Current Efforts at Estimation of Costs-of-Production in the Economic Research Service

by Ronald D. Krenz*

Introduction

The topic for this session indicates that we are dealing with the matter of "issues in setting effective target prices". From examining the titles of the various papers to be presented, one would get the impression that the cost-of-production is important in setting target prices. This raises several questions that I would like to address. First, "Is cost-of-production a good basis for setting target prices?"; secondly, "If it is considered appropriate that they be used to set target prices, then what costs should be covered by target prices?"; and finally, "How should these production costs be estimated?".

Legislation

In passing the Agriculture and Consumer Protection Act of 1973, the 93rd Congress established a set of target prices for some crops including wheat, feed grains and cotton. These target prices were designed to be used as a basis for income payments to farmers if market prices fell below these levels.[1/] These target prices were intended to be adjusted for the 1976 and following crop years on the basis of the

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1/ These target prices are not to be confused with loan prices which serve as a "Price floor" for CCC loan operations.

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index of prices paid for production items, interest, taxes and wage rates, and further adjusted by changes in the three-year moving average yields.

This same act directs the Secretary of Agriculture to carry out studies of cost-of-production for wheat, feed grains, cotton and dairy products. The act does not specify that the costs-of-production would be used to set target prices, but the implication is there. Also, requests for cost-of-production data from various Congressmen in recent months and recent proposed legislation would strongly suggest that cost-of-production data will be used as a basis for setting target prices, if not now, then in the near future.

Appropriateness of Costs

It is appropriate to ask whether the cost-of-production is a good basis for setting a target price. From the standpoint of guaranteeing adequate returns to farmers' resources, it would appear that such an arrangement would be appropriate. This method seems more logical than the parity concept in which an index of prices paid was applied to a production technology used in 1910-1914. Prices supported at the cost-of-production would seem to alleviate the fears of consumers that the government is subsidizing farmers at their expense.

However, a price equal to the cost-of-production may result in more output of some commodities than consumers want to consume. Such a price may not be an equilibrium price.

Foreign trade must also be considered. How does our cost-of-production compare with that of our foreign competitors? Do we wish to compete in foreign trade? Perhaps we need to consider the effect

on our balance of payments in foreign trade when we set target prices.

Hence, it seems appropriate that policy makers should have some liberty to depart from the cost-of-production in setting target prices. The policy maker should know what the cost-of-production is, but should also consider other factors in setting the target price.

Input Pricing Problems

A second issue is, "What costs should be covered?" Costs-of-production on farms is a much more nebulous item to estimate than in an industrial organization where all inputs are purchased. Farm production utilizes several resources which are not priced in the market place. A farmer's labor and management is not priced in any market. It is often a matter of assumption as to an equitable return to these factors. A farmer wage rate can be inferred from the wage rate for hired farm workers but the rate of substitution is not clear. Also no market exists for the sale or exchange of the managerial talents used on the typical U.S. farm.

Land Costs

Perhaps more significant is the cost of land. Land costs probably constitute the single largest cost item in agricultural production. It may account for 25-40% of total production costs, depending on your method of estimation. The question revolves around the issue "What is farm land worth?". As per Ricardo, farm land is worth what farmers are willing to pay for it, which depends upon what profits can be expected from production. Hence, land values are essentially based on current and expected returns from crop production. Setting of target prices

will influence profits which in turn effect land values and hence, cost-of-production.

This could give rise to a wage-price type of ratchet effect. If target prices are set too high, land values will move upwards. As land values move upwards, costs-of-production will increase which will give the basis for further upward increases in target prices with an unending spiraling effect of rising farm prices and land prices.

Perhaps this is more of a political issue than an economic issue. However, economists should inform the politicians of the likely impacts of such actions.

Perhaps target prices should be set to provide a floor to cover only non land costs letting returns to land become a function of the market place. If demand causes market prices to exceed target prices, then farm profits will rise and land values will be bid up. On the other hand, as market prices approach target price levels, land values may fall. However, farmers out-of-pocket costs would still be covered, allowing him to remain in production.

And what about the relationship between loan rates and target prices and production costs? Should loan rates be below or equal to target prices; or should loan rates be set to cover certain production costs but not other costs? What criteria would seem useful in this regard?

Should target prices be the same for all regions if costs of production are different? Should target prices be set to cover costs of the average producer or at a high level to cover 90 percent or 100 percent of all producers?

Briefly stated, these are some fairly fundamental issues that need to be resolved. I do not expect to resolve them at this time, I only wish to bring some of these issues to your attention for further discussion.

Estimating Costs-of-Production

The remaining item that I wish to discuss is the matter of procedures in estimating cost-of-production and current efforts at cost estimates in the Economic Research Service.

Production costs in agriculture are extremely variable both among producers at one point in time and over time. In a given year, costs will vary between neighboring farmers due to differences in prices paid for inputs and due to size economies. For instance in 1969 the cost of producing one pound of cotton lint was estimated to range from less than 15¢ per pound to greater than 39¢ per pound.[2/]

Production costs will also vary over time due to changes in these same factors.

As previously pointed out, some farm inputs such as labor and management are not priced in any market. These facts simply point out the difficulty of estimating the cost of producing farm commodities. Variation in costs make larger sample sizes desirable and calls for careful stratification and selection of the sample.

2/ Starbird, J.R. and B.L. French, "Costs of Producing Upland Cotton in the United States, 1969", Ag. Econ. Report No. 227, ERS, USDA. June, 1972.

ERS Experience

Let me now discuss two somewhat separate but not independent cost-of-production efforts that are being conducted in ERS. These will be described as (1) the Firm Enterprise Data System (FEDS), and (2) the cost-of-production task force.

Early in 1973, the Commodity Economics Division of ERS made a decision to proceed with the development of a systematic approach to development and updating of firm enterprise data. The purpose of this effort was primarily to collect and keep current over time enterprise cost data that would be available for research purposes including interregional competition types of supply analyses and for analysis of policy questions. The system thus established is currently known as the Firm Enterprise Data System (FEDS) which I will disucss in more detail later.

A few months later Congress passed the Agriculture and Consumer Protection act referred to earlier, calling for cost-of-production studies. This action was really an expansion of previous efforts rather than a new concept. Acting upon congressional request, ERS had conducted surveys in 1964, 1969, and 1972 on the cost of producing cotton. Hence, the 1973 Act was really an extension to cover additional commodities.

As a result of the 1973 Farm Act, ERS requested additional funding for cost-of-production surveys. Such funds were obtained and early in 1975 a comprehensive survey of cost-of-production of cotton, feed grains, wheat and dairy was taken. Approximately 5600 farm interview schedules were obtained in this manner. These data are now being processed and

results should be available soon. This survey work is being directed by our ERS cost-of-production task force.

One of the major differences between these two cost-of-production efforts is that in the FEDS system we attempt to budget only an average cost-of-production for a given crop for a given geographic area. No estimates are made of the extent of variance in cost-of-production. On the other hand, the task force efforts with the large sample survey will provide both an estimate of the mean cost by geographic area and an estimate of the total distribution of costs. Such a distribution will indicate for example, the percent of cotton produced at 20¢ a pound, percent produced between 20¢ and 25¢, etc. Similar estimates will be made for other products.

The cost-of-production survey effort and the budget system will probably both be continued in the future as both play somewhat different roles. The survey provides data on machinery types, sizes and number of operations performed which serves as an update of technology of production. These data are not available from ERS or any other source. This will likely be done every 3-4 years. In the interim years, however, the budgeting system can use ERS data and other sources to update the production cost estimates as influenced by yields and prices.

FEDS Budgeting System

The FEDS system uses the Oklahoma Budget Generator which is a set of computer programs developed at Oklahoma State University by Walker and Kletke.[3/] This system, along with some additional programs that

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3/ Kletke, Darrel D., "Operations Manual for the Oklahoma State University Enterprise Budget Generator." Research Report P-719, June 1975, Oklahoma State University.

have been written, provides a completely computerized system for the development, modification, updating and comparing of budgets.

The plan is to estimate average cost-of-production by crops by area for all major producing situations in the United States. Approximately 750 crop budgets are now stored on the system. These budgets depict approximately 93 percent of the acreage of wheat grown in the United States in 1973, 85 percent of the barley, 91 percent of the corn, 89 percent of the soybeans, 81 percent of the oats, 94 percent of the sorghum and virtually all of the cotton, rice, peanuts, and sugarbeets. A few budgets on potatoes, tomatoes, sugar cane, hay, pasture and silage are also included for some geographic areas.

At this time no livestock budgets have been completed. We are now developing the specification of machinery and equipment requirements for the livestock budgets and hope to develop a fairly complete set of livestock budgets during this coming fiscal year.

The crop budget data were assembled from a wide variety of sources, but primarily from ERS field men, experiment station, and extension service sources throughout the nation. During this first year the major emphasis was on trying to get a set of these crop budgets developed. Additional time must be spent on making these budgets comparable across commodities and geographic regions. During the coming year, data from the 1974 ERS Cost-of-Production Survey will be incorporated into these crop budgets so hopefully by January of 1976, a set of budgets will be available which will be comparable across the nation in terms of inputs and machinery technology.

The major responsibility of the FEDS staff is that of processing the budget data and working on annual update and comparability. The

bulk of the data used in the annual updating will come from the Statistical Reporting Service. This past year the budgets developed were generally based on 1973 farming conditions, yields, acreages, etc. These will be updated to 1974 during the fall of 1975. This set of crop budgets will constitute our historical set which will be updated each year as crop data for the previous year become available.

This set of historical budgets may not be appropriate for setting target prices from the standpoint of timing. In setting target prices we should be concerned with production costs a year or two in the future whereas the historical budgets will be one or two years old. This would not be a serious matter except for inflation. These base historical budgets can; however, be used for projecting one or two years in the future. For instance, recently the 1973 budgets, along with projected yields and input prices, were used to project 1975 costs of production by crops, by regions for seven major crops.

This type of projection work will likely be continued in the future. This fall after the historical budgets have been updated to 1974, these budgets, along with projected prices and yields, will be used to make preliminary estimates of 1976 costs-of-production. These projected cost estimates should be useful as guides to policy makers in setting target prices.

Whole Farm Budgets

A series of whole-farm budgets is also being planned within the FEDS system. The purposes of this budget series would be (1) to provide estimates of current net incomes of typical farmers as influenced by prices, yields, and costs; and (2) to have available for ready access

a set of farm resource and cost data which can be used for quick analysis of impacts of various price and policy variables on net incomes of typical farms.

This series would in essence replace the discontinued ERS costs-and-returns series which provided a general type of economic information demanded by the general public. In this new series, all of the enterprise data for the typical farms will be obtained from the enterprise budgets. Given additional information on farm size, enterprise size, and other overhead cost data, a whole farm budget will be developed, which will be entirely computerized, and will show differences from year to year in net farm income for major types of farming situations in the United States.

Future Plans

Future plans for the FEDS system include expansion of the enterprise budgets to cover all the major crop and livestock enterprises plus the typical farms mentioned above. Some planning has gone into the idea of developing a computerized budgeting process for estimating costs in processing and distribution firms. With such a program it would be possible to develop budgets for firms such as flour mills, slaughtering plants, feed plants, etc. The same computer technology for insuring uniform budgeting procedures, comparability and updating procedures that has been found to be useful for farm enterprises could be put to use for these agribusiness firms.

Studies of economies of size or scale could also be made with such budgeting programs. Plant operations at various levels of capacity could be simulated and cost curves developed. Similarly, costs can be

updated due to changing input prices or changing technology thus giving estimates of marketing margins and cost components.

Conclusion

In recent years significant advancements have been made in the use of computers in modernizing our methods of cost computations. The methods now available promise a vast improvement in terms of gaining comparability across commodity and geographic regions, in facilitating the updating from year to year that is necessary due to changing prices and technological developments, and also allowing the economist to budget unique situations with simpler types of data than were previously required.

What remains, however, in regard to establishment of target prices are the same conceptual problems that have always plagued economists. That is, how to deal with certain residual claimants such as labor and land, and the additional questions, "What does society want from its agriculture in terms of stability and production levels?"

Where is the economists' role in this determination? Perhaps it is true that setting target prices does involve value judgments and political considerations. However, I think it is also quite obvious that economists must be available to provide data regardless of the legislation enacted and to indicate the implications of various target price determinations.