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MEATPACKER COSTS: RECENT INTEREST, METHODS OF ANALYSIS,  
AND IMPLICATIONS

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Address at meeting of American Farm Economic Association,  
University of Minnesota, Minneapolis, Minn., Aug. 27, 1963

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MEATPACKER COSTS: RECENT INTEREST, METHODS OF ANALYSIS,  
AND IMPLICATIONS

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There is widespread recent interest in costs for livestock slaughter plants. Regional research committees need cost coefficients from economy-of-scale studies for long-range projections of location of livestock slaughter. Rural development planners and farmer cooperative groups also want cost figures for economic feasibility studies and planning investment in new plants. Meatpackers operating in high-cost plants, confronted with squeezed price margins, are analyzing alternatives: which plants to modify and how much, where to build new and how big, whether to increase volume by enlarging existing plants or multiplying plant numbers, which plants to close.

Physically, the increase in number of livestock slaughter plants since World War II continues. In recent years, number of new plants being constructed has exceeded increase in total plants operated; this combination implies a high rate of exit as packers continue to suspend slaughter or to close obsolete plants. Meatpackers report continued unsatisfactory earnings from livestock slaughter during the past several years. They attribute these to a narrowing of live-wholesale price margins or packer spread, 1/ and to relatively less seasonal widening than in previous years.

What is happening? Is inadequate planning information misleading some investors into making unwise investments in packing plants? Are there true economies to size and scale, or are savings in costs within plants perhaps offset by diseconomies in external costs? Or do growth plans or market position govern despite current unfavorable costs? Does capacity perhaps assure operational flexibility or expedite purchasing and selling? Would a new slaughter plant improve prices paid for livestock locally? Would the jobs and payroll make a new slaughter plant an attractive investment for rural development? These questions emphasize the importance of detailed analysis of costs, volume, and scale in typical meatpacking plant operations.

1/ DeGraff attributes the narrower price spread to retail food chains' ability to control packer spread and to take advantage of reduced slaughter cost in new, efficient plants. (Herrell DeGraff, Beef Production and Distribution, University of Oklahoma press, 1960, pp. 208-209).

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Let us compare alternative research methods useful for such studies, examine results in recent studies, and explore some implications.

Beef slaughter represents a specialized, largely uniform operation. Recent studies <sup>2/</sup> include an industrial engineering study of a Texas cattle plant, a synthetic study of economy-of-scale for eight California cattle plants, and a current statistical study of accounting costs for 34 cattle slaughter operations located mostly in Corn Belt and adjoining Lake, Plains, and Southern States. In the current USDA study we have obtained similar cost information for pork operations from about 70 plants, not only for slaughtering but also for cutting and processing hogs into fresh pork cuts, cured, and smoked products; but there is less uniformity among pork plants because of varying combinations of activities following slaughter. This paper will focus on packers' costs generally and beef costs specifically, although fully as applicable to packers' pork operations.

#### Measurements of operating costs

Slaughter cost will differ if generated by the synthetic or the accounting method. Both accounting and synthetic methods show meatpacker cost structures for fresh beef operations include some economy of labor use with size and process. Economic-engineering studies, however, show economies to size larger than accounting studies. Study of firms' records shows much variation between accounting periods, with some firms maintaining average labor use closer to their minimum than others. Analysis of accounting records helps also to evaluate the assumptions that go into the industrial engineering models. <sup>3/</sup>

Where labor use is transformed to labor cost, there is conflicting evidence on economy of size and scale. Either the wage-rate factor, offsetting lower labor use, or differing average weight and dressed yield, may account for differing economies with size

<sup>2/</sup> Donald R. Hammons and Jarvis E. Miller, Improving Methods and Facilities for Cattle Slaughtering Plants in the Southwest, U. S. Dept. of Agr. WRR-436 (1961); Samuel Logan and Gordon King, Economies of Scale in Beef Slaughter Plants, Gianinni Foundation Report 260, (1962); Donald B. Agnew, (1) Meatpacker Costs in Fresh Beef Operations--A Pilot Survey and (2) Meatpacker Costs and Income with Changing Beef Volume, both U. S. Dept. Agr., Econ. Res. Serv., (Proc.) (1963), and (3) Meatpackers Recent Costs and Spreads for Beef, USDA, ERS-135 (Aug. 1963).

<sup>3/</sup> Difference between estimated and actual performance may have contributed much of the error of cost estimates or projected earnings involved in recent closing of some newly-built plants after only a short operating period.

and the cost variations found in accounting studies. <sup>4/</sup> In both studies using the synthetic method, assumptions of uniformity were used--uniform wage rates, composition and characteristics of kill, and product transformation rates. This may be appropriate for specialized operations with stable wage rates--e.g., with relatively stable slaughter volume, of uniform weight and finish, and with little or no overtime or guaranteed time to push effective wages upward. Standard and stable costs per pound of output result. More important for most firms' planning purposes, some firms and some plants may be able to survive by paying lower-than average wage rates, and processing livestock with above-average yields.

Turning away from in-plant costs, we find that external costs (for procurement and selling) were omitted in the studies using the synthetic methods. While external cost could be studied by the synthetic method, similar studies (assembling milk, eggs, and poultry) have relied heavily on accounting data, sometimes in combination with the engineering approach. External-cost patterns with changing volume may variously enhance, reduce, or reverse the cost-to-volume patterns for in-plant operations. This has obvious implications for planning.

Fixed Costs: Level, relevance, relation to overcapacity

Although fixed cost is important in determining final net income, in most day-to-day operating decisions it is not a determining factor. Yet fixed as well as variable cost must be covered in planning new investment and for long-run survival. Fixed costs can be studied by either the synthetic or accounting method. Standardizing fixed costs becomes a problem with the accounting approach. Allocating fixed costs among activities and products is a knotty problem. It differs for costing beef and pork, fresh meats and processed. If a fixed or overhead cost is assigned equally to all departments and products, this places an unrealistic burden on some narrow-margin although essential operations.

On the profit-and-loss statement, fixed plant and equipment costs vary even among firms with similar investments according to the depreciation method for income tax accounting; this is affected by Federal tax provisions, especially for investment credit and guideline depreciation rates for equipment. By definition, fixed cost within a plant varies inversely with volume; yet accounting records show considerable additional variation among months in the amounts for items considered as fixed. In part this reflects differences between actual cash flow and accrual, and in part the

<sup>4/</sup> In my recent research, wage-rate effects sometimes reduced, absorbed, or offset the slight difference in labor efficiency. This was true for analysis of both beef slaughter and hog slaughter. See also: Donald B. Agnew, Labor Cost of Killing Hogs from Packers' Accounting Records, USDA, ERS (Proc.) Oct. 1962.

impracticability of separating fixed and variable elements of some partially fixed items.

For planning, fixed cost estimates must include also the cost of idle capacity, whether intentional or circumstantial. Because of the investment credit and likely future increases in wage rates, standby capacity may become more costly both to hold and to use. But this could lead to either less or more standby capacity,--less if it encourages idle (obsolete) plants to be scrapped, but more if the credit encourages some speculative investment in larger capacity labor-saving equipment to offset expected future wage rate increases. Fixed cost thus may be relevant in different ways to planning new current investment, to cost-and-pricing practices in existing plants, and to retaining vs. scrapping an obsolete plant when it is replaced.

#### Pros and cons of alternative methods for studying costs

First, the different methods of studying costs and their differing scope may affect cost estimates for uniformly defined operations in scale studies.

The synthetic approach, as used so far, measured only two of the five factors associated with differing level of in-plant costs for beef slaughter, and has treated external costs only by assumption. Useful information has been developed in both studies. But for planning, both need supplementary accounting data to improve their estimates of total actual costs--since the assumption of fixed wage-rate, labor efficiency, liveweight and yield factors may underestimate costs and overstate size and scale economies.

Second, each approach has advantages for certain uses, and a combination approach is most useful for some analyses.

In the synthetic (engineering or building-block) approach, investment requirements and costs are determined for selected plants, newly planned and equipped, using current engineering data, equipment lists, and cost rates. Each stage of the production sequence is analyzed separately. In a multistage operational sequence, such as livestock slaughter, the synthetic method results in a summary of man-and-machinery requirements and costs for each of a succession of stages. This introduces problems of segmentation, discontinuous costs, and harmonious combinations. <sup>5/</sup> A disadvantage claimed for this approach is its costliness for man-hours of research labor. For broad objectives--comparing total costs or determining general economies

<sup>5/</sup> B. C. French, L. L. Sammet, R. G. Bressler, Economic Efficiency in Plant Operations with Special Reference to the Marketing of California Pears. Hilgardia, Vol. 24, No. 19, July 1956, pp. 707-09.

of size--a less costly approach may give adequate though less refined results. Accounting data may sometimes serve both objectives. 6/

In making long-run projections, least-cost estimates for stand-ard operations are needed. Also, the disparity between actual and optimum cost serves as an index of economic pressure to replace existing plants with new, lower-cost plants. Either calculation can be made within an accounting study if detailed data are available 7/ or by combining engineering with accounting approaches. 8/

But the accounting approach involves special problems such as segregating operations, assuring uniform accounting procedures, and, for time-series data, continuity of reporting for physically similar or identical plants for several production periods with varying volume. Stratified samples are required to yield industry cost curves of suitable precision. 9/ In return for this extra trouble, study of accounting records enables a wider range of conclusions about factors affecting cost and about supplementary activities.

Third, study of costs for principal operations (i.e., slaughter) needs to be supplemented with analysis of subsidiary operations that enter into investment planning or into plant survival. For meat-packers' operations, many factors encourage sharp competition and make returns low and survival hazardous. 10/ Survival factors may include the feasibility of differentiating a firm's product line or its customer service, even though it handles a largely undifferentiated commodity, i.e., fresh beef carcasses within a narrow range of weight or finish. This differentiation may take the form of brands, degree of processing, or specialized trim, delivery, credit, or related services. Additional or integrated operations--whether by-products, further processing, and related marketing services--might be included or continued in a plant's activity mix if it appears that they will increase or maintain earnings.

6/ Pritchard, N. E. and Olson, R. E. An Economical Source of Research Data. Agr. Econ. Research 6(3) p. 93-96, July 1954. Richard Phillips, Empirical Estimates of Cost Functions for Mixed-Feed Mills in the Mid-West, Agr. Econ. Res. 8(1) pp. 1-8. Jan. 1956.

7/ E. g., Walker, S. H., Preston, H. J., and Nelson R. T., Economic-Analysis of Butter-Nonfat Dry Milk Plants. Idaho Agr. Expt. Sta. Res. Bul. 20, 1953.

8/ For an analysis combining synthetic with accounting data, covering separately both assembling and processing functions with scale, see Donald B. Agnew, How Bulk Assembly Changes Milk Marketing Costs, U. S. Dept. Agr. MRR 190, 1957.

9/ J. F. Stollsteimer, R. G. Bressler, and J. N. Boles, Cost Functions from Cross Section Data--Fact or Fancy?, Agr. Econ. Research 13(3) p. 74-79.

10/ Scattered references occur in Joe S. Bain, Industrial Organization, J. Wiley and Sons. 1959. See also; American Meat Institute. Financial Facts About the Meatpacking Industry, (annual, since 1949). Chicago.

Among the implications of these studies is the question of whether a new packing plant in an area would improve prices paid for livestock. Individual analysis would be required at each specific location, working back from wholesale price through cost, as determined for local supply density, present and probable plant costs, competition for cattle (or hogs) and for customers for the dressed meats, and alternative factor costs. A number of specific situations may exist where a new plant could be expected to operate profitably at lower cost and presumably increase prices paid locally for livestock or returns to livestock producers.

Thus, detailed study of meatpacker costs will contribute to our long-range projections, improve our interpretation of the cost of services comprising marketing margins,--including some aspects of wholesaling and distribution to retailers as well as slaughter and shipping,--and increase our understanding of the pricing process and pricing practices for meats and livestock.