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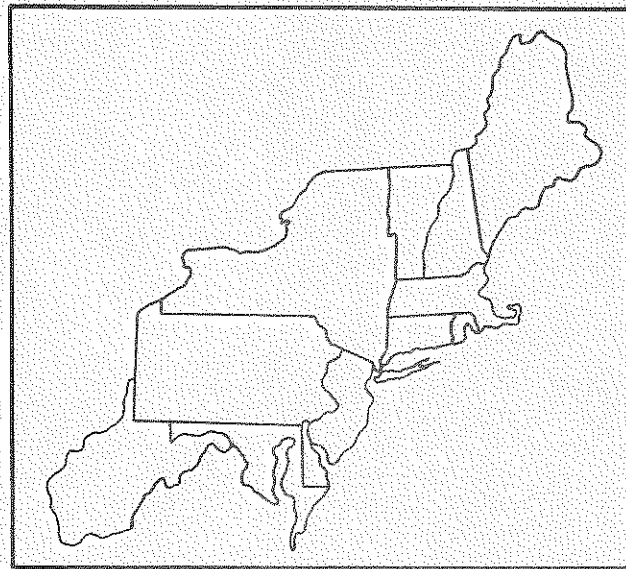
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Proceedings
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**THE SPATIAL ORGANIZATION OF
THE NORTHEAST DAIRY INDUSTRY**



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ESTIMATES OF THE COSTS OF PROCESSING
FLUID, SOFT, AND HARD MANUFACTURED MILK PRODUCTS

by

Blair J. Smith*

The NE-126 model of the Northeast dairy industry is structured to accommodate milk and dairy products in three groups on the consumption side of the market. These are the fluid products, the soft manufactured products (mostly ice cream, cottage cheese, sour cream, and yogurt), and a hard products grouping of butter, non-fat dry milk powder, and hard cheese. The costs of processing these product groups are in terms of dollars per hundredweight of raw milk going through each of the three types of plants, and pertain to the year 1980.

The fluid milk processing cost function was estimated from observations of processing costs reported in four different studies [1, 3, 6 and 7]. The report by Jones [4] was used to adjust those reported costs to a common time base (1980).

From the four reports, it was possible to identify 16 cost-quantity observations to which several functional forms were fitted using least-squares multiple regression techniques. The following function was determined to be the most appropriate for use in the NE-126 model:

$$ACF = 224.246623 + 427.536285 (1/\sqrt{V})$$

(t=48.9) (t=22.3)

Where:

ACF = Cost of processing raw milk into fluid milk products in cents per cwt.

V = Pounds of raw milk processed per month divided by 100,000

$\bar{R}^2 = 0.97$, $F = 497.8$. The F and all t-statistics are statistically different from zero at probabilities greater than 99.9 percent.

Using the estimating equation shown above, approximate costs for indicated quantities of raw milk processed per month are as follows:

Monthly Volume of Milk Processed (pounds)	Cost per cwt. (cents)	Monthly Volume of Milk Processed (pounds)	Cost per cwt. (cents)
250,000	495	20,000,000	254
500,000	415	25,000,000	251
1,000,000	359	30,000,000	249
2,500,000	310	35,000,000	247
5,000,000	285	40,000,000	246
10,000,000	267	45,000,000	244
15,000,000	259	50,000,000	243

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Where:

ACH = Cost of processing raw milk into hard manufactured products in cents per cwt.

V = Pounds of milk processed per month divided by 100,000

$\bar{R}^2 = 0.99$, $F = 9430.0$. The F and all t-statistics are significantly different from zero at probabilities greater than 99.9 percent.

Using the estimating equations shown above, approximate costs for indicated quantities of milk processed per month are as follows:

Monthly Volume of Milk Processed (pounds)	Cost per cwt. (cents)	Monthly Volume of Milk Processed (pounds)	Cost per cwt. (cents)
2,500,000	309	17,500,000	126
5,000,000	238	20,000,000	116
7,500,000	198	22,500,000	108
10,000,000	171	25,000,000	101
12,500,000	152	27,500,000	95
15,000,000	137	30,000,000	90

At monthly volumes greater than 30,000,000 pounds, manufacturing costs were assumed to remain constant at 90 cents per hundredweight of milk processed. Figure 2 is a plot of the relevant range of the hard products manufacturing cost function.

The soft products processing cost function (ACS) will be a weighted combination of the fluid and the hard products functions. That is,

$$ACS = X(ACF) + Y(ACH)$$

The variables X and Y are the weights to be applied to the fluid and hard products functions, respectively, according to where the soft products cost function lies in the space bounded by the two functions, X and Y are each ≥ 0 , and $X + Y = 1.0$.

For the initial run of the NE-126 model, X will be set equal to 0.8 and Y will be set equal to 0.2. Subsequent runs of the model will use other values for X and Y if later information suggests a different combination of weights would be more appropriate.

FIGURE 1. COSTS OF PROCESSING FLUID MILK PRODUCTS, 1980

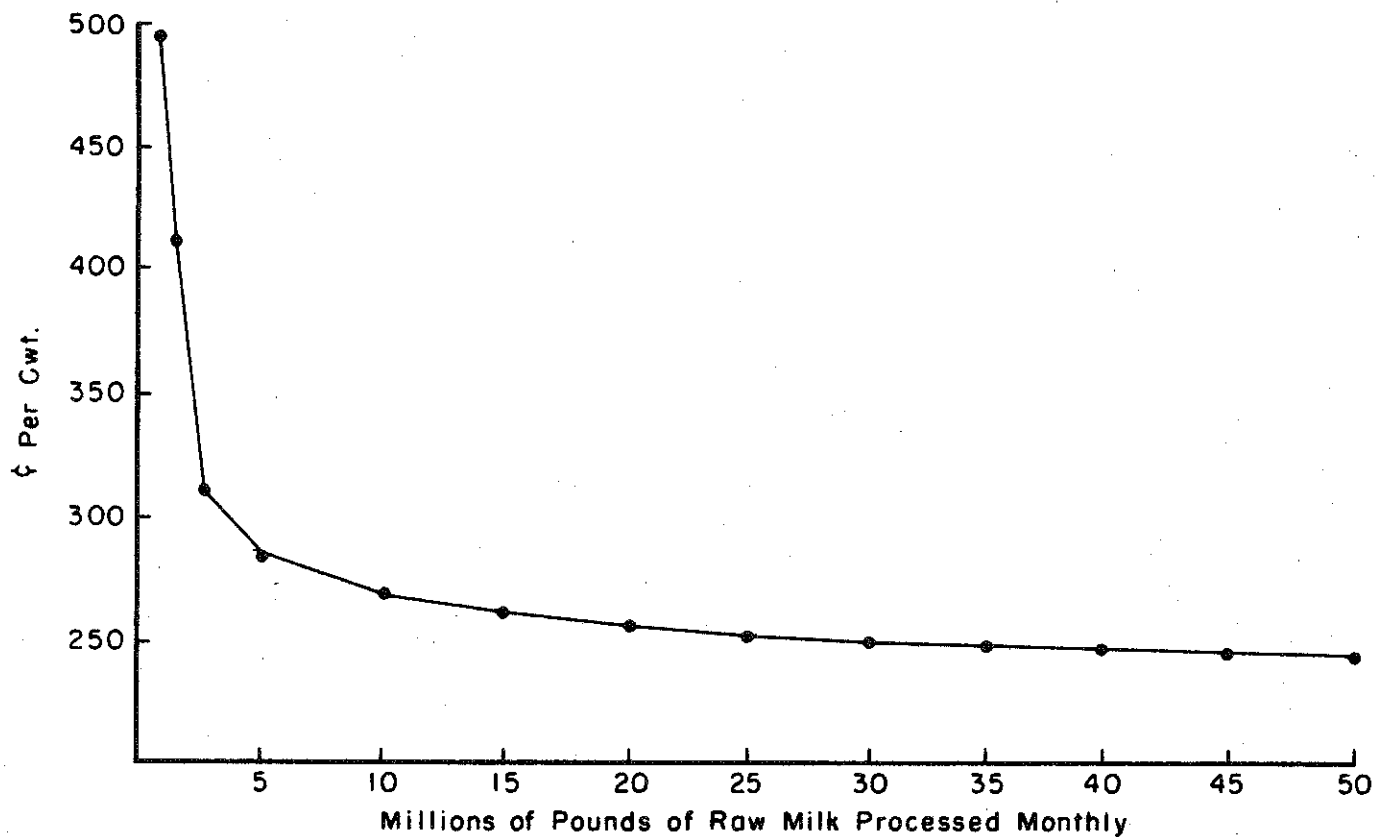
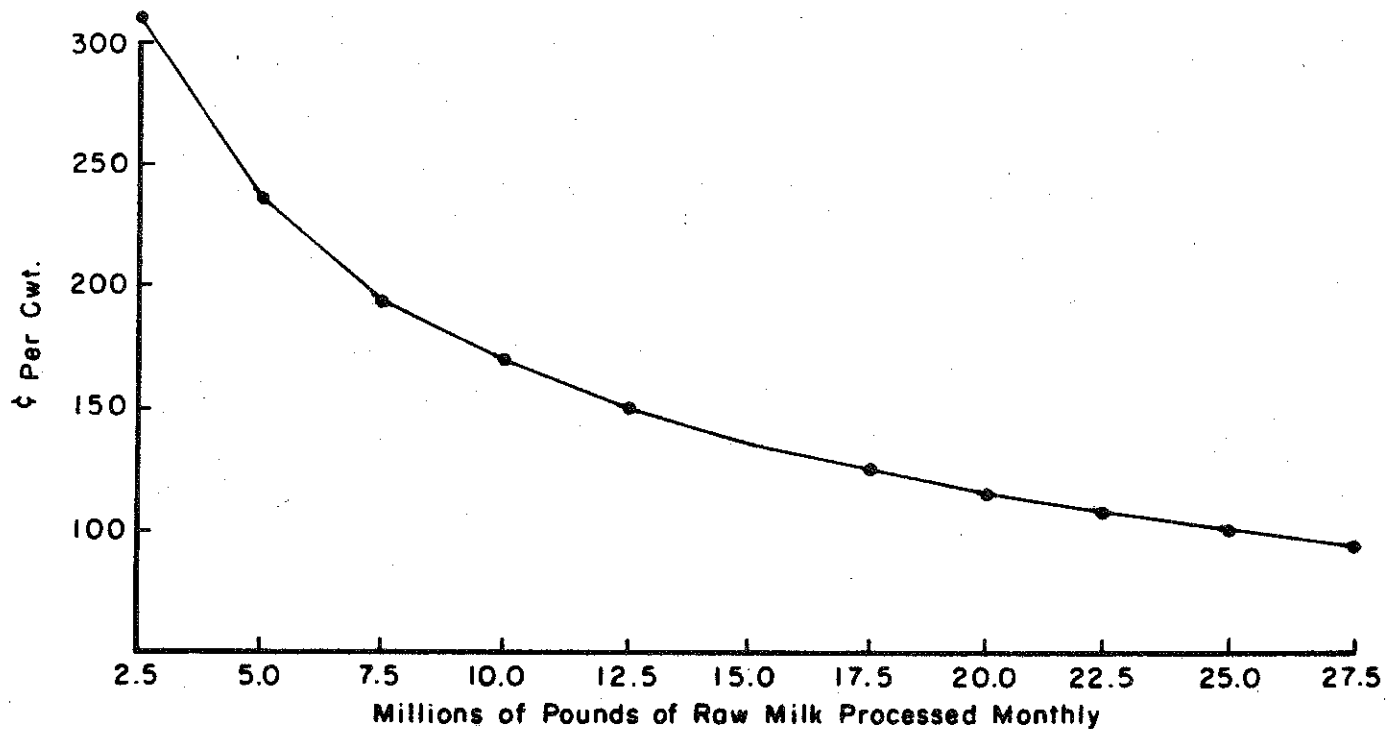


FIGURE 2. COSTS OF MANUFACTURING HARD DAIRY PRODUCTS, 1980



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