Regional Impacts of Federal Milk Marketing Order Policy Alternatives

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Impacts of alternative federal milk marketing policies which result in reduced fluid (Class I) milk prices were assessed using a simulation model of the U.S. dairy industry. Results indicated that milk production, farm milk prices and producer revenues were significantly reduced in the Southern and Northeast regions of the country under some options. The regional shares of total U.S. milk production were not significantly altered from those which would exist under a continuation of the current policy.

There has been much discussion in recent years about the need for changes in national dairy policy. While the price support program received most of the attention in the 1980s, federal milk marketing orders more recently have come under increasing scrutiny. In the autumn of 1990, national hearings were held in several cities to consider proposed changes to federal orders. Numerous proposals were received covering many topics, but the majority pertained to price differentials for Class I milk including proposals for changes in the level of Class I price differentials, changes in inter-order price relationships, and the establishment of multiple base point pricing (Francis and Novakovic). While the outcome of the hearings resulted in no major changes regarding Class I prices, the subject remains a divisive issue. Recently, the Federal District Court in Minneapolis ruled the USDA's decision not to consider changes in the Class I price differentials to be arbitrary and capricious and ordered the Secretary to reconsider changes in the pricing structure. The issue has been a source of regional divisiveness with dairy farm groups and industry leaders in the upper midwest favoring changes in the federal order Class I pricing structure, and those in the southern and eastern regions of the country wanting Class I prices to stay as they are. Clearly, the federal milk marketing order debate is not over. The purpose of this research is to examine the regional consequences of alternative proposals concerning Class I prices in federal orders.

Federal Milk Order History and Operation

Milk marketing orders have been in existence for more than 50 years, and for much of that time they weie not a source of disharmony among dairy farmers from different parts of the country. The purposes of federal orders according to the enabling legislation, the Agricultural Adjustment Act of 1933 and the Agricultural Marketing Agreement Act of 1937, are somewhat vague but encompass establishing adequate prices to farmers through orderly marketing, protecting consumer interests, providing an orderly and adequate flow of milk to market, and avoiding unreasonable fluctuations in milk prices (Babb et al.). Through the years the objectives that have been used to administer the program have included promoting orderly marketing in fluid milk markets, stabilizing milk prices and improving the income situation, supervising the terms of trade in milk markets in such a manner as to achieve more equality of bargaining between producers and milk processors, and assuring consumers of adequate supplies of good-quality milk at reasonable prices (Forrest).

One of the most difficult items to interpret regarding these objectives is what is meant by orderly marketing. Traditionally, orderly marketing has been interpreted to mean compliance to a competitive norm in that milk moves to where it is needed for fluid use at the time it is needed (Ham-

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mond and Harris). When the orders were initiated, producers were at a tremendous disadvantage in bargaining with respect to processors. This stemmed in part from the perishable nature of milk, the relative size and market power of processors, the lack of public information regarding prevailing prices, and the highly seasonal nature of milk production and demand. Hence, the market was not purely competitive. To encourage orderly marketing, order provisions were designed to equalize the bargaining power between producers and processors, align prices within orders to encourage raw milk supplies located near a particular processor to move there in preference to a more distant processor, and align prices between orders so as to encourage the production of fluid milk products from the nearest sources of raw milk (Babb et al.). The enforcement of minimum Class I price differentials and the interorder pricing structure is intended to be one means to achieve these orderly marketing objectives.

Today, federal order regulation of milk markets is extensive. There are roughly 40 federal milk marketing orders which regulate approximately 75 percent of all Grade A (fluid grade) milk in the country. Milk is priced in these orders according to its use. Milk that is processed and sold in fluid form receives a Class I designation, milk used to make perishable manufactured products is assigned Class II use, while milk used to make storable products receives a Class III designation.[1] The Class III price for a given month in all federal orders is equal to the Minnesota—Wisconsin (M—W) price for the month. The M—W price is an average of prices paid by milk plants in Minnesota and Wisconsin for manufacturing grade (Grade B) milk. The Class I price is equal to the basic formula price (the M—W price from two months earlier) plus a Class I differential.

The economic justification for Class I differentials is that they represent the added cost of producing Grade A milk, the higher value that such milk has in the marketplace, and the cost of transporting raw milk from the source of reserve supplies, which is represented by a base point in Eau Claire, Wisconsin (Babb). The transportation cost component gives rise to the pricing structure where Class I prices increase with distance from the upper midwest. The differentials are set by the USDA through the hearing process in which industry representatives give testimony regarding their appropriate level. For example, the current differential added to the M—W price to obtain the Class I price is $1.20 per hundredweight in Minneapolis—St. Paul and $4.18 per hundredweight in Miami.

Producers in each order receive a uniform or blend price equal to the sum of the class prices weighted by the uses of all milk. This concept of processors and manufacturers paying for milk according to how they use it, and producers receiving a uniform price based on order utilizations is known as pooling. In addition to the minimum class prices that processors must pay for milk, over-order payments are made by processors in most federal orders to reimburse cooperatives for the cost of obtaining supplies and providing marketing services. Hence, the effective price received by a farmer can often be higher than the blend price. Cooperatives can also apportion losses to members and both cooperative and proprietary firms can assess transportation charges to producers, so the price received by the farmer can likewise be lower than the blend price.

Reasons for the Current Debate Over Class I Prices

Regional conflicts over federal order pricing are not new (French and Kehrberg), but concerns about the structure of Class I prices were not in the forefront during the late 1970s and early 1980s when increases in milk support prices seemed to ensure adequate income for many dairy farmers. During the 1980's however, the debate regarding federal orders began to resurface with various groups divided along regional lines. The resurgence of regionalism was due to many factors. The decline in federal price supports led to falling prices and put the squeeze on farm incomes (Novakovic and Jacobson). Also, changes in technology and the relative costs of concentrate feed resulted in the emergence of large-scale dairy operations with low production costs. These systems were embraced by many producers in the south and west, but less so in the traditional regions, leading to regional shifts in the shares of national milk production (Jesse and Babb). On top of these changes in industry structure, the Food Security Act of 1985 mandated increases in Class I differentials in most orders, but increases were larger in the south than they were in the upper midwest. Tensions were exacerbated by these changes because they differentially benefited producers in the south, and because they were mandated via the political process rather than through the customary

[1] Recently, most orders have adopted a Class IIIa designation for milk used in making dry milk powder. The price for milk used in this manner has usually been lower than the Class III price.

public hearing process (Novakovic and Jacobson). These events have resulted in some groups advocating changes in the current Class I differentials, while others maintain that the current differentials are appropriate.

Proponents of change maintain that it no longer makes sense to think of the upper midwest as the only source of reserve supplies (Anderson). They point out that Class I utilizations in many federal order markets are below 60 percent and question why differentials should be higher in those markets than in the midwest (Table 1). Also mentioned is the argument that regional differences in the differentials can no longer be justified by cost of production (McDowell et al. 1988). Another criticism is that differentials have been set too high in many markets, as evidenced by regional shifts in milk production shares and the fact that supplies of Grade A milk are well in excess of fluid needs and reserve requirements. Often cited with respect to this criticism is the case of the Texas order, which has seen dramatic increases in production since the differentials were increased in 1986 (Novakovic and Jacobson). Another concern is that the Class I price is reflective of a limit price, which may be higher than the competitive equilibrium price for fluid milk in many regions. Such pricing techniques, it is argued, differentially benefit producers in regions distant from the upper midwest.

Balanced against these assertions are the arguments of those who believe that the current system is both working well and reflective of a competitive solution. They point out that federal order prices in most cases are not the effective Class I prices and that market forces are acting to adjust prices through over-order payments (Jesse and Babb). Another argument in support of the current structure addresses the limit price issue, noting that the federal order Class I price structure is not a true limit price because it represents only about 60 percent of actual transportation costs. Furthermore, some studies have indicated that the current federal order price structure is generally consistent with competitively determined prices, given the current regional distribution of production and consumption (Babb; Novakovic and Pratt). A final point made is that the Class I differential question is declining in importance, as such differentials represent a much smaller percentage of the total milk price than was the case in prior years (Novakovic and Jacobson).

The Secretary of Agriculture made no major changes to the level and interregional alignment of Class I differentials as a result of the 1990 hearings. Since then, pressure has been building for the Secretary to reconsider possible changes. Against this backdrop, this research analyzes the impact of some of the proposals regarding the Class I differentials. While proposed changes have impacts in all orders, the magnitude of such impacts can obviously vary on a regional basis. Changes in the relative price levels would change the total income from dairying accruing to a particular order or region. The objective of this analysis is to determine the impacts of alternative federal order policies on regional milk production, milk prices, and producer revenues, taking into account the dynamic and spatial aspects of the market.

Table 1. Average Class I Utilizations and Minimum Class I Differentials for Selected Federal Order Regional Aggregates

Region	Class I Utilization	Class I Differential
	percent	dollars per hundredweight
Northeast	45	3.00
Middle Atlantic	50	2.67
Corn Belt	48	1.85
Kentucky—Tennessee	76	2.61
Southeast	85	3.37
Florida	85	4.85
Deep South	76	3.26
Lake States	16	1.81
Northern Plains	35	1.54
Southern Plains	47	2.37
Texas	53	3.11

Source: McDowell, H., A. Fleming and R. Fallert. *Federal Milk Marketing Orders: An Analysis of Alternative Policies.* Washington, DC: Economic Research Service, U.S. Department of Agriculture, September 1988.

Model Development

The regional impacts of alternative federal order policies were simulated using a capacitated transshipment model of the dairy industry known as the Dairy Market Policy Simulator (DAMPS). DAMPS was developed to simulate the impact of alternative policies on various response variables in federal and state milk marketing orders and unregulated areas (Novakovic et al. 1980; 1991). Model components include: supplies of Grade A and Grade B milk, processing activities, demand for fluid and manufactured products, commercial and government stocks of manufactured products, and transportation activities. In the model, each federal and state milk marketing order has a supply and demand center associated with it. The inclusion of state regulated areas is important because

California, the largest milk-producing state, does not have a federal order.

The model's objective function is to minimize the sum of the costs of milk assembly, processing, and product distribution subject to available milk supply, plant capacities, and consumption requirements. The transshipment model is formulated as a network and is solved using a primal-simplex algorithm (Bradley et al.). A representation of the network model is shown below.

$$\text{(1) Min } \Sigma\, c_k\, x_k, \quad k \in A$$

subject to:

$$\text{(a)} \quad \sum_{k \in A \text{ with tail } i} x_k - \sum_{k \in A \text{ with head } i} x_k = b_i, \; i \in N$$

$$\text{(b)} \quad l_k \leq x_k \leq u_k, \; k \in A,$$

where:

b_i = supply if i is a supply node; negative of demand if i is a demand node; 0 otherwise
A = set of all defined arcs
N = set of all nodes
c_k = cost along arc K
x_k = amount of product moved along arc k
l_k = lower bound on arc k
u_k = capacity of arc k.

This formulation is equivalent to the standard linear programming (LP) representation of the transshipment problem. The objective function of minimizing the sum of assembly, processing, and distribution costs is defined as minimizing the sum of total costs over all arcs. The first constraint encompasses the supply, demand, and balancing constraints found in traditional LP formulations. The second constraint defines upper and lower bounds for movements along particular arcs; hence, this represents constraints on plant capacity. The network formulation requires that allowable arcs are predefined by the set A; therefore, unrealistic linkages are not considered. Unlike the simplest transshipment models, DAMPS allows for milk supply and dairy product demand to respond to changes in prices by incorporating elasticities in a recursive simulation structure. A change in relative prices in one period will impact supply and demand quantities in the subsequent quarter; thus, the model is price responsive and does not assume fixed quantities for supply and demand.

DAMPS was modified to include dynamic regional milk supply response parameters for eight regions (Schiek 1991). The basic form of the supply response model is shown in below.

$$\text{(2) } mpd_t = ypc_t * cpf_t * fms_t$$

$$\text{(3) } ypc_t = f(ypc(L), fms_t, cpf_t, mfr_t, t)$$

$$\text{(4) } fms_t = g(fms(L), ypc_t, cpf_t, E(r\pi d_t), t)$$

$$\text{(5) } cpf_t = h(cpf(L), ypc_t, fms_t, E(\pi d_t), t)$$

where:

mpd_t = annual milk production in year t
ypc_t = annual milk yield per cow in year t
cpf_t = average herd size (cows per farm) in year t
fms_t = number of farms with milk cows in year t
L = lag operator where $x(L)$ is x_{t-1} and $x(L^2)$ is x_{t-2}
mfr_t = milk-feed price ratio in year t
$E(r\pi d_t)$ = expected relative profitability of dairying compared to other activities in year t
$E(\pi d_t)$ = expected profitability of milk production in year t
t = time trend.

The estimated supply response model is an error-correction formulation (Engle and Granger) where the dependent variables are yield per cow, farm numbers, and cows per farm. Milk production is the product of the three dependent variables. The model is dynamic and includes lagged values of the endogenous variables, as well as price expectations variables. The supply response parameters were estimated using iterative seemingly unrelated regressions (Judge et al.). A dynamic approach to supply modeling is necessary because it may take a number of years for the full impact of a price change on production to be realized. For dairy farmers, price changes in previous periods affect their expectations about current-period prices, future prices, and the profitability of dairying. Based on these expectations, dairy farmers may expand or contract the size of their operations, or even exit the industry. Likewise if price expectations are favorable, new producers may enter the industry. Static supply models and dynamic models which do not incorporate firm numbers do not fully capture these relationships (Veloce and Zellner). Another reason for specifying a dynamic model of this type relates to arguments that recent increases in Class I price differentials have been partially responsible for regional shifts in milk production. A dynamic model that allows for firm entry and exit provides a vehicle for addressing this issue.

A milk-composite input price ratio is included to represent the profitability of dairying on a per cow basis. The composite input price is a weighted average of feed prices, hay prices, and agricultural wage rates. A milk-labor price ratio is used as a proxy for the profitability of dairying, relative to other enterprises in which the owner-operator could be employed. The expectations for the milk-composite input price were assumed to be a single average of the previous four years' price changes, while expectations for the milk-labor price ratio were determined by identifying the autoregressive-moving average (ARMA) process in the series, and using the estimates of the ARMA model as price expectations. A summary of the regional own-price elasticities generated by this model is presented in Table 2.

The regional supply response estimates were incorporated in DAMPS and the simulation model is solved recursively. Regional milk production is determined according to the supply response model. These results become the milk production data used by DAMPS to determine the cost-minimizing solution to the transshipment problem. Average farm milk prices are computed by DAMPS based on milk utilization in each region and these data are used by the regional supply models to determine the next period's production.

Policy Simulation

For the purposes of policy simulation, it is necessary to establish a baseline to serve as a comparison for various scenarios. Five years were simulated for the baseline and for each policy alternative. While results were generated for all federal and state milk marketing orders, only annual summary data for regional aggregates are reported here. The regions used in this study are shown in Figure 1. These regional delineations differ from those usually used by the USDA. Attempts were made to make these state groupings more consistent with respect to trends in average herd size, milk production, yield per cow, and the dominant type of milk production system in use. Percentage changes in milk production, production share, farm milk price and gross producer revenue under the baseline after 5 years are shown in Table 3.

Table 2. Cumulative Own-Price Elasticities of Milk Production Through Year 5 by Region

	Year				
Region	1	2	3	4	5
Corn Belt	0.06	0.11	0.10	0.13	0.18
North Central	0.04	0.12	0.13	0.19	0.24
Northeast	0.09	0.12	0.18	0.23	0.28
Pacific	0.05	0.05	0.14	0.28	0.35
South Central	0.08	0.07	0.10	0.17	0.07
Southeast	0.10	0.13	0.14	0.17	0.17
Southwest	0.00	0.12	0.20	0.33	0.47
Mountain	0.07	0.12	0.25	0.39	0.47

Source: Schiek, W.A. *Regional Farm Structure Impacts of Bovine Somatotropin Adoption*. Staff Paper No. 94-16, Department of Agricultural Economics, Purdue University, West Lafayette, IN, August 1994.

Federal Order Policy Scenarios

While a number of issues were considered at the national hearings on Federal Milk Marketing orders, many of the proposals regarding Class I differentials are reflected by the four policies examined here. These alternatives represent proposals that were submitted prior to the 1990 hearings (Francis and Novakovic). The scenarios analyzed include the following: multiple base point pricing, reinstatement of Class I price differentials that existed before 1986, the elimination of the Grade A differential and the establishment of uniform (fixed) Class I price differentials in all orders.

Multiple base point pricing. In this scenario, it was assumed that the Class I differential was equal to $1.20 per hundredweight in all orders having adequate milk production to satisfy fluid use requirements (Class I sales plus a necessary reserve). The exceptions to the $1.20 differential rule are orders that must acquire supplemental milk to meet fluid consumption requirements. In these orders the minimum Class I differentials were set in accordance with a competitive model at levels that were required to attract supplemental milk supplies during deficit periods (McDowell et al. 1990). These differentials ranged from a high of $5.03 per hundredweight in Florida to a low of $1.57 in Louisiana, Mississippi, and Arkansas. California which does not have a federal order was assigned a Class I differential of $0.87 per hundredweight, the applicable level during the year (Table 4). In addition to the minimum differentials, the cost of intraregional fluid milk marketing was added to the Class I prices to reflect the minimum over-order premiums that would prevail. These costs amounted to an additional $0.65 per hundredweight in orders east of the Rocky Mountains and $0.45 per hundredweight in orders west of the Rockies.

1985 Class I differentials. Some of the proposals submitted at the federal order hearings in the autumn of 1990 called for a reinstatement of the

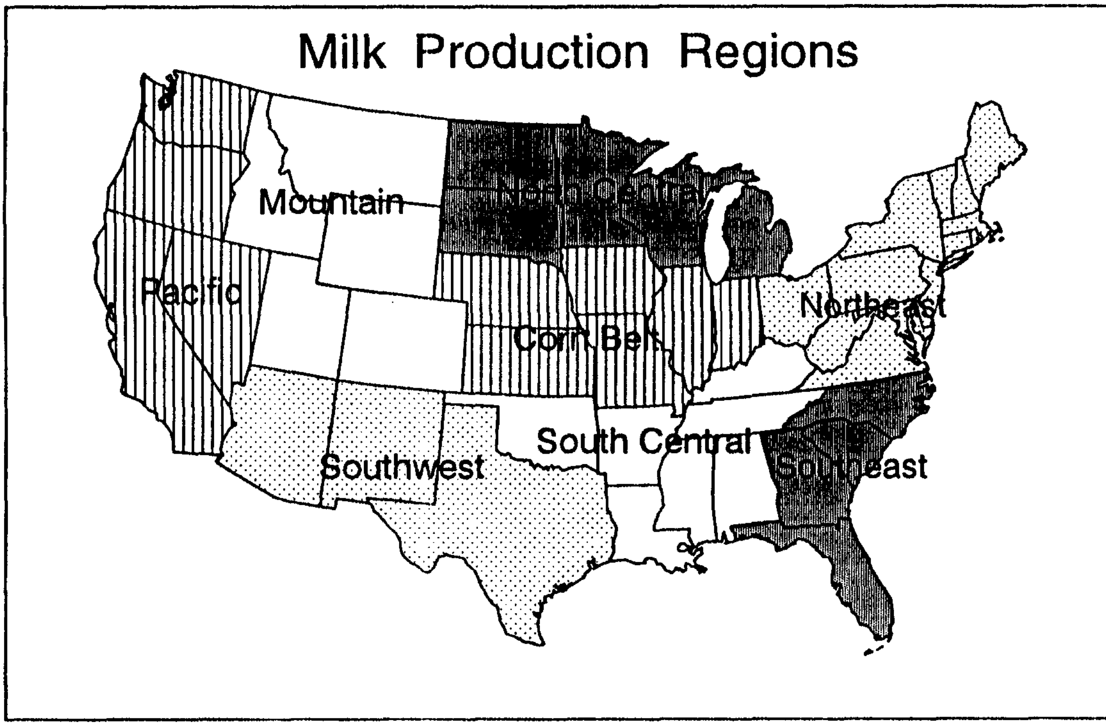

Figure 1. Milk Production Regions Used in This Study.

Class I differentials in effect prior to the changes that were made in 1986 under the 1985 farm bill. The level of the 1985 Class I differentials were obtained from *Federal Milk Market Order Statistics* (USDA 1985). For the purposes of this simulation, it was assumed that over-order premiums would continue at base-year levels. In reality, the over-order premiums could be expected to change when the minimum differentials change. However, there was no basis for predicting how much the premiums would change.

Table 3. Baseline Simulation Results, Five-Year Percentage Changes in Selected Variables by Region

Region	Milk Production	Production Share	Farm Milk Price	Gross Producer Revenues
	percentage change from base year			
Corn Belt	4.1	−0.6	−0.2	3.9
North Central	3.0	−2.1	−0.0	3.0
Northeast	5.3	−1.2	−0.5	4.7
Pacific	25.4	2.2	−0.6	24.6
South Central	2.2	−0.5	0.2	2.3
Southeast	13.7	0.1	−2.0	11.5
Southwest	54.5	2.0	−5.2	46.5
Mountain	13.9	0.1	−0.5	13.4
U.S.	10.9	—	−0.8	10.0

Elimination of the Grade A differential. The elimination of the Grade A differential has been discussed. This differential is supposed to reflect the added cost of Grade A milk production and the higher value of such milk in the marketplace. Modeling the impact of eliminating this differential would involve reducing Class I differentials in all federal and state orders by a fixed amount. This scenario was simulated by reducing Class I differentials in all orders by $0.50 per hundredweight (Schwart et al). Over-order premiums were assumed to continue at base-year levels.

Establishment of uniform (fixed) Class I differentials. Some proposals at the federal order hearings called for the establishment of uniform Class I differentials in all federal orders. Several levels for the uniform differential were proposed, with $1.80 per hundredweight being the most frequent choice. For the purposes of this simulation, all Class I differentials were reduced to $1.80 per hundredweight plus the applicable over-order premiums that were in effect during the base year.

National Impacts

For each of the federal order policies examined, the Class II and Class III prices and all input prices

Table 4. Class I Differentials in Federal and State Milk Orders Under a Multiple Base Point Pricing Plan

Order	Differential	Order	Differential
Upper Florida	5.03	Central Arkansas	1.57
Tampa Bay	5.03	Lou-Lex-Evans.	2.05
S.E. Florida	5.03	Paducah	2.05
Alabama-W. Florida	2.95	Nashville	2.05
Georgia	2.95	Memphis	2.05
North Carolina	2.95	Tennessee Valley	2.05
South Carolina	2.95	California	0.87
Greater Louisiana	1.57		
New Orleans-Miss.	1.57	All Others	1.20

Source: McDowell, H., A. Fleming and F. Spinelli. *U.S. Milk Markets Under Alternative Federal Order Pricing Policies.* Washington, DC: Economic Research Service, U.S. Department of Agriculture, November 1990.

were maintained at base-year levels. The results are reported as changes in the year 5 projected value from the projected year 5 baseline value. Hence, references to decreases or increases in a particular response variable are expressed relative to what would have occurred in the absence of the policy change. Such responses are not increases or decreases relative to the initial state (year 0).

The aggregate impact of the four federal order policy alternatives on selected variables is shown in Table 5. Milk production decreases slightly under each of the four scenarios. This result was expected since under the assumptions employed here, all of the policies involve reductions in milk prices. Producer revenues also fall, as do consumer expenditures and government removals. Fluid utilization increases as a result of the combined effect of decreased production and increased consumption caused by lower milk prices. Impacts are greatest under the multiple base point pricing plan since this scenario involves the greatest average price reduction from base run levels (2.7 percent). However, the national-level impacts on these variables are small in all cases.

Regional Impacts

Regional milk production declines under each of the federal order policies in almost every case (Table 6). The exception is the Pacific region, which shows a modest increase in production relative to the baseline under multiple base point pricing, and the North Central region, which shows an increase under fixed differentials. The reductions in regional production are greatest in the Northeast, Southeast, and Southwest. Such results are not surprising because these regions experience greater price reductions than other regions under the policies examined (Table 7). However, note that the reductions in milk production in the South Central region are relatively small, even though this region has the second greatest decrease in milk price (Tables 6 and 7). Dairy farmers in the South Central region, which includes Tennessee and Kentucky, probably have fewer alternative uses for their land and other inputs than farmers in the Southeast, Northeast, and Southwest. Hence, many farmers in the South Central region may continue dairying even in the face of declining prices because few

Table 5. Federal Order Policy Simulation Results for Selected Response Variables

	Milk Production	Milk Price	Producer Revenues	Consumer Expenditures	Net Government Removals	Fluid Utilization
	billion pounds	dollars per cwt.	billion dollars	billion dollars	percent (fat basis)	percent
Baseline						
Year 0	145.01	12.24	17.75	31.12	6.3	40.6
Year 5	160.75	12.14	19.51	35.59	8.7	37.1
	percentage change in simulated Year 5 values relative to Year 5 Baseline values					
Multiple Base Points	−0.7	−2.7	−3.4	−1.2	−0.6	1.9
1985 Differentials	−0.2	−0.9	−1.1	−0.5	−0.2	0.8
No Grade A	−0.4	−1.4	−1.9	−0.8	−0.4	0.8
Fixed Differentials	−0.5	−1.8	−2.3	−1.1	−0.5	1.4

Table 6. Federal Order Simulation Results for Regional Milk Production, Percentage Change from Baseline Values

	Corn Belt	North Central	Northeast	Pacific	South Central	Southeast	Southwest	Mountain
				billion pounds				
Baseline								
Year 0	14.72	43.49	35.09	24.36	8.75	5.62	7.47	5.50
Year 5	15.33	44.79	36.95	30.54	8.94	6.40	11.54	6.26
			percentage change in simulated Year 5 values relative to Year 5 Baseline values					
Multiple Base Point	−0.3	−0.1	−1.6	0.4	−0.4	−2.0	−3.0	−1.1
1985 Differentials	−0.2	−0.1	−0.2	0.0	−0.2	−0.5	−1.2	−0.3
No Grade A	−0.3	−0.2	−0.5	−0.5	−0.1	−0.4	−0.9	−0.8
Fixed Differentials	−0.2	0.1	−1.1	0.0	−0.4	−1.3	−2.2	−0.6

alternatives are available. As was the case for national aggregate results, multiple base point pricing had the greatest impact of any policy on regional production.

When compared to the baseline, milk prices are lower under the federal order policy alternatives in almost all cases. Again, the exceptions are the Pacific region under multiple base point pricing and the North Central region under fixed differentials (Table 7). The greatest price impacts are in regions which currently have high Class I differentials or high fluid utilizations, such as the Northeast, Southeast, South Central, and Southwest. Any plan that lowers differentials would have the strongest impact in these regions. In all cases, the Southeast and South Central regions experience the greatest change in milk prices. However, under a multiple base point policy, the impact in the southeast is magnified because the high over-order premiums which existed in the base year were not carried forward in the simulation. The level of prices under this scenario were determined to be those required to induce adequate supplies of milk to move during deficit periods (McDowell et al. 1990).

Impacts in the Pacific region are heavily influenced by impacts on California. The increase in the Class I price in California under multiple base point pricing is due to the inclusion of interregional marketing costs in the effective Class I price which was not assumed under the baseline. This assumption was made under the multiple base point scenario to maintain consistency with an earlier study (McDowell et al. 1990). Under the elimination of the Grade A differential, California was treated the same as federal orders and received a 50 cent reduction in its Class I price, something which would not necessarily occur if this policy were adopted, as only those areas regulated by federal orders would be required to comply.

The impact on regional producer revenues mirrors that of milk prices. The Southeast, Southwest, South Central, and Northeast regions experience the greatest decreases in gross producer revenues when compared to the baseline (Table 8). Multiple base point pricing generally has the greatest impact (0.5 to 14.1 percent) followed by the uniform differential policy (0.1 to 8.9 percent). A return to 1985 differentials and the elimination of Grade A differentials have more modest effects, although

Table 7. Federal Order Simulation Results for Regional Milk Price, Percentage Change from Baseline Values

	Corn Belt	North Central	Northeast	Pacific	South Central	Southeast	Southwest	Mountain
				dollars per hundredweight				
Baseline								
Year 0	12.06	11.92	12.71	11.21	13.18	14.78	12.88	11.84
Year 5	12.04	11.91	12.65	11.14	13.20	14.49	12.22	11.78
			percentage change in simulated Year 5 values relative to Year 5 Baseline values					
Multiple Base Points	−1.4	−0.4	−5.3	1.0	−5.5	−12.3	−4.6	−1.9
1985 Differentials	−1.2	−0.2	−0.8	0.0	−3.4	−3.0	−1.9	−0.5
No Grade A	−1.4	−0.8	−1.8	−1.3	−2.3	−2.5	−1.4	−1.5
Fixed Differentials	−0.8	0.6	−3.6	−0.1	−5.5	−7.7	−3.5	−1.3

Table 8. Federal Order Simulation Results for Regional Producer Revenues, Percentage Change from Baseline Values

	Corn Belt	North Central	Northeast	Pacific	South Central	Southeast	Southwest	Mountain
				billion dollars				
Baseline								
Year 0	1.78	5.18	4.46	2.73	1.15	0.83	0.96	0.65
Year 5	1.85	5.34	4.67	3.40	1.18	0.93	1.41	0.74
				percentage change in simulated Year 5 values from Year 5 Baseline values				
Multiple Base Points	−1.7	−0.5	−6.8	1.4	−5.8	−14.1	−7.4	−3.0
1985 Differentials	−1.4	−0.3	−1.0	0.0	−3.7	−3.5	−3.0	−0.8
No Grade A	−1.7	−1.0	−2.3	−1.8	−2.4	−3.0	−2.3	−2.3
Fixed Differentials	−0.9	0.7	−4.7	−0.1	−5.8	−8.9	−5.6	−1.9

eliminating the Grade A differentials has a proportionately greater impact than a return to 1985 pricing in the Mountain and Pacific regions where Class I differentials are already small. In these regions, the Grade A differential represents a larger percentage of the Class I milk price. In general, the impact of a return to 1985 differentials is larger in regions distant from the upper midwest (east of the Rocky Mountains) and in regions with high fluid utilizations. The impact of eliminating the Grade A differential varies directly with the regional Class I utilization percentage. One should note that under the fixed differential, the North Central region is the only one to experience an increase relative to the baseline in milk production, prices and revenue. Given this, it is not surprising that this option was put forward and supported by a coalition of cooperatives and processors in the upper midwest.

The alternative policies result in very little change in the regional production shares relative to the baseline (Table 9). The forces at work causing regional shifts in milk productions appear to go beyond the influences of federal order pricing. These results suggest that changes in the Class I price differentials will not stem the exodus of milk producers or the decline of milk production in the North Central and Corn Belt regions, nor will they stop the expansion of milk production in the Southwest and Pacific regions.

Conclusions

Given the assumptions used in this study, the federal order policies examined do not substantially impact aggregate U.S. milk production, prices, or producer revenues. The average U.S. milk price falls at most by about 2.6 percent under multiple base point pricing and 1.8 percent under uniform Class I differentials. The differences in the impacts on regional production, milk price, and producer revenues were more striking. Clearly the biggest losers under any of the proposed changes are the Southern regions and the Northeast as they suffer the biggest reductions in average milk prices and aggregate producer revenues. The Southeast experiences the most severe consequences and is particularly hard hit under the multiple base point pricing policy with a milk price decrease of over 12 percent and an aggregate revenue decrease of

Table 9. Regional Shares of U.S. Milk Production Under Baseline and Federal Order Policy Alternatives

	Corn Belt	North Central	Northeast	Pacific	South Central	Southeast	Southwest	Mountain
				percent of U.S. milk production				
Baseline								
Year 0	10.2	30.0	24.2	16.8	6.0	3.9	5.2	3.8
Year 5	9.5	27.9	23.0	19.0	5.6	4.0	7.2	3.9
				production shares in Year 5 under alternative federal order policy scenarios				
Multiple Base Point	9.6	28.0	22.8	19.2	5.6	3.9	7.0	3.9
1985 Differentials	9.5	27.9	23.0	19.0	5.6	4.0	7.1	3.9
No Grade A	9.5	27.9	23.0	19.0	5.6	4.0	7.1	3.9
Fixed Differentials	9.6	28.0	22.8	19.1	5.6	3.9	7.1	3.9

over 14 percent. It is important to mention that these results carry the implicit assumption that over-order payments do not adjust under the new policy, which is obviously unrealistic. Given the high Class I utilization in the Southeast, periodic deficits in milk for fluid use are likely to occur. At such times, the effective Class I price might be bid up to reflect transportation costs and prices in the closest milk exporting region. Hence, the actual impact in the Southeast and South Central regions may not be as large as projected here.

The regions which fare the best under these policies are the North Central and Pacific regions. The North Central region is perhaps a bigger long term gainer because of its proximity to the markets where production is reduced. Because the North Central region is the residual supplier of fluid milk to the southern markets, it will likely experience an increase in its share of fluid milk sales in those markets when production there is reduced. It is therefore understandable why the North Central region's dairy cooperatives are advocates of changing the federal orders in the direction of reducing or eliminating inter-order price differences. However, depending on how over-order premiums adjust, such policy changes may result in little overall benefit for producer groups in the North Central region. Furthermore, it does not appear that they will reverse the shifts in regional production that have already occurred, nor will they halt the continuation of these trends.

This research examined the impact of various proposals for changes in Class I differentials in federal orders on regional milk production, farm milk prices, and producer revenues. These results do not make any claim about the overall economic efficiency of the various alternatives compared to the current policy, but merely addresses the distribution of producer benefits among regions. All of the options analyzed reduce Class I prices in most orders. The most obvious economic justification for them is that they reduce regulated minimum prices, allowing market forces to have greater influence over the actual market price, and reducing any arbitrary enhancement of prices in some regions over others. Reducing regulation may allow consumers greater latitude in demonstrating demand and generating value for milk and milk products and producers are better able to respond with any comparative or cost advantage they may have.

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