An Analysis of Reconstituted Fluid Milk Pricing Policy

Glen D. Whipple

This analysis suggests that alteration of the reconstituted fluid milk pricing provisions of federal and state milk market orders would have a substantial impact on market equilibrium. A reactive programming model of the U.S. milk market was used to simulate the effects of altered reconstituted fluid milk pricing policy. The solutions indicate that reconstituted fluid milk, as a lower cost alternative to fresh fluid milk, would make up a substantial portion of the fluid milk consumption in some markets.

Key words: market effects, pricing, reactive programming, reconstituted fluid milk.

The federal market order pricing of reconstituted fluid milk is a 1980s policy issue. The commercial reconstitution of milk components (solids-not-fat and milk fat with potable water) has been technically feasible for a number of years, but federal and state market orders have prohibited the sale of reconstituted fluid (RF) milk in most markets.

Classified pricing and pooling provisions affect Grade A milk marketed under federal or state market orders. Under classified pricing, minimum prices are set for raw Grade A milk based on how it is used. (Prevailing prices may be above the market order prices.) Milk for fluid use (Class I) is paid a fixed differential (Class I differential) above the Minnesota-Wisconsin manufacturing milk price (hereafter MW). Milk for manufacturing use (Class II or Class III) is paid the MW price or slightly more. With pooling, the revenue from Class I, II, or III sales is distributed so that each producer in the pool receives the average price.

The allocation and compensatory payment provisions of the market orders effectively prohibit the sale of RF milk within an order. The allocation provision ensures that in the order market all local milk is assigned to Class I use while, to the extent possible, all local or imported reconstituted milk or components are allocated to manufacturing classifications.

The compensatory payment is the difference between the market order Class I use price and the manufacturing milk price. It is paid into the revenue pool by the processor for each unit of reconstituted milk used as Class I. Thus, RF milk products cannot be produced at lower cost than those made from fresh whole milk (Hammond, Buxton, Thraen).

Recently a consumer group petitioned the U.S. Department of Agriculture (USDA) proposing that the market order provisions be altered to allow commercial reconstitution of fluid milk. Components used in RF milk would be paid the Class III rather than Class I price (USDA 1980). Proponents argued that such action would allow more efficient marketing of milk and lower fluid milk prices in some markets. Others suggested that it would cause producer prices to fall in many regions, cause market instability, and threaten the classified pricing system (USDA 1981). This paper evaluates the market impacts of altering the federal and state market orders to allow the commercial sale of RF milk.

Theoretical Model

The theoretical interregional model of the U.S. dairy industry, which serves as a basis for this analysis, incorporates the workings of the classified pricing system and the price support program. It is an adaptation of earlier models by Dahlgran, Ippolito and Masson, and Kessel. The model, presented functionally, is
(1) \( QA_i = QA(PA_i, PM_i) \)
(2) \( QB_i = QB(PM_i, PA_i) \)
(3) \( OFF_i = OFF(PFF) \)
(4) \( QM_i = QM(PM_i) \)
(5) \( QIII_i = QA_i + QAT_i - QFF_i \)
(6) \( PA_i = OFF(PFF_i) + QIII_i(PM_{mwr}) + QA_i \)
(7) \( PFF_i = PM_{mwr} + CLI_i \)
(8) \( PM_i \geq SL \)
(9) \( QMT_i = QIII_i + QB_i + QBT_i \)
(10) \( QMS_i = QMT_i - QM_i \)

where

- \( QA \) is quantity of Grade A milk produced in region \( i \);
- \( QB \) is quantity of Grade B milk produced in region \( i \);
- \( QAT \) is net quantity of Grade A milk traded in region \( i \) (positive for region \( i \) imports, negative for region \( i \) exports);
- \( QBT \) is net quantity of Grade B milk traded in region \( i \) (positive for region \( i \) imports, negative for region \( i \) exports);
- \( QFF \) is quantity of fresh fluid milk consumed in region \( i \);
- \( QM \) is quantity of milk used in manufactured products in region \( i \) which is purchased by the private sector;
- \( QMS \) is quantity of milk used in manufactured products in region \( i \) which is purchased by the government sector;
- \( QIII \) is quantity of Grade A milk used in manufactured products in region \( i \);
- \( QMT \) is quantity of milk used in manufactured products in region \( i \);
- \( PA \) is blend price received by Grade A milk producers in region \( i \);
- \( PFF \) is farm level fresh fluid milk price in region \( i \);
- \( PM \) is farm level manufacturing milk price in region \( i \);
- \( SL \) is the USDA price support level for manufacturing milk;
- \( PM_{mwr} \) is farm level manufacturing milk price in Minnesota and Wisconsin; and
- \( CLI \) is differential paid for milk in Class I use in region \( i \).

Equations (1) and (2) are supply functions for Grades A and B milk, respectively. Equations (3) and (4) are private sector demand functions for fresh fluid (FF) and manufacturing milk, respectively. The workings of the classified pricing and pooling system are represented by equations (5), (6), and (7). Grade A milk not used for fluid purposes is assigned to Class III in equation (5). Equations (6) and (7), respectively, define the Grade A blend price and the FF milk price. Equations (8), (9), and (10) represent the working of the price support program. The price support program maintains manufacturing milk prices at the USDA support level through Commodity Credit Corporation (CCC) purchase and storage of manufactured products. Thus, the demand for manufacturing milk is perfectly elastic at SL as indicated by (8). Equation (9) defines total manufacturing milk sales. The quantity of manufacturing milk purchased for price support is defined by equation (10).

Market equilibrium occurs when

\[
(11) \quad QA_i + QB_i + QAT_i + QBT_i = QFF_i + QM_i + QMS_i
\]
subject to the condition that

\[
(12) \quad QA_i + QAT_i \geq QFF_i
\]

Equilibrium in an interregional model composed of \( N \) \((N > 1)\) markets occurs when the interregional equilibrium conditions are satisfied:

\[
(13) \quad \sum_{i=1}^{N} (QA_i + QB_i) = \sum_{i=1}^{N} (QFF_i + QM_i + QMS_i)
\]

(14) \( |PA_i - PA| \leq TF_{ij} \),

(15) \( |PM_i - PM| \leq TM_{ij} \), and

(16) \( |PFF_i - PFF| \leq TFF_{ij} \),

where \( TF_{ij} \) is transportation cost for fluid milk between region \( i \) and region \( j \), \( TM_{ij} \) is transportation cost for manufactured milk products between region \( i \) and region \( j \), and \( TFF_{ij} \) is transportation cost for packaged fluid milk products between region \( i \) and region \( j \).

Alternating the market order RF pricing provisions will change the market equilibrium conditions if the RF milk price is less than the FF milk price. In this case, a portion of the total fluid demand would be captured by RF

\footnote{It is possible that a few consumers would prefer reconstituted fluid milk over fresh fluid milk and would consume it even at a higher price. However, this case is not considered here.}
milk. Its size would depend on the RF and FF milk prices and the cross-price elasticity of demand between the two products. The functional demands for fluid milk would be

\[(17) \quad Q_{FF}^r = Q_{FF}^r(P_{FF}^r, P_{RF}^r), \]  
\[(18) \quad Q_{RF}^r = Q_{RF}^r(P_{RF}^r, P_{FF}^r). \]

where \(Q_{RF}^r\) is quantity of RF milk consumed in region \(i\), and \(P_{RF}^r\) is price of RF milk in region \(i\). Grade A milk used in manufactured products would be

\[(19) \quad Q_{III}^r = QA_r^r + QAT_r^r - QFF_r^r - QRF_r^r. \]

The total quantity of milk used in manufactured products would be

\[(20) \quad Q_{MT}^r = Q_{III}^r + QB_r^r + QBT_r^r. \]

The blend price equation would be

\[(21) \quad P_{A}^r = \frac{Q_{FF}^r(P_{FF}^r) + Q_{RF}^r(P_{FM}^r) + Q_{III}^r(P_{FM}^r)/QA_r^r}{QA_r^r}. \]

The price of RF milk would be

\[(22) \quad P_{RF}^r = P_{FM}^r + CRF, \]

where CRF is the cost of processing RF milk. All other variables are as previously defined, with the superscript \(r\) indicating the post-policy change value. Equilibrium in region \(i\) would occur where

\[(23) \quad QA_r^r + QB_r^r + QAT_r^r + QBT_r^r = QFF_r^r + QRF_r^r + QM_r^r + QMS_r^r, \]

subject to the condition that

\[(24) \quad QA_r^r + QAT_r^r \geq QFF_r^r + QRF_r^r. \]

Interregional equilibrium would occur in \(N\) such markets when the following conditions are satisfied:

\[(25) \quad \sum_{i=1}^{N} (QA_r^r + QB_r^r) = \sum_{i=1}^{N} (QFF_r^r + QRF_r^r + QM_r^r + QMS_r^r), \]

\[(26) \quad |PA_r^r - PA_r| \leq TF_{ij}, \]
\[(27) \quad |PM_r^r - PM_r| \leq TM_{ij}, \]
\[(28) \quad |PFF_r - PFF_r| \leq TFF_{ij}, \] and
\[(29) \quad |PRF_r - PRF_r| \leq TFF_{ij}. \]

The model suggests the following effects of the proposed RF milk pricing policy: (a) the total quantity of fluid milk consumed would increase because of a lower price for the RF portion of fluid milk consumption; (b) producers would receive the manufacturing price for milk used in RF products causing a lower Class I utilization and Grade A blend price; (c) total milk production would decrease in response to the lower blend price; (d) increased fluid consumption and decreased production would reduce CCC price support acquisitions. If price support purchases reached zero, \(PM_r\) could rise above the support level causing RF and FF prices to rise. These a priori market impacts will be evaluated by the simulation model developed in the following section.

**Simulation Model**

The simulation model used to evaluate the RF pricing policy employs reactive programming (Seale and Tramel). This model estimates a least-cost spatial equilibrium for the U.S. dairy industry from supply and demand functions for twenty-one production and fluid consumption areas, eight manufacturing milk consumption areas, and appropriate transportation costs.\(^2\) Transfer costs were based on supply to demand point distances and linear transportation cost functions. The fluid milk transfer function was estimated by Lough (1977). The manufacturing milk transfer function (Hallberg et al.) reflects shipping costs of equivalent amounts of manufactured products. Both functions were adjusted to 1978 costs by the consumer price index for transportation service. All CCC price support operations were assumed to take place in the Lake States (Dahlgran 1980b).

The supply and demand functions used in the model are log linear and price dependent. They were calculated using 1978 farm prices, 1978 quantity data for each production and consumption area (USDA 1978a,b,c,d) and supply and demand elasticity parameters estimated by Dahlgran (1980a,b). A total milk supply schedule was calculated rather than separate Grade A and B schedules to aid the

\(^2\) The manufacturing consumption regions are larger to improve computational efficiency. This causes little distortion since transportation costs for manufactured products are relatively low, and manufactured products are a residual use for milk.
computational efficiency of the model. The farm level elasticities of demand for fluid and manufactured products were set at -0.112 and -0.35, respectively. The price elasticity of total milk supply was set at +1.19. Variation in elasticities among areas was not considered. Dahlgran (1980a) shows that such differences are not significant.3

Two variations of the simulation model were formulated. Model I simulates the actual 1978 policy situation, viz., classified pricing, pooling, and price supports. It is used as the basis of comparison to measure the market changes of alternative policies. Model II simulates the long-run equilibrium impacts of the proposed RF pricing policy.

In Model II, a reconstituted fluid milk demand function was constructed for each area with a commercial potential for RF milk. If the Class I differential was less than or equal to the cost of reconstitution (\( CLI \leq CRF \)), then it was assumed the area did not have a commercial RF potential. If the Class I differential was greater than the RF processing cost, then an RF demand function and a new FF demand function were calculated using constructed quantities and prices. The RF milk-processing cost (CRF) was set at $1.10 per hundredweight. This includes the cost of processing the raw milk into fat and nonfat solids and the cost of recombining the components. Processing cost was assumed to equal the margin between wholesale milk product prices (nonfat milk powder and butter or cream) and producer milk prices using yield data. This margin was approximately $1.04 per hundredweight in 1978. Hammond, Buxton, and Thraen estimated recombining costs to be $0.03 per hundredweight for a large bottling plant in 1976. To account for 1978 prices and varying sizes of bottling plants, recombining costs were set at $0.06 per hundredweight.

The consumption quantities used to calculate the new FF and RF demand functions were constructed according to equations (30) and (31):

\[
QFF_i = QFF_i - \left( \frac{CLI_i - CRF}{PFF_i} \right) (E\alpha)(QFF_i)
\]

\[
QRF_i = \left\{ \left[ \frac{CLI_i - CRF}{PFF_i} \right] (E\alpha)(QFF_i) \right\} \left[ 1 + \left( \frac{CLI_i - CRF}{PFF_i} \right) (E\gamma) \right]
\]

where \( QRF_i \) is a constructed quantity of RF milk consumed in area \( i \); \( QFF_i \), constructed quantity of FF milk consumed in area \( i \); \( E\alpha \), elasticity of demand for FF milk with respect to the price of RF milk; \( E\gamma \), elasticity of demand for RF milk with respect to the price of RF milk; and \( QFF_i \) is the observed FF consumption shifted from FF to RF by the cross-price substitution effect of the RF price reduction (equation 30). \( QRF_i \) includes the consumption shifted from FF to RF by the cross-price substitution effect and the increased consumption resulting from the own-price effects of the lower RF milk price, equation (31). The RF milk price (PRF) was assumed to be PM, plus CRF. The elasticity of demand for RF milk (EY) was assumed equal to the elasticity of demand for FF milk (-0.112). The cross elasticity of demand for FF milk with respect to the price of RF milk was estimated from consumer test data to equal +5.0 (Whipple, Davidson, Sanders).4

In summary, if the potential price of RF milk in an area was less than the minimum federal order FF price, a RF demand schedule was constructed. Also, a new FF demand schedule reflecting RF milk consumption was constructed. Model I is consistent with the assumptions and structure described in equations (1) through (16), except that it uses a total milk supply function and estimates a blend price which includes Grade B milk.5 Model II is consistent with the assumptions and structure in equations (1), (2), (4), (7), (8), (10), and (17) through (29) with the above-mentioned exception. For Model II, it was assumed that all RF milk was Grade A, and RF milk was not consumed in states where it was directly prohibited by law. The actual 1978 support level (SL) was assumed for Models I and II.

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3 The elasticity sensitivity of the model was tested using a broad range of supply and demand elasticity parameters. The model is reasonably insensitive to elasticity changes.

4 Model II simulation solutions were generated using cross-price elasticity parameters (E\alpha) ranging from -0.5 to +10.0. These solutions do not differ substantially from the presented results for parameter values near (± 50%) the estimated value (E\alpha = +5.0).

5 The combination of Grade A and B supply schedules is a simplification which does not distort model estimates seriously. Over 85% of the milk produced in the United States is Grade A. Most Grade B production is in the upper Midwest and Lake states where Class I utilization is low.
Whipple

Results

The absolute value of the margin between the Model I estimates and actual 1978 market price and quantity data were used to validate the simulation model. The average size of this margin provided a measure of the accuracy with which Model I simulated the observed market conditions. For all production and consumption areas, Model I incorrectly estimated 1978 market quantities by .82% and market prices by 1.81%. Model I and Model II solutions are directly compared to measure the market impacts of the proposed RF pricing policy. Comparing Model I and Model II solutions, rather than actual and Model II solutions, insures that any simulation error is solely a result of Model II misspecification.

Milk Production

The production area impacts of the proposed RF pricing policy are in Table 1. This policy would result in a 1.8% reduction in the average U.S. blend price. The quantity produced would fall 2.3%, and total producer revenue would fall 4.1%.

The policy impacts vary substantially across areas: Model II indicates that the blend price would fall 14.9% in Florida, an area with high Class I differentials and utilization. Total production in that area would fall 18.3% resulting in a 30.5% reduction in producer revenue.

Fluid Milk Consumption

The impacts on fluid milk consumption areas are in Table 2. With increases in the manufacturing milk price, the farm level FF milk price would increase approximately 0.6% in each area. The quantity of FF milk consumed would be reduced by 30.3% over the United States, as consumers substituted RF for FF milk. Total consumption of fluid milk (RF plus FF) would increase 0.4% as consumers respond to the lower RF prices. Total consumer expenditure for fluid milk would decrease 1.9%.

Because of high Class I differentials, 80.5%

Table 1. Production Area Impacts of an Altered Reconstituted Fluid Milk-Pricing Policy

<table>
<thead>
<tr>
<th>Area</th>
<th>Production</th>
<th>Fluid Milk Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Change Blend Price</td>
<td>Change Quantity Produced</td>
</tr>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>New England</td>
<td>-3.4</td>
<td>-5.6</td>
</tr>
<tr>
<td>N.Y.-N.J.</td>
<td>-3.2</td>
<td>-4.6</td>
</tr>
<tr>
<td>Pa.-Md.</td>
<td>-4.6</td>
<td>-8.5</td>
</tr>
<tr>
<td>Mid. Atlantic</td>
<td>-6.0</td>
<td>-8.4</td>
</tr>
<tr>
<td>Florida</td>
<td>-14.9</td>
<td>-18.3</td>
</tr>
<tr>
<td>S.C.-Ga.-Al.</td>
<td>-2.6</td>
<td>-11.6</td>
</tr>
<tr>
<td>Ky.-Tn.</td>
<td>-2.0</td>
<td>-2.7</td>
</tr>
<tr>
<td>Wis.-Mich.</td>
<td>+0.7</td>
<td>+0.9</td>
</tr>
<tr>
<td>Minn.-N. Dak.</td>
<td>+0.7</td>
<td>+0.7</td>
</tr>
<tr>
<td>Illinois</td>
<td>+0.7</td>
<td>+0.1</td>
</tr>
<tr>
<td>Ind.-Ohio</td>
<td>-1.2</td>
<td>-2.4</td>
</tr>
<tr>
<td>Mo.-Ark.</td>
<td>-5.5</td>
<td>-8.1</td>
</tr>
<tr>
<td>Miss.-La.</td>
<td>+0.8</td>
<td>+0.8</td>
</tr>
<tr>
<td>Iowa</td>
<td>+0.2</td>
<td>+0.8</td>
</tr>
<tr>
<td>S. Dak.-Neb.</td>
<td>-2.6</td>
<td>-3.3</td>
</tr>
<tr>
<td>Kansas</td>
<td>+0.7</td>
<td>+0.8</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>-4.9</td>
<td>-7.0</td>
</tr>
<tr>
<td>Texas</td>
<td>-4.2</td>
<td>-6.0</td>
</tr>
<tr>
<td>Intermountain-S.W.</td>
<td>+0.2</td>
<td>+0.2</td>
</tr>
<tr>
<td>Northwest</td>
<td>-2.0</td>
<td>-1.0</td>
</tr>
<tr>
<td>Calif.-Nev.</td>
<td>-1.8</td>
<td>-2.3</td>
</tr>
<tr>
<td>Total U.S.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* All prices are farm level.

Table 2. Fluid Milk Consumption Area Impacts of an Altered Reconstituted Fluid Milk Pricing Policy

<table>
<thead>
<tr>
<th>Area</th>
<th>Change Fresh Fluid Consumption</th>
<th>Change Consumer Outlay</th>
<th>Change Total Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>New England</td>
<td>-29.5</td>
<td>-2.9</td>
<td>+0.1</td>
</tr>
<tr>
<td>N.Y.-N.J.</td>
<td>-54.5</td>
<td>-4.3</td>
<td>+0.9</td>
</tr>
<tr>
<td>Pa.-Md.</td>
<td>-44.5</td>
<td>-2.8</td>
<td>+0.5</td>
</tr>
<tr>
<td>Mid. Atlantic</td>
<td>-68.0</td>
<td>-6.8</td>
<td>+1.5</td>
</tr>
<tr>
<td>Florida</td>
<td>-80.5</td>
<td>-9.3</td>
<td>+1.4</td>
</tr>
<tr>
<td>S.C.-Ga.-Al.</td>
<td>-23.2</td>
<td>-0.9</td>
<td>+1.1</td>
</tr>
<tr>
<td>Ky.-Tn.</td>
<td>-38.1</td>
<td>-1.9</td>
<td>+0.3</td>
</tr>
<tr>
<td>Wis.-Mich.</td>
<td>-0.1</td>
<td>+0.6</td>
<td>-0.1</td>
</tr>
<tr>
<td>Minn.-N. Dak.</td>
<td>-0.1</td>
<td>+0.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>Illinois</td>
<td>0.0</td>
<td>+0.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Ind.-Ohio</td>
<td>-0.1</td>
<td>+0.6</td>
<td>-0.1</td>
</tr>
<tr>
<td>Mo.-Ark.</td>
<td>-21.5</td>
<td>-0.2</td>
<td>+0.2</td>
</tr>
<tr>
<td>Miss.-La.</td>
<td>-48.5</td>
<td>-3.9</td>
<td>+0.6</td>
</tr>
<tr>
<td>Iowa</td>
<td>0.0</td>
<td>+0.7</td>
<td>0.0</td>
</tr>
<tr>
<td>S. Dak.-Neb.</td>
<td>-18.0</td>
<td>+0.2</td>
<td>+0.1</td>
</tr>
<tr>
<td>Kansas</td>
<td>-18.1</td>
<td>-0.5</td>
<td>+0.1</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>-36.0</td>
<td>-1.6</td>
<td>+0.3</td>
</tr>
<tr>
<td>Texas</td>
<td>-45.6</td>
<td>-3.1</td>
<td>+0.5</td>
</tr>
<tr>
<td>Intermountain-S.W.</td>
<td>-40.3</td>
<td>+2.6</td>
<td>+0.2</td>
</tr>
<tr>
<td>Northwest</td>
<td>-13.1</td>
<td>+0.2</td>
<td>-0.1</td>
</tr>
<tr>
<td>Calif.-Nev.</td>
<td>-21.8</td>
<td>-0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>-30.3</td>
<td>-1.9</td>
<td>+0.4</td>
</tr>
</tbody>
</table>

* All prices are farm level.
of the fluid milk consumed in Florida would be reconstituted and a 9.3% reduction in consumer outlays would occur. The northeastern and southern areas also would show high proportions of RF consumption and accompanying reductions in consumer outlays. The low Class I differentials in the upper and central Midwest would preclude commercial reconstitution of fluid milk in those areas. Thus, the increase in the FF milk price would result in a slight decrease in fluid milk consumption and an increase in consumer outlay.

Manufacturing Milk Demand

The impacts on manufacturing milk consumption areas are in Table 3. The Model II simulation indicates that the farm level manufacturing milk price would increase 0.8% across all areas, and manufacturing milk consumption would decrease 4.5%. Much of this decrease occurs as price support purchases fall. As production falls in response to lower blend price, manufactured product purchases necessary to maintain support prices would decline. This output decline, combined with the slight increase in fluid milk consumption, would result in no price support purchases. Manufacturing prices would rise above the support level. Since the Lake States area is the focus of the price support program, manufacturing milk consumption would fall 13.9% in that area. In the other areas, the reduction would be less than 1.0%. Consumer outlay would increase slightly in areas other than the Lake States. However, the absence of support purchases would result in a substantial outlay decline in that area.

Marketing Facilities Adjustments

The Model II solution indicates that if the RF milk-pricing policy were altered as proposed, 16 billion pounds of fluid milk would be consumed as RF. Two additional processing steps are required to market RF milk—drying and recombining. Model II contains no constraints on processing industry adjustments. Thus, some consideration of the industry's ability to meet this additional demand is warranted.

The recombining process probably would require only a minimal industry adjustment because it utilizes basically the same equipment needed for fortification and blending of fluid milk products (Hammond, Buxton, Thraen). Moreover, most of the RF milk consumed would displace FF. The drying process will require more adjustment. The Model II simulation indicates that 2,106.6 million pounds of dried whole milk would be required to satisfy the RF demand. In 1978, 1,049.1 million pounds of dried milk products were manufactured in the United States, of which the CCC purchased 285.5 million pounds. This indicates a nongovernment demand of 763.6 million pounds. If the RF pricing proposal were implemented, the market equilibrium would require milk powder production of 2,870.2 million pounds, more than twice the 1978 production.

The 1977 industry capacity for milk powder production was estimated at 2,079.6 million pounds (Lough 1979). Assuming 1978 capacity equal to 1977's, Model II indicated a 38% shortfall (790.7 million lbs.) in milk powder production. This suggests that a substantial adjustment in milk powder capacity would be necessary.

Conclusions

The proposed alteration of the RF pricing provisions of federal and state milk market orders would have a substantial impact on market equilibrium. Producer blend prices would fall in most areas, causing quantity produced and total producer revenue to decline. The Northeast, Atlantic states, and the South would have the largest declines. Producer blend prices, quantities produced, and producer

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Table 3. Manufacturing Milk Consumption Area Impacts of an Altered Reconstituted Fluid Milk-Pricing Policy

<table>
<thead>
<tr>
<th>Area</th>
<th>Change Manufacturing Milk Price (%)</th>
<th>Change Manufacturing Milk Quantity</th>
<th>Change Consumer Outlay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>+0.9</td>
<td>-0.3</td>
<td>+0.6</td>
</tr>
<tr>
<td>Southeast</td>
<td>+1.1</td>
<td>-0.4</td>
<td>+0.7</td>
</tr>
<tr>
<td>Lake States</td>
<td>+0.7</td>
<td>-13.9</td>
<td>-13.2</td>
</tr>
<tr>
<td>Upper Midwest</td>
<td>+0.7</td>
<td>-0.2</td>
<td>+0.4</td>
</tr>
<tr>
<td>South Central</td>
<td>+0.7</td>
<td>-0.2</td>
<td>+0.4</td>
</tr>
<tr>
<td>Intermountain-S.W.</td>
<td>+1.0</td>
<td>-0.6</td>
<td>+0.6</td>
</tr>
<tr>
<td>Northwest</td>
<td>+0.9</td>
<td>-0.3</td>
<td>+0.6</td>
</tr>
<tr>
<td>California</td>
<td>+0.8</td>
<td>-0.3</td>
<td>+0.6</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>+0.8</td>
<td>-4.3</td>
<td>-3.8</td>
</tr>
</tbody>
</table>

*All prices are farm level.*

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*Approximately 7.6 lbs. of milk will yield 1 lb. of whole milk powder (16,003/7.6 = 2,106.6 lbs.).
revenue would increase slightly in the upper and central Midwest. Hence, this policy change would be counter to the interests of many U.S. producers but favorable to upper and central Midwest producers.

With lower prices for RF milk, total fluid milk consumption would increase while total expenditure would fall. The Northeastern and Southern regions would use high proportions of RF milk with accompanying reductions in consumer expenditures. Consumers in the upper and central Midwest, using no RF milk, would decrease fluid milk consumption slightly with an increase in their expenditures. The proposed policy change would be in the interest of many fluid milk consumers, but not those in the upper and central Midwest. In most areas, manufacturing milk prices would increase slightly as would consumer outlays for manufactured products.

Alteration of the market order provisions probably would induce some short-term instability. Total output and producer prices would fall causing some marginal producers to leave the industry. However, the transportability and the storability of milk components would add a new dimension of temporal and spatial stability. Availability of reconstituted products would lessen the need for a milk reserve during the low production season. Therefore the prospects for long-term stability would be enhanced.

The simulation analysis indicates that the proposed policy could result in pressure to alter the classified pricing system in some markets. In Florida, a reduction in the Class I price to $11.00 (RF milk price) would preclude any RF milk sales. This would raise the area’s blend price from $10.54 to $10.77. Dissolution of the market order would have a similar effect on blend price. Therefore, under the proposed RF pricing policy some producers would find it in their interest to operate without a market order, thereby endangering the existence of the market order system. Producers in the Northeast, Atlantic states, and the Southwest would be so affected.

Permitting the sales of RF milk at Class III based prices could lead to reconstitution strictly to avoid the high Class I prices for fluid milk. The result would be higher total marketing costs. This is a misallocation of resources.

However, if Class I prices were allowed to adjust to the new RF milk competition, price alignment would occur. Reconstituted fluid milk would be used only when its real cost was lower than the real cost of obtaining FF milk. This would enhance allocative efficiency. A policy of altered RF milk pricing with Class I price alignment would result in lower fluid milk prices and blend prices compared to the present pricing system.

References


