Milk: Prices

1982

[U.S. Economic Research Service 1981.]

Some Implications of Increasing Dairy Farm Income with Price Support or Milk Order Pricing Policies

by

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Recent increases in surplus milk production and a continued public interest in deregulation have focused attention on the dairy price support and federal milk order programs. This was evidenced when the U.S. Congress called for a special report of dairy programs in the Agricultural and Food Act of 1981 (U.S. Congress, p. 9). Congress explicitly asked how existing and proposed pricing mechanisms effect "supply and demand conditions including farm income and consumer costs" and "social costs and benefits."

Although the price support and federal milk orders are separate programs and administered by different government agencies they, by law, share a common objective: to "assure a level of farm income adequate to maintain productive capacity sufficient to meet future needs" for dairy products (U.S. Congress, p. 9, Ward, p. 40). The two programs use different pricing mechanisms to increase farm income. As a result the distributional impact and social costs are quite different. This paper considers some of these differences. This first section reviews and compares the pricing mechanisms employed by the two programs. The second section describes the model and procedures used. The third section contrasts the distributional implications of using either program to achieve a given increase in the U.S. all milk wholesale price.

Presented at AAEA meetings, Logan, Utah, Aug. 1-4, 1982.

Pricing Mechanisms

Under the price support program the government sets a minimum price for manufacturing milk. This minimum is assured by the government standing ready to buy all the cheese, butter and/or nonfat dry milk that will not clear commercial market at prices that enable processors to pay farmers the designated support price.

In contrast no products are purchased under milk marketing orders. Rather minimum prices are set for milk depending on how it is utilized. Present pricing policies set the minimum price for milk used in fluid products higher than for milk used in manufactured products (classified pricing). Dairy farmers receive an average price reflecting the revenue from both fluid and manufacturing sales. Farm income (price) is increased by increasing the differential between fluid and manufacturing milk prices if the elasticity of demand for manufactured products is more elastic than for fluid milk.

In sum, assuring a level of farm income would be accomplished by a higher support price under the price support program or by increasing the minimum differential between fluid and manufacturing milk prices under the milk marketing order program.[1/]

Model and Procedures

A static partial equilibrium model of the U.S. dairy industry is used to evaluate the impact of increasing farm prices with an increase in the support price or with an increase in the minimum differential between fluid and manufacturing milk prices. The two price model is capable of considering either pricing policy. It is represented in the following equations:

$$D_f = a + bP_f$$

$$D_m = c + dP_m$$

$$S = e + fP_w$$

$$G = \bar{G}$$

where

D_f = quantity of milk used as fluid.

D_m = quantity of milk used for manufactured products.

S = quantity of milk produced.

G = the amount of milk equivalent purchased by the government under the price support program.

P_f, P_m and P_w are the fluid milk (Class I), manufacturing grade milk and the all milk wholesale price received by farmers respectively.

Pricing policies under federal milk orders are reflected by a specified minimum differential (θ) between P_f and P_m as follows

$$\theta = P_f - P_m$$

Farmers receive an average price reflecting both fluid (P_f) and manufacturing milk prices (P_m) as:

$$P_w = \frac{P_f D_t + P_m D_m + P_m G}{S}$$

Restating this equation as

$$P_w = \frac{(P_m + \theta) D_f + P_m D_m + P_m G}{S}$$

illustrates how market order pricing policies (that set θ) and price supports policies (that set P_m) can both be evaluated as to their impact on farm milk prices (P_w).[2/]

Equilibrium conditions are

$$S = D_f + D_m + G$$

The procedure used is to evaluate the intermediate (2 - 3 year) impact of increasing the fluid-manufacturing differential (θ) by $1 per hundredweight

on the all milk wholesale price (P_w). The increase in the support price (P_m) that would be required to provide the same increase in the all wholesale milk price is then determined. The results are then compared.

The 1981 calendar year prices and quantities are used to position the supply and demand curves. This positioning reflects the combined influence of all factors, measurable and unmeasurable, that have resulted in the present level milk production and consumption and milk prices. The short and intermediate run farm level demand elasticities used were those reported by Hallberg.

The conceptual basis for the measure of whether society is better off or worse off after a change in fluid-manufacturing differential compared to the higher support price includes an interpretation of what the supply and demand curves represent. The area under the supply curve between two quantities is a measure of the total production costs in terms of all other goods and services that could have been produced with the resources used to produce that quantity of milk. The area under the fluid and manufacturing demand curves between two quantities is a measure of the total value of milk consumed in terms of all other goods and services. The net social cost of milk order and price support policy changes come from these measures. Products purchased by the government under the price support program are assumed to be exported. The procedure for calculating social gains and losses are similar to those reported in Buxton and Hammond.

Results

The impact of increasing the fluid-manufacturing milk price differential $1 per hundredweight would be to increase the all wholesale milk price an estimated 10 cents (Table 1). However, the fluid price would increase 71 cents per hundredweight while the manufacturing milk price would decline 29 cents

per hundredweight. These results assume that the government lets the manufacturing milk price adjust so that the quantity of milk equivalent it purchases does not change. This assumption is needed to approximate the implication of a milk order pricing decision by itself without mixing results with changes in the support program.

Gross farm income would increase about $200 million annually. Consumers of fluid milk would account for $324.4 million more of total gross farm income. Consumers of manufactured dairy products would account for $87.5 million less and the government would account for $37 million less than before the market order policy change (Table 1).

Fluid milk prices would be about 6.3 cents per gallon higher while cheese would cost about 2.9 cents per pound less.

The net social cost would be an estimated $15.4 million annually. This is a relatively small amount compared to the size of transfers between farmers, fluid milk consumers, manufactured dairy products consumers and the government (taxpayers).

The same 10 cent per hundredweight increase in the all wholesale milk price could be achieved by increasing the support price for manufacturing milk 10 cents per hundredweight (to $12.90)(Table 1). The fluid milk price would also increase 10 cents per hundredweight.

The transfers associated with the higher support price are very different than for the market order policy even though both increase farm prices 10 cents. Gross farm income would increase about $195 million annually. Of this increase fluid consumers would account for $47 million, manufactured product consumers would account for $117.6 million. The government would also incur the expense of processing and storing the additional surplus milk ($11.9 million).

The net social cost would be an estimated $109.5 million annually - substantially above the federal milk marketing order policy.[3/]

Table 1. Estimated transfers, consumer prices and net social cost of increasing farm milk prices 10 cents per hundredweight with market order or price support policies.[a/]

Item	Unit	1981 base	Increase fluid-manufactured milk price differential	Increase support price
Fluid-manufactured milk price differential	dol./cwt.	2.36	3.36	2.36
Support price	"	12.80	12.51	12.90
			--Change from base--	
Milk prices (farm level)				
All milk wholesale	dol./cwt.	13.75	.10	.10
Fluid use	"	15.16	.71	.10
Manufacturing use	"	12.80	-.29	.10
Sources of gross farm income				
Fluid consumers	mil. dol.	8,074	324.4	47.0
Manufactured prod. consumer	"	8,508	-87.5	30.1
Government	"	1,651	-37.0	117.6
Total	"	18,233	199.9	194.7
Government cost for processing and storing purchases	"	189.6[b/]	0	11.9
Consumer prices				
Fluid milk	cents/gal.	202.6	6.3	0.9
Cheese	cents/lb.	220.5	-2.9	1.1
Social cost	mil. dol. Annually	0	15.4	109.5

a/ Assumed farm level demand elasticities are -0.1393 for fluid milk and -0.554 for manufactured products. Assumed supply elasticity is 0.5

b/ Does not add to farmers gross income.

Summary and Conclusions

The dairy price support and federal milk orders are separate programs with separate objectives but, by law, share a common objective of assuring a level of farm income adequate to insure future milk needs. Because the programs use quite different pricing policies to achieve higher farm income, the transfers between farmers, consumers and taxpayers and the net social cost is quite different. For a given increase in farm milk prices (farm income) the transfers between the groups considered are larger but the social cost is smaller for milk order pricing policies than for price support policies.

Footnotes

* Agricultural Economist, Economic Research Service, USDA, stationed at the University of Minnesota. The analysis and conclusion in this paper do not necessarily represent the views of USDA.

1/ As presently administered only Grade A dairy farmers share in higher valued fluid sales. Therefore, Grade B dairy farmers are not assured a higher price through higher fluid-manufacturing price differential set under federal orders. Federal milk orders also do not regulate all Grade A milk as some is under similar state regulation.

2/ Only farmers producing Grade A milk share in higher valued sales of fluid milk. Farmers producing Grade B milk (about 18 percent of all milk produced in 1980) receive only the manufacturing price. However, two simplifying assumptions are implied in the all wholesale milk price equation: (1) all dairy farmers receive the all milk price and share in the revenue generated through classified pricing and (2) that pricing policies in state milk orders would parallel the policies of federal milk marketing orders.

3/ This measure assumes that surplus dairy products purchased under the price support program are exported or distributed to noncommercial uses at zero salvage value.

References

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