

Estimating and Using Cost Data to Measure Performance

Lee F. Schrader
Purdue University

Handwritten notes: *1987*, *Ch. 10, p. 51*

Efficiency, getting the most utility from resources used, is a key dimension of performance at the plant, firm, or industry level. Cost data and relationships, appropriately interpreted, are important for firm decisions and for policy decisions as well. Accurate cost data are necessary for the credibility of many other analyses.

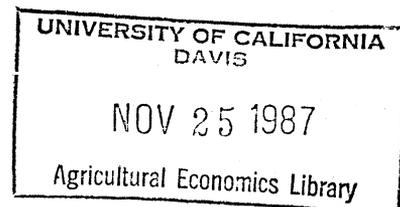
Considerable progress has been made in techniques of cost function estimation and in the use of cost functions in efficiency measurement. Techniques for estimation of frontier cost functions and cost functions for multiproduct firms have been developed.

Nevertheless, my bias is that we have too little cost data collection and analysis currently being done. One of the reasons for this lack is that excellent work in straight empirical cost analysis is not considered good journal material and our academic rewards systems prefer journal publication. A second reason is that data are not easily obtained and are becoming even more difficult to get.

I'll go no further into the rewards system. It is a problem of our own making. Unfortunately the problem of access is a problem not of our own making. Cost information has become less available to the researcher. As the scale of agricultural businesses increases, one is more likely to find firms acting as rivals and less willing to divulge cost data. They may be concerned about information reaching either or both rivals and potential entrants. Deregulation of transportation has made data in that area more complex and negotiated rail rates (perhaps the most interesting of all) are not public information.

Handwritten note on left margin: *1987*
Cost of production

AAEA paper, 1987



Private sector businesses have also entered the market for comparative cost information in some industry groups. These data are typically not available to researchers but may preclude the gathering of cost data from the firms involved. No one told us life was easy!

At Purdue we have used accounting data gathered from agricultural supply and marketing firms in a comparison of performance of cooperative and proprietary firms. Cooperating firms were induced to provide data with the promise to provide a comparison of their firm's performance relative to similar firms in their industry. This approach proved successful with grain marketing and farm supply firms and with cheese manufacturing plants. These were not generally very large firms and they were operating in relatively competitive markets.

A subsequent project to gather, analyse, and feed data back to grain and farm supply firms failed to generate sufficient participation to be continued on a fee basis. We had expected this to be a source of data for other analyses as well as a service to the firms involved. We have had a project to collect plant level data from fertilizer retailers on a semi pay-as-you-go basis for some years. It has yielded data useful for statistical analyses and performed a service role.

The accounting data analyses are an appropriate means to compare groups of firms and to provide some measure of performance of an industry relative to the lowest cost firms in the industry. These analyses provide no standard other than that - the best of the industry. If there are conditions which lead all the firms to be less than efficient, it will not be identified. That is, if a lack of competition has resulted in a general relaxation by management or input prices have been allowed to creep up, the statistical analysis of accounting data will not reveal the cost function we

would like to see. We should still be able to observe the effects of firm or plant size even if the level of cost is biased upward.

We shall probably have to rely to a greater extent on the use of the relatively more expensive economic engineering studies to estimate cost relationships in many instances. The well done study does provide an absolute standard. If appropriately documented, a cost synthesis can be modified easily to reflect changes in input costs. Cost syntheses are less able to capture firm level economies of size and scope because of a line of business or plant orientation. A cost synthesis is also difficult to validate without cooperation from firms in the industry. It can be used to make a clean separation between the time and rate effects on costs.

Several years ago I was involved with a study of the cost of producing high fructose corn sweetener. There was a great deal of interest in the product and very few firms involved. None of the then current producers would provide the data required. We relied on input and equipment vendors and private consultants to obtain the data needed. The study, now out-of-date, was quite useful to many judging from the stream of requests for the publication. We used a version of the model to assess the performance of corn quality standards - not in the sense of this symposium but still an aspect of marketing performance. Its major use was, I believe, by potential entrants or investors. It may have had some impact on the performance of that industry.

We have just completed an attempt to assess the efficiency of local cooperative operations in grain and farm supplies. Estimates of scale economies (cost relationships) are at the heart of these analyses. Our cost estimates are based on both statistical analyses of accounting data and some cost synthesis. The study was designed to assess the degree of competition among and excess capacity of cooperatives. It was approached via the

computation of the optimum size and number of plants to serve a given area and market share as well as to compute a cost minimizing organization for the entire market. This type of analysis can help to assess the tradeoff between technical efficiency and competition in spatial markets.

Back to my biases, I submit that the availability of high quality cost analyses should be regarded as a part of our data system. Too often we see examples of very complex models based on cost estimates derived from out-of-date or poorly executed cost studies. We need these building blocks to develop credible industry models to assess performance of processing firms as well as the coordination systems involved.

I learned a few years ago that one must get data when one can. Representatives of a large firm visited our department to try to interest someone in an economies of size study for their industry. At that time they had or anticipated having antitrust actions against them. When some time later I had a student interested in the problem the firm no longer perceived a problem with Government and had lost all interest in giving us any cooperation.