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**MILK-HAULING RATES: A SELF-IMPOSED CONSTRAINT
WITH DIFFERENTIAL EFFECTS UPON LARGE AND SMALL FARMS**

Edward Karpoff and Fred C. Webster

ABSTRACT

Costs impose restraints upon all activities. Certain costs chargeable to a sector of an industry—as for example, milk assembly and hauling costs—must be broken down from their total into the shares chargeable to individual users. When there is flexibility in this apportionment of cost shares, part of the burden upon the individual shipper becomes an industry-apportioned constraint upon individual firms, in this case dairymen-shippers. An alternative means of apportioning hauling costs is suggested, to retain large shippers in the conventional hauling system, and to sustain that system for the benefit of small dairymen.

INTRODUCTION

A representative group of Vermont dairymen paid 3.4 percent of their 1979 milk receipts for the collection and hauling of their milk output to market, according to a farm account summary. In extreme cases—assuming a haul of northern Vermont milk directly from farms to receivers in southern New England—hauling costs can rise to about 6 percent of the farm value of the product. The hauling costs which are represented by these averages are, in effect, an industry-apportioned restraint upon individual firms—in this case dairymen-shippers—because, route by route, there is opportunity for considerable flexibility in the apportionment of the total hauling charges to the individuals who are served by the respective haulers.

The point of this paper is to suggest an apportionment of those costs restraints on a basis somewhat different from the prevailing mode, particularly to recognize situations where an existing rate schedule results in a payment by a shipper higher than the charge he would have to pay under an alternative means of transport. The need for changed apportionment of charges is not so acute that it is regarded as urgent, but the findings here are recommended as a basis to define the direction for inevitable future changes in rates and rate structures.

MOST COSTS FIXED OR UNALLOCABLE

About 70 percent of the costs of milk assembly are fixed and/or unallocable costs, according to a recently completed Vermont study.¹ Because of the high proportion of these fixed or unallo-

cable costs to the total, milk haulers and dairymen have acted as if there were wide latitude in the range of justifiable rates to individual shippers, so long as rate schedules were non-discriminatory, and the total costs of the hauler were covered.

This opportunity toward flexibility means that, within very narrow sectors of the dairy industry (such as a milk route), there is partial and self-apportioned division of cost-constraints upon individual producers. For the most part, rate structures and their cost-restraints seem to have evolved gradually from simple past structures. To the extent that there has been recent guidance toward objective rational rate structures, that guidance seems to have come mostly from Roof and Tucker.

The unarticulated but accepted test-questions by which dairymen check the appropriateness of rates and rate schedules are:

Is the schedule of rates nondiscriminatory, in that all like producers on a given route are charged the same price?

Does every shipper cover the direct costs involved in the pickup of his milk, and pay at least some contribution to overhead? (Lacking this, the hauler might drop the shipper.)

Does the total revenue on the route cover the hauler's costs, assuming an acceptable degree of efficiency on the hauler's part?

On the 13 Vermont milk collection routes that we surveyed (20 runs), the first of these criteria was essentially satisfied. No evidence was found of unpublished discounts or otherwise discriminatory rates. The second criterion was likewise essentially satisfied, since among the 167 shippers served by those routes, only one shipper was found who generated less revenue than the direct costs allocated to his service.

Judgment toward the third criterion presents some troublesome problems. It is clear that some haulers are not fully covering their costs, if total costs are scaled to the costs of replacing their vehicles and providing a competitive rate of return. But resolution of that problem is outside the scope of this paper.

A fourth criterion and an associated test-question, more subtle than the first three, can

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¹ As used here, "fixed" and "unallocable" are not synonymous. Depreciation, for example, is a fixed cost, and it is also unallocable among participating shippers on any but an arbitrary basis. The costs of washing the bulk tank on a truck are not fixed except in the context of a very short time frame, but they are essentially unallocable as among the shippers whose milk was carried in the tank, except, again, arbitrarily.

also be posited:

Is every shipper on this route being served more cheaply than he could be served by any alternative milk collection and assembly system?

In the case of large producers with well-laid-out farmsteads and located on all-weather roads in dense production areas, the answer may frequently be "no."

LARGE SHIPPERS HAVE ALTERNATIVES

Any producer who is realizing less than his potential maximum net return is a candidate for change. If many large producers of the sort described in the preceding paragraph can better themselves by switching haulers (and, incidentally, switching dealers at the same time), their ties to the conventional hauling system are obviously impermanent.

The conventional hauler goes down the road and takes the milk of every shipper who is tied to the receiver he serves. Loosely speaking, the receiver's specifications for an acceptable shipper would permit service, if market conditions justified, to any of the bulk of the milk producers in the area. This contrasts with the selective receiver, who builds his clientele around a trailer-route planned to fill the tank by six or eight stops at large farms, located within a distance of a few miles of each other on a hard-surface road without highly restrictive load limits. The resulting trailer-load of milk is typically taken on a direct-haul to distant markets, avoiding the transshipment that is common after the conventional assembly. Aggressive receivers in southern New England, who search out opportunities to organize trailer-load clusters of dairy farms as described above, have been estimated by one milk plant manager to account for 10 to 15 percent of Vermont's whole milk shipments to out-of-state destinations.

For receivers, haulers, and participating farmers, the direct-haul is a low-cost way to supply southern New England markets with milk from origins some 200 miles distant, but the diversion of milk to such an assembly system imposes a cost upon the remaining shippers served by the conventional routes. After the problem is recognized, a solution can be achieved through a modest restructuring of hauling rates on the conventional routes, as described in this paper.

An adequate restructuring of rates on conventional routes will slow the expansion of direct-haul from large farms, and thus will give a little more time for adjustment to the farmers who cannot take advantage of the opportunities toward direct-haul. In general, farmers who cannot adapt to direct-haul are those less than ideally located, or farmers with relatively small herds—herds averaging less than about 6,000 pounds per every-other-day pickup, or fewer than about 70 cows.

Such farms, not in the favored category for direct-haul, can economically ship to nearby manufacturing plants whose milk flow is required, on both seasonal and "crisis" bases, to balance the

whole milk supply for every major milk market.

The direct-haul trailer-load skims the large convenient shippers from the conventional hauler, and leaves the high-cost accounts to be served by the existing system. Having lost the big accounts, and with his overhead and/or unallocated costs continuing at a nearly unchanged level, the conventional hauler would be forced to operate at a loss or to raise his rates to a level that could make dairying financially unattractive to his remaining shippers. Eventual result: end of either hauling business or of milk production, or intervention by co-ops or bargaining associations that would temporarily absorb deficits.

EXISTING VOLUME-DISCOUNTS INADEQUATE

The Vermont study from which this report is drawn found that even a widespread system of volume discounts, to large shippers on conventional routes, falls short of equalizing the attractiveness of large and small shippers to milk haulers. Direct-haul can be an attractive option to the large farmer even when he qualifies for a substantial discount from his conventional hauler.

A scale of volume discounts representative of those applied by Vermont collector-haulers in 1979-80 is shown in Table 1. These discounts were applied to base hauling charges (exclusive of stop charges), which typically ranged up to 30 cents per 100 pounds.

Existing quantity discounts notwithstanding, in comparing actual hauling charges with charges under a revised alternate rate structure, in a sample of 167 farmers, 95 were found eligible to pay less for their milk hauling under a proposal that will presently be described.

INCREASED CHARGES FOR OFF-ROUTE AND SMALL SHIPPERS

The offsetting burden of higher hauling charges would be borne to some extent by the smaller shippers, but an even larger part of the shifted costs would be allocated against the farms located on spurs off the direct route.

Table 1

A Representative Quantity-Discount Schedule for From-Farm Milk Collection in Vermont, 1979-80

Size of pickup, every-other-day	Discount from base hauling charge
Pounds of milk	Dollars per hundredweight
Under 4,000	None
4,000- 7,999	0.01
8,000-11,999	0.02
12,000-15,999	0.03
16,000-19,999	0.04
20,000-23,999	0.05
24,000-31,999	0.06
32,000-47,999	0.07
48,000 and over	0.08

Such spur locations impose significant additional distances (and costs) upon the operator of the milk pickup route.

The general designations of these shippers against whom higher charges would be assessed—in general, (a) off-route producers and (b) smaller producers—reflect the answers to the initial central question in the general study of the structure of milk hauling rates. That question is: Are the charges to the individual shipper for milk hauling services reasonably aligned with the costs incurred by the hauler (or by the hauling system in general) in behalf of that same shipper?

With regard to the off-route shippers, it is a *prima facie* case that their rates should be higher than those charged to other patrons on the route. With regard to the group that turns out to be generally small producers, however, the rationale for increased charges is somewhat more involved.

The thesis here is that, despite the higher charges this proposal would impose upon the farms with generally smaller herds, the longtime results would, nevertheless, be beneficial to them, because otherwise—if the larger shippers are tempted away from the system which those larger shippers presently help to support—the smaller shippers risk an early loss of their present milk hauling services, or else they face higher charges for hauling.

PROPOSED NEW RATE STRUCTURE

A rate structure that would support a milk hauling system more stable than the present conventional system would have three principal elements:

1. A basic stop charge, regardless of the volume of milk picked up. Vermont research suggests a charge that would cover about 8 minutes of targeted "return per allocable minute" (description follows) for the vehicle and operator.
2. A supplemental stop charge of about \$1.60 (under Vermont conditions in 1979-80) for each mile that is added to the route by an off-route shipper.²
3. A volume charge per 100 pounds of milk, computed on the basis of the time in-

² The mileage charge suggested here would yield the hauler his target revenue per allocable minute, on the average. It has been suggested that such a charge may be unfairly high, since even the off-route shipper will have already "paid his dues" by paying the target rate for his stop and volume charges. We would not argue against making the supplemental stop charges (1) reflect either marginal costs (including time) for off-route mileage, or (2) basing the off-route mileage on the excess over the average mileage per patron in the pick-up phase of the route (but not including the over-the-road phase).

involved in handling incremental quantities of milk. This incremental time involves principally pumping time, both in and out, which Vermont research places at 0.3 minutes per 100 pounds. The time for this operation, like the time for the basic stop charge, should be valued at the targeted return per allocable minute.

As previously stated, about 70 percent of the cost of running a milk collection route is either fixed or otherwise unallocable to individual shippers. The unallocable nature of the costs follows from so many of the services being common to all patrons—like washing the tank on the truck, or driving mileage that served all patrons. Therefore, the targeted return per allocable minute is surprisingly high. For the 13 surveyed routes (20 runs), the range was from 23 to 69 cents per minute, and it averaged 49 cents. Our overall target simply was to duplicate the gross revenue of each existing route, since the study was not intended to define appropriate revenue levels, including profit, for the respective routes. Our concern was simply with apportionment of charges among shippers.

The target return per allocable minute is most easily computed by first considering the second of the three items which are listed above: the revenues to be expected from the supplemental stop charge should, for the moment, be subtracted from the total target. The remainder should be divided by the sum of:

1. The minutes involved in each pickup stop, exclusive of pumping time (8 minutes per shipper, under Vermont conditions), and
2. the minutes involved in milk handling (in Vermont, 0.3 minutes per 100 pounds, to cover both pumping-in and pumping-out).

The result—the quotient—is the target return per allocable minute.³

From the target return per allocable minute, the stop charge can be established, as well as the volume charge per 100 pounds, and of course the supplemental stop charges which are to be levied only against out-of-position farms has already been defined. By definition, for each of the 20 runs analyzed, the total of the three elements equaled the 1979-80 gross revenues for the respective runs. But what a difference to the individual shippers!

By classes of shippers, Table 2 shows that the 26 producers located on spurs off the main route would be hurt the most. They would pay an

³ In mathematical format:

Target return per
allocable minute =

$$\frac{\text{Total target return for the route}}{\text{Number of pickup stops}} - \frac{\text{Revenues from supplemental stop charges}}{\text{Hundredweight of milk handled}} \times 8 \text{ min.} + \times 0.3 \text{ min.}$$

Table 2: Summary of Effects of An Alternative Structure of Milk Hauling Rates, by Classification of Affected Shippers

Class of shipper (and number of shippers)	Monthly volume of milk		Average monthly hauling charge	
	Range	Average	Under prevailing schedules, 1979-80	Under alternative schedules ^a
	Thousand pounds		- - - -Dollars-	- - - -
Off-route shippers; spur locations or otherwise				
1. Total group (26)	12-254	54	138	186
2. Excluding one observation (25)	12-124	46	128	172
Shippers directly on established routes				
1. Subject to increased charges				
a. Total group (46)	8-248	41	113	131
b. Excluding one observation (45)	8-108	36	106	124
2. Subject to decreased charges				
a. Total group (95)	9-180	64	175	153
b. Excluding five observations (90)	29-180	67	178	156

^a These charges are computed so as to duplicate the 1979-80 total revenues of each individual route or run. If the intent had been to create uniform rates, there would have been a greater separation of large and small shippers into the groups paying respectively reduced or increased hauling charges.

average of \$186 per month for hauling their milk, compared with \$138 at the time of the survey, an average increase of 35 percent. However, both the range and the average of their monthly milk shipments show that this group of off-route shippers is not composed exclusively of small farmers. (It may be that some of them are large producers to whom haulers are already giving, but not on an objective basis, the kind of favorable rate treatment that this paper urges!)

Among the on-route shippers, the 46 who would pay more under the proposal would incur average charges of \$131 per month, compared with \$113 under the 1979-80 scales. This would average a 16 percent increase, and the producers involved ship from 7,905 to 247,605 pounds per month, with an average of 40,952 pounds. However, if one farm on an atypical run were to be eliminated from this group, the remaining shippers in the group would then range from 7,905 pounds to 108,120 pounds with an average of 36,360 pounds shipped monthly.⁴

⁴ The atypical run served only three shippers, all large.

LOWER CHARGES FOR LARGE ON-ROUTE SHIPPERS

Among the remaining 95 on-route shippers whose hauling charges would be lowered by a revised rate structure, the monthly hauling charges would be reduced an average of 13 percent, from \$175 to \$153. These shippers had monthly volumes of 9,075 to 180,390 pounds, averaging 63,651 pounds. As did the group who would pay higher charges, this group also included shippers of a size that, on account of special circumstances, did not conform to the *a priori* expectations. The shipper with the smallest volume in this group, for example, was on an unprofitable route with so many off-route (spur location) patrons that under the proposed rate structure his route location would qualify him for a potentially lowered rate, despite his small monthly volume of 9,075 pounds. The omission of this and four other small shippers on this atypical route, from the 95-shipper subsample, would leave the average size of the remaining shippers at 66,900 pounds per month, 63 percent larger than the average volume of the 46 on-route shippers that would be disadvantaged by a revised rate structure.

In the short run, the change proposed here

seems to hurt the smaller producer; for the long run, the opposite would be true. A substantial body of public opinion recognizes that many constraints are man-made and institutional (such as the allocation of a large portion of these charges on milk routes). Public opinion also pretty much accepts the value that the small farmer merits an even chance in his competition against the larger one. With these as given, it is an appropriate challenge for the dairy leadership structure to convince the smaller dairyman--say, 50 cows or fewer--that he should be open-minded toward paying somewhat higher milk hauling charges, if he can thereby retain the 70- and 80-cow dairies as shippers on the same route, with the large dairies thereby continuing to pay a share of overhead costs.

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