

## MARKET ORGANIZATION AND FUNCTIONAL EFFICIENCY

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Market organization is both the cause and effect of differences in functional efficiency. Despite this mutual dependency and responsiveness, structure research has stressed firm size, numbers, and concentration within an industry, while efficiency generally has been considered from a plant or firm viewpoint.

While the relationships would be similar for most agricultural product markets, this paper approaches the market organization-efficiency relationship with the specific question, "How does the organization and execution of supply coordination influence efficiency in a milk market?" Efficiency is compared by two measures: The proportion of supply needed as reserve, and the cost of handling the supply. The relevant variable is the organizational level at which responsibility is exercised for coordinating supply. This responsibility is borne by individual handlers in some instances and by a producer cooperative in others. Although few markets are at either extreme, producer cooperatives have been increasingly active in supply coordination and related activities.

### COORDINATION AND COSTS

Many of the technological changes in milk production and marketing have increased fixed costs. As fixed costs increase, in relation to the total, so does the cost of providing flexibility. Costs are increased by uncertainty and variability in volume and timing.

Central coordination reduces fixed costs, uncertainty, and variability, while simultaneously providing flexibility and an effective vehicle for adjusting volume, product mix, methodology, and technology.

Supply coordination has at times been characterized as merely a bargaining tool. It is much more than this. It represents an active market organization that can

effectuate mutually beneficial functions more readily and efficiently than can any individual or group of participants acting separately. The benefits of such organization are not limited to, or even shared disproportionately by, any one segment of the market. The actual processes may be performed either by a producer cooperative, fluid handler, or manufacturer.

The high cost of performing certain functions by individual firms generates pressure to combine these activities in such a manner as to realize the potential economies from larger scale operations and reduction in operating uncertainties. The individual plant need not be responsible for each function from procurement through distribution. Certain functions can be executed more effectively by one participant than by another.

Potential gains are especially significant in handling and processing milk which is excess to the needs of each individual plant. These excess supplies are sporadic in volume and timing. Most markets could process this excess milk into manufactured products more efficiently in coordinated surplus plants than could each handler operating his own plant.

Through coordination and central facilities, 6 Oklahoma plants could have reduced the cost of processing excess supplies into butterpowder to approximately 45 percent of the cost for operating individual manufacturing plants [1]. By using 2 central surplus processing plants, 14 handlers in the Pittsburgh market could have reduced this manufacturing cost to approximately 55 percent through effective supply coordination [2]. Transportation costs would have been lower in both areas.

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## COORDINATION AND COMPETITION

Supply coordination can serve to increase effective competitive viability. If potential market outlets are limited to plants which can completely service those outlets with their own individual supply, then our system is exerting tremendous pressure to build huge quantities of reserve milk while simultaneously restricting competition to a few handlers. In such an instance, all segments of the marketing system, including producers and consumers, would be subsidizing these handlers.

Central supply coordination, which would supply each handler with his needs, tends to isolate competitive ability in processing and distribution from procurement inadequacies. Processing, handling, sales, and distribution efficiencies can be passed on to all segments of the market without being penalized by the inefficient or inadequate procurement system of an individual handler. These limitations are especially significant when servicing contracts such as schools, military, and supermarkets, which must be bid for on relatively short-term arrangements.

## SHORTAGES AND SURPLUSES

A handler (or a market) uses a fluctuating supply to meet a variable demand. Procurement activities are designed to secure not only a given volume of milk, but a supply that meets the fluctuating demand for products. This is the primary reason for carrying a reserve supply above the normal needs. The difficulty of attaining the desirable balance varies directly with the extent and irregularity of the fluctuations. The greater these uncertainties, the higher the "necessary reserves" and the cost of handling them.

The shortage during the fall months, resulting from seasonally low production and high consumption, is normally the gauge for procurement. "Get enough during the short season" has been the guide. Fully meeting the needs during the short season results in a surplus during most of the year.

It is not necessary for a handler, or even a market, to meet all needs from regular producer supplies. Comparing shortages and surpluses in different markets suggests that a "satisfaction ratio" of something less than 100 percent may be advantageous for the market. The most satisfactory ratio of producer receipts to fluid utilization depends upon the interrelationships of the several variables in a given market situation. A centrally coordinated supply would provide any specified level of satisfaction with a lower reserve ratio than would be needed by the plants acting as individual supply-demand coordinators.

Within-week and between-week fluctuations have

replaced seasonal ones as the major supply-demand coordinating problem for most handlers. Here, demand is the variable villain, while production holds relatively steady. In our Oklahoma study, handlers' fluid sales were 25 percent higher on Friday than on Wednesday, yet average daily sales were only 20 percent greater in the November peak than in the July low. Heavy weekend sales and 5-day processing weeks impose a strain on the entire system. Rather than attempting to balance daily supply with demand, handlers achieve timeliness by adjusting the rate of movement through the assembly-processing-storage complex. Additional facilities and effort (both costly) are required to achieve time flexibility.

Two causes underlie the week-to-week fluctuation: random and competitive changes in both supply and demand. These include the gain or loss of school, military, chainstore, and other contractual markets as well as patron switching. There is no regularity, no gradual buildup or reduction, as with seasonal differences. These changes are sudden and may be short-lived, creating a great deal of uncertainty.

The handler considers the week as an operating and balancing period. He hopes to wind up each week with no raw milk in storage. Shortages and surpluses are handled within the week - not at the end of the month or any other accounting period.

In Oklahoma, fluctuating producer receipts accounted for 70 percent of the market's seasonal surplus above fluid use, and variations in demand for 30 percent. Fluctuating fluid sales of 3 handlers were responsible for 30 percent of weekly surplus at plant A, 45 percent at plant B, 52 percent at plant C, and 36 percent for the 3 plants combined. Weekly producer receipts variation accounted for the remainder. The 3 plant volumes combined showed a 23 percent smaller surplus from these weekly fluctuations than they did as individuals. Weekly demand fluctuations were 39 percent lower for the 3 combined. The greater relative gain in reducing fluctuations comes from the demand side. Reserves to cover weekly supply variations for 7 Oklahoma plants combined would be only 44 percent of those needed by the plants individually.

What "satisfaction quotient" should regular suppliers provide? Should local sources seek to meet 100 percent of the market's needs? How much more reserve (and surplus) does 100 percent satisfaction require than 99 or 95 percent? How do shortages compare with surpluses?

A case study of the Pittsburgh, Pennsylvania market indicates that balancing each plant's producer receipts with fluid use in the relatively short month would have left 7 individual handlers short 18 percent of the

weeks. On this basis, they would have been short 2.3 million pounds during the year, with 58.1 million pounds of surplus, while using 269 million pounds as fluid milk. They would have needed a 7 percent reserve in the low month to meet all weekly needs. This 7 percent reserve, while giving 100 percent satisfaction, would have added 22.9 million pounds to the surplus during those periods when supplies were more than adequate.

A lower reserve ratio would have satisfied the 7 handlers if serviced by a central coordinating agency. A 3 percent monthly reserve for the combined group would have met all weekly fluid needs and would have added but 9.6 million pounds to the surplus. A coordinated supply would have given any specified satisfaction level with lower reserves than required by the same plants acting individually.

Generally, only a small part of the total needs would be obtained from supplementary supplies. Reserves to provide a fully adequate supply become surplus for the rest of the year. The net cost of the relatively small volume should be weighed against the effective costs of producing, pricing, handling, and marketing the increased surplus from the higher reserves. Herein lies the promise of success for such ventures as "standby pools."

The greater importance of weekly fluctuation in fluid use by individual plants, as compared with the combined total, indicates that consumers switched their patronage from 1 plant to another more than they altered their total milk purchases. Changes in individual plant utilization were more abrupt and extreme than for the combined volume. Fifty-two

percent of the weekly surplus for the individual Pittsburgh plants was due to fluctuating utilization; whereas, variable fluid utilization for the 7 combined accounted for only one-half this much (26 percent). For the individuals, weekly fluid variation was slightly greater than that in producer receipts. For the 7 combined, producer receipt variation was 3 times as great as that in fluid use.

Combining the volume flow for the 7 plants resulted in only 25 percent as much surplus from weekly fluid variation and 79 percent as much surplus from variations in producer receipts as was shown by considering the 7 plants individually. For both sources, this was the difference between 1 and 2 million pounds surplus per week (32.9 vs. 16.7 million pounds for 16 weeks).

## ACTION AND REACTION

Potential economies from central supply coordination are generally external to the firm. These advantages accrue through random "averaging out", offsetting competitive variations, less duplication, economies of scale, and ease in adjusting the flow of milk. Each is dependent upon, and proportional to, the degree of participation by firms in the market. These economies can be measured, separately or in combination, and compared under different forms of market organization.

Any given structure is neither inviolable, sacred, nor static. Market organization is dynamic, evolving through the continual efforts of all participants seeking a more satisfactory competitive relationship.

## REFERENCES

1. Lasley, Floyd A., "Coordinated Fluid Milk Supplies in the Oklahoma Metropolitan Milk Market," USDA, ERS, MED, MRR 686, Nov. 1964.
2. \_\_\_\_\_, "Coordinated Fluid Milk Supply in the Pittsburgh Milk Market," USDA, ERS, MED, MRR 746, March 1966.

