Location Differentials and Price Zones In the Eastern Ohio - Western Pennsylvania Milk Market Order[1]

My purpose is to support Proposals No. 1 and No. 6 which would remove price zones and location differentials within the market area and define a single $1.90 Class I differential across the entire market area. My basis for supporting these proposals goes to research we have recently completed in the Agricultural Economics Department at Ohio State which analyzed the market in terms of an efficient milk flow.[2]

The present four-zone, zero-5cent-8 cent-and 10 cent provisions were implemented in Order No. 36 on January 1, 1973. Several factors have emerged over the intervening years that indicate that what may have worked then certainly does not work now.

A first factor is the continuing shift in milk production from west to east in the milkshed for the Eastern Ohio - Western Pennsylvania market. In December, 1975, for example, 54.3 percent of Order 36 milk was produced in Ohio and 35.6 percent in Pennsylvania. In December, 1984, with 25 million more pounds in the monthly pool, Ohio production had dropped to 50.7 percent of the pool, and Pennsylvania production was up to 41.5 percent of the pool. This kind of shift challenges the west to east price alignment reflected in current location differentials.

[1]Testimony presented by Robert E. Jacobson, Dept. of Agricultural Economics and Rural Sociology, The Ohio State University at Federal order public hearing, Strongsville, Ohio, August 7,1985.

[2]Gerhardt, Terri Ann, Location Differentials In Federal Milk Marketing Order 36, MS Thesis, The Ohio State University, June, 1985, 65 pages.

A second factor is found in the major increase in transportation costs, specifically fuel, since the early 1970s. In 1972, the average price of diesel fuel was 19 cents per gallon. Currently it is approximately $1.00 per gallon. When present location differentials were implemented, they were geared to reflecting a milk transportation cost of 15 cents per cwt. per 100 miles. The major increase in fuel costs has been the primary factor in leading to a current best estimate of 33 cents per cwt. per 100 miles for milk shipments. The increase in milk transportation costs has clearly outdated the size of location differentials presently used in Order No. 36.

A third factor is found in the reduced number of fluid milk processing plants in the market, increased size of processing operations, and changing location of plants in the market over time. Cuyahoga County, Ohio (Cleveland) and Allegheny County, Pennsylvania (Pittsburgh) have reflected a more rapid downtrend in numbers of plants in the past ten years than has the market as a whole. Meanwhile the average Class I processing volume on a monthly basis has increased from about 1.9 million pounds in 1973 to 5.1 million pounds in 1985. This means more extended distribution areas for plants in the market today and therefore more direct competition for packaged sales across the entire market area. The net effect of this structural change is to diminish the relevance of existing zones and location differentials.

A last point to make in the criticism of existing zones

and location differentials is that these were put in place January 1, 1973 to attempt to reflect how milk actually moved in the market, not to reflect what zones and differentials would be if milk were moving on its most efficient basis. In our research, we contend that the Federal order regulation should be structured to reflect an efficient market and not be structured to stamp in place existing inefficiencies. The specific application I will point to is a free-flow of milk as contrasted with a market largely tied up in terms of outlet by the several marketing organizations including cooperatives and proprietary handlers in the market.

We accepted the existing wisdom with respect to location differentials, i.e., that they apply to both producers and handlers and that their purposes are (1) to provide producers an incentive to supply milk to outlets in the market (even when alternative outlets may be closer), and (2) to reflect the value of milk at different demand points and establish equal raw product costs to competing handlers. We ultimately discovered that it was difficult to reconcile these two objectives.

A particular form of linear programming, called the capacitated transshipment problem, was used to calculate the minimum cost-flow pattern for producer milk in the entire market. Data on supply and demand were gathered for the twelve month period July, 1983 through June, 1984. Seventy-four supply points (counties) in the milkshed were identified, and 38 pool

plants plus 23 non-pool manufacturing outlets were identified. Mileages were measured from each supply point to each outlet (a total of 4,696 mileages). Transportation costs at the rate of 33 cents per cwt. per 100 miles were applied. The specific objective of the study was to determine the relative value of milk at both the county and plant levels to determine what location differentials would be appropriate.

Four models were developed including (1) the basic, or freeflow model, representing the most efficient flow of milk in the market (only fluid processing plant demand was included); (2) a non-member model, in which the flow of milk marketwide was constrained by the amount of non-member milk assigned, and (3) and (4) repeats of the first two models but with manufacturing plants added so that all producer milk in the market is analyzed, not just milk demanded at fluid processing plants.

We chose to use the freeflow model because it meets a total efficiency criterion, and it is the most simplistic and flexible of the models in terms of supplying milk to pool fluid processing plants. The program generated relative values (node prices) for milk at each of the 74 supply points with respect to the 38 demand points in the market. The node prices ranged from zero cents (relative) at 30 of the supply points to a high of 26 cents in Cuyahoga County, Ohio.

Given the 74 node prices, it was possible to compare alternative regulation schemes for the market. We chose to compare (1) the market as it exists today with four zones; (2) a market

in which node prices were aggregated somewhat in terms of three zones with zero, 10 cent, and 16 cent location differentials; and (3) a market area per Proposal No. 1, i.e., the market area is the only pricing zone as such.

The three alternatives were measured against three location differential criteria: (1) milk flow -- ideal versus actual; (2) flexibility to move milk efficiently; and (3) achievement of equal raw product costs to handlers so far as the order can accomplish that.

With respect to these criteria, the present four zone arrangement was dismissed quickly, primarily for the reasons cited earlier relative to market changes since 1973.

The three zone model, with zero, 10 cent, and 16 cent location differentials had some merit, primarily on the basis of the milkflow criterion. This approach presumably would encourage a more efficient flow of producer milk in the market. However, it is weakened by the fact that (1) it is geared to the structure of the market in the 1983-84 period; (2) it locks in the differentials and therefore decreases a flexibility to move producer milk when market conditions change; and (3) most importantly, it aggravates the problem of equal raw product cost to competing handlers by increasing differentials across the market.

Finally, we found merit in the no zone - no differential alternative. Its strongest attribute is that it equalizes raw product cost to competing handlers in the market. If the

market area for Order No. 36 is truly an economic market by Federal order criteria, and it appears to be, then a single Class I price across the market area is essential.

We also concluded that Proposal No. 1 met the flexibility-producer incentive criterion on a positive score. The absences of location differentials would permit the market or demand points in the market to respond to changing market conditions as they occur. As noted in the thesis, "The almost constantly changing supply and demand points, coupled with the larger amount of non-member milk suggest that the lack of location differentials may best meet the goal of location differentials."

As for the milkflow criterion, the lack of location differentials does not help resolve that problem. Total transportation costs in the market are currently 34 percent higher than they would be if optimum assembly efficiency were in place. Much of the inefficiency goes to the ways that producer milk is tied up by competing interests. Federal order regulations, in terms of locations, are not designed to resolve such problems. In that sense, no location differentials are a reasonable choice to make because even the 16 cent differentials will not accomplish the total freeflow desired.

Therefore, with respect to the three criteria for location differentials -- milkflow, flexibility, and equal raw product cost, I believe that an Order 36 market area with no location differentials in the market area would best serve the orderly marketing purposes of the Federal order program.