from the problems of society, seems to approach zero as only a small part of the infinitely complex, real and imaginal world is relevant.

One of the intermediate stages on the road from problem-solving to extreme positivism involves the technique of assuming or taking as given what is good and bad and then defining problems as involving the maximization of the good or minimization of the bad. This technique, referred to elsewhere by this author as "conditional normativism",[33] was more widely used by production economists formerly than now but is still followed extensively.

Kenneth Parsons has attacked conditionally normative research in a recent article.[34] Parsons feels that if researchers do not proceed under the proposition that knowledge of right and wrong is possible, they will become unproductive. Parsons' own specialized pragmatic philosophy holds that answers to normative and non-normative questions are inextricably interdependent and that to assume one while varying the other is impossible. In contrast to Parsons, Ciriacy-Wantrup urged production economists to become more positivistic.[35]

With or without Ciriacy-Wantrup's urging, the tendency has been for some production economists to be more positivistic. Distinctions are now being drawn between *supply functions,* which are defined as what profit maximizing farmers ought to do, and *supply response estimates,* which predict what farmers will actually do. The first are labelled normative, while the latter are dubbed positive or predictive. In commenting on as assignment to discuss normative supply functions, this author once wrote:

> "The term 'Normative', which appears in the title, has unfortunately tended to become an opprobrious epithet reserved in certain circles for *inaccurate* supply estimates while accurate estimates are labelled 'predictive' or 'positive'. This unfortunate distinction arises from the desire of positivists to avoid purpose or ends as being animistic, teleological and, hence, non-scientific (in their opinion). The use of this distinction implies that the behaviour of producers can be accurately predicted without reference to desire for profit, liquidity preference, desires for security as reflected in risk discounts, and the desires for security as reflected in willingness to make long chance investments which condition the behaviour of producers. The author feels that appropriate handling of subjective matters involving purposes and ends will produce more accurate (in the positivistic sense) supply response estimates than attempts to eliminate consideration of such matters. Obviously, studies which assume entrepreneurs to maximize what they do not, in fact, try to maximize may produce at least as inaccurate estimates as studies which avoid all maximization. Human behaviour (and production decisions are a form of human behaviour) is often a compromise between the

[33] Glenn L. Johnson, "Value Problems in Farm Management," *Journal of Agricultural Economics,* Vol. 14, June 1962, p. 13f. This article discusses conditional normativism in relation to modern welfare economics.

[34] In this attack, he specifically and emphatically disagrees with the conditional normativism of J. D. Black and E. O. Heady. See, Kenneth Parsons, "The Value Problem in Agricultural Policy," in E. O. Heady, *et. al.* (eds.) *Agricultural Adjustment Problems in a Growing Economy,* Iowa State University Press, Ames, Iowa, 1958, pp. 295-6.

[35] S. V. Ciriacy-Wantrup "Policy Considerations in Farm Management Research", *Journal of Farm Economics,* Vol. 38, pp. 1301ff.

entrepreneurs, concepts about 'what ought to be' (values or norms) and concepts about 'what is or can be' (beliefs—facts or predicted facts). It seems obvious that more accurate predictions of facts about supply decisions and responses must, generally speaking, be obtained in studies which take both values and beliefs into account than by non-normative studies. In addition, of course, errors in the process by which 'right actions' are determined from value and belief concepts would have to be considered in order to arrive at still more accurate predictions. The point is that the behaviour of producers is in part a social phenomenon, 'a serious analysis' of which, in Knight's words, requires 'a quite complicated pluralism', including but not limited to positivism . . ."[36]

On the relative objectivity of normative and non-normative concept formulation Boulding has written "Although I shall argue that the process by which we obtain an image of values is not very different from the process whereby we obtain an image of fact, there is clearly a certain difference between them".[37]

A conference of the Iowa Adjustment Center, recognized the inadequacy of positive research by focusing on goals and values. As Director of the Center for Agricultural and Economic Adjustment, Heady wrote; ". . . until it is recognized that progress to solution of the income problem rests on resolution of apparent conflicts in goals and values, progress in solving major structural problems of agriculture may be small."[38] The importance of normative considerations in defining and solving problems which Heady recognized in the above quotation has been underscored in a large number of recent reports,[39] even if not reflected in the nature and content of much current production economics research which has, instead, tended toward the positivistic at the expense of the conditionally normative and normative. This tendency toward positivism has led us away from relevant problem-solving work.

In summary, then, this long section supports the thesis that specialization and a tendency towards positivism are responsible for the lack of

[36] Glenn L. Johnson, "Budgeting and Normative Analysis of Normative Supply Functions," in Earl O. Heady *et. al.* (eds.) *Agricultural Supply Functions—Estimating Techniques and Interpretations,* Iowa State University Press, Ames, 1961, pp. 170-171. Frank Knight's interesting but somewhat contradictory position on this is found in his book. *On the History and Method of Economics,* The University of Chicago Press, Chicago, 1956, Chapter VII, especially pp. 172-177.

[37] Kenneth E. Boulding, *The Image,* The University of Michigan Press, Ann Arbor, Mich., 1956, p. 11.

[38] Iowa State University Center for Agricultural and Economic Adjustment, *Goals and Values in Agricultural Policy,* Iowa State University Press, Ames, 1961, p. vi. At this conference, many conflicting positions on how to work with values and goals were presented and noted, emphatically, to be inconsistent. In this connection, see pp. 254ff.

These conflicts, in turn, were still apparent at a subsequent conference of the Center which was devoted to the *problem* of land use; one-half of one out of 22 chapters reporting that conference was devoted to normative considerations. See, Iowa State University Center for Agricultural and Economic Adjustment, *Dynamics of Land Use--Needed Adjustment,* Iowa State University Press, Ames 1961. For a review of this effort, with emphasis on its normative shortcomings, see G. L. Johnson, "Dynamics of Land Use—Needed Adjustment—Review," *Journal of Farm Economics,* Vol. 44, May 1962, pp. 643ff.

[39] Joseph Ackerman, *et. al.* (eds.) *Land Economics Research,* Farm Foundation and Resources for the Future, Inc., Johns Hopkins Press, Baltimore, Maryland, 1962. See Chapters, 1, 3, 9 and 11. Also see *Land and Water Planning for Economic Growth,* Western Water Resources Conference, University of Colorado Press, 1961, pp. 129-136 and pp. 177ff. and Glenn L. Johnson and Lewis K. Zerby "Values in the Solution of Credit Problems," in E. L. Baum, *et. al.* (eds.) *Capital and Credit Needs in a Changing Agriculture,* Iowa State University Press, Ames, 1961, pp. 271ff.

productivity (in terms of solving problems) noted in the previous section.

As constructive criticism demands corrective suggestions, the next step is to examine some of the problems being neglected as a prelude to suggesting some needed redirection in the last section.

Examples of the Kinds of Problems Which Are Not Being Handled

As problem situations are dynamic and not static, a stable list of neglected problems cannot be produced. Thus, the following partial list of specific problems is necessarily ephemeral and only illustrative.

In the *problem area of farm management,* production economists can contribute to the solution of problems:

1. faced by technical researchers asking what kind of new technologies are needed;
2. faced by farmers unsure about the value to be placed on security, income, the "fringe benefits" of urban society, education, public facilities, research etc.[40]
3. faced by farmers in different regions when changes are proposed which would influence their comparative advantages. Such changes include modifications of transportation, technology, production control and price support schemes, credit institutions, international trade arrangements, *etc.*;
4. faced by farmers without command over enough resources to enable them to earn acceptable incomes in equilibrium. Here the need may be for access (right) to more credit, outright ownership of more property, command (ownership) of more skills, use (right to, ownership of) more public or semi-public property such as roads, schools, market facilities, research agencies, and accounting systems. The production economist can help predict the consequences of such changes and contribute substantially to conclusions about their desirability even when the changes under consideration are obviously non-Pareto-better;
5. faced by farmers locally, seasonally and chronically short of labour or priced out of the labour market. In this connection, work is needed (a) on institutional arrangements affecting the seasonal and geographical supply of labour, (b) on farm reorganization plans affecting labour utilization (such plans involving far more than shifts on given subproduction functions), and (c) by technical researchers on what kinds of labour saving technology are needed.

Without exploring all the ramifications of these and other farm management problems, some attention should be given to the kinds of marketing problems which production economists can help solve. Roughly, these parallel those in farm management and, like those in that area, are often not definable in terms of initial disequilibria. In fact, marketing situations in initial equilibrium may often call for drastic changes.

[40] Dynamic production economists interested in the managerial process clearly have an interest in the "good judgment of managers." Judgment is asserted here to depend on knowledge of the value of income, security, *etc.*

1. In both factor and product markets, situations reach static impasses where drastic action is required. Present product markets are not characterized by widespread disequilibria, given existing government controls, yet there is an active search for new market arrangements and mechanisms. In Michigan, for instance the Farm Bureau actively seeks, through its farm service organization, new bargaining rights for farmers producing processing apples, pickles and sugar beets. Elsewhere in the U.S., bargaining rights are sought by a new major farm organization, the National Farmers Organization, for livestock products and for food grains. What are production economists doing with respect to problems involving new ways of producing marketing services, reorganizing markets and devising new marketing mechanisms?
2. The labour market, too, is characterized by demands for new arrangements for handling foreign and domestic migrant labourers to meet seasonal, local and regional shortages of labour. Production economists have much to offer in predicting the consequences of alternative solutions and in estimating the disequilibria which would be created by various proposed changes.
3. In marketing, too, there is great interest in new physical layouts and technologies to reduce labour requirements. What production economists have really become creative and aggressive in developing such layouts and in indicating to engineers and architects the kind of equipment and buildings required?

Economic development and growth has always been a major concern of agricultural economists. Farm economies, stagnating in near static equilibria, are characteristic of many of the underdeveloped countries. People can be starving and going without the elemental requirements for supra-animal existence in "penny capitalistic" economies which are in equilibria.[41] The problems here involve changes in land tenure, additional ownership of capital, new skills, and rights to new services. Introduction to these changes, in turn destroys old equilibria whose existence paralyzes the thoughts of economists trying to find infinitesmal problems of disequilibria while walking over mountains of problems involving human suffering, injustice and hopeless despair. Especially in economic development, normative work is badly needed to clarify and establish (by experience and logic) the workability of various concepts of the goodness and badness of such things as income, medical facilities, lawfulness, disorderliness, justice, work, education, *etc.*

Agricultural policy also presents a wide range of problems, only part of which involve disequilibria and most of which involve serious normative questions. Here we have problems involving public investment in agricultural research; the creation of institutions to stabilize production and prices, public investment in roads, irrigation and drainage facilities, and education; the procurement and/or maintenance of rights to services such as electricity, telephones, markets, schools, *etc.,* as size of farms increases and population densities decrease. We also have problems of devising new institutional ways of controlling resource flows into and out of agriculture. The production economist has much help to offer in

[41] Sol. Tax, *Penny Capitalism: A Guatemalan Indian Economy,* University of Chicago Press, Chicago, 1963.

estimating and evaluating the output effects of such alternative policies and programmes if he will face up to such problems.

Needed Redirections

All of the above has noted two current tendencies:

1. of production economics researchers (and others acquiring increased theoretical and empirical competence) to specialize in problems of disequilibria to the *exclusion* of problems involving technical, political, social and other changes; and
2. of production economics researchers to become increasingly positivistic to the *exclusion* of normative investigations.

Fortunately, neither tendency has become completely dominant though both have reduced the relevance of the research work of production economists and others stressing theoretical and empirical competence. The needed redirections do not involve either a change in or a diminished total role for production economics. Instead, they involve:

1. the use of production economics in conjunction with data and concepts from a wide range of academic disciplines to attack a wide range of practical problems going far beyond conventional economic disequilibria;
2. the avoidance of the sterilizing impacts of highly specialized philosophies of inquiry, particularly positivism, with its presumption that objective knowledge of purpose, of good and bad, or of right and wrong is unobtainable;
3. recognition that the wide range of problems to be attacked by production economists which is beyond economic disequilibria requires related research in the physical and social sciences and in the humanities; thus, the contribution of production economists to problem-solving research needs to be recognized as *partial* within problematic areas much broader than production economics or, for that matter, all of economics.

So directed, the contribution of production economics can fulfill the hopes of that "small group of able and venturesome workers in farm management and production economics, with the author (Heady) of this volume in the forefront" who ". . . brought the new economics to bear on farm production problems in an original and most valuable manner."[42] At the time Heady's book was written, the reviewer just quoted also wrote, "Our definition and understanding of problems is more revealing; and our tools sharper. For these advances we owe a tremendous debt to Professor Heady." Now, over ten years later, I would write instead, "Professor Heady's book has increased our capacity to understand and find problems and has sharpened our tools. For this we owe Professor Heady a tremendous debt. Whether or not we use this capacity to understand and find and help *solve* the important problems of private and public decision makers depends upon *our* ability to use these tools without being confined to them and without becoming unduly positivistic as our account keeping and/or surveying forebears did before us. This performance we came dangerously close to repeating during the last half of the decade which has passed since Professor Heady made his truly great contribution to agriculture."

[42] MacFarlane, *op. cit.* p. 444.