IMPACT OF REDUCING FEDERAL ORDER CLASS I DIFFERENTIAL ON REPRESENTATIVE TEXAS AND NEW MEXICO DAIRY FARMS

Joe L. Outlaw, Ronald D. Knutson, Robert B. Schwart, Jr., John Holt, James W. Richardson, Dalton H. Garis

Abstract

The General Accounting Office (GAO) recommended that the USDA substantially reduce or eliminate the extent of price discrimination practiced under federal milk marketing orders. The purpose of this study was to quantify the impacts of alternative means of implementing the GAO proposal on the economic viability of Texas and New Mexico dairy farms. Five dairy farms were simulated for six years under the current dairy policy and five alternative proposals. Results of the analyses indicate that large New Mexico dairies can remain economically viable under all of the alternatives. On the other hand, federal order policy changes would accelerate the loss of equity for moderate size Texas dairy farms.

Key words: dairy, federal market order, Class I differential.

In a March 1988 report, the General Accounting Office (GAO) recommended that the USDA substantially reduce or eliminate the extent of dairy price discrimination practiced under federal marketing orders. The GAO recommended a gradual but persistent move toward lower levels of federal order regulation including options such as reduction of the Class I differential to pre-1985 farm bill levels, elimination of the distance differential, elimination of the Grade A differential, or the establishment of Class I price basing points other than Eau Claire, Wisconsin.

The GAO report was highly controversial. Upper Midwest dairy interest groups tended to support the GAO conclusions and recommendations while interests in other regions were critical of the GAO findings. Questions arose as to what the economic impact would be if the GAO report recommendations were adopted. This research evaluates the impact of alternative means of implementing the GAO proposal on Texas and New Mexico farms. These two regions have experienced accelerated increases in milk production—particularly since the 1985 farm bill action increasing the Class I differential.

BACKGROUND ON FEDERAL ORDER REGULATION

Federal milk marketing orders price milk on the basis of use (classified pricing). There are typically three classes of Grade A milk in each marketing order. Class I milk includes milk that will be used directly for fluid consumption as whole, lowfat, or skim milk. Class II milk is disposed of as fluid cream or in "soft" dairy products such as cottage cheese and frozen desserts. Milk disposed of as cheese, butter, or nonfat dry milk is referred to as Class III milk. Processors are charged higher prices for milk used for fluid (bottling) purposes (Class I milk) than for milk manufactured into frozen desserts (Class II) or butter, nonfat dry milk, and cheese (Class III milk). Milk producers in a market order area are paid a "blend" or average price based on the amount of milk utilized for Class I, II, and III and their respective prices. Milk utilization refers to the percentage of milk in a marketing order area that is used in each of the three milk classes. For example, the 1989 Class I utilization for all milk produced under milk marketing orders in the United States was 45.2 percent (USDA, Federal Milk Order Market Statistics). Because processors pay more for Class I milk, orders with higher Class I utilization rates would be expected to pay producers a higher blend price.

The difference between the Class I price and the Class III price is referred to as the Class I differential. The Class I differential is made up of two components (Garis):

(1) The Grade A differential at the basing point of Eau Claire, Wisconsin. The pre-1985 farm bill

Joe L. Outlaw is a Research Associate, Ronald D. Knutson is a Professor and Extension Economist, Robert B. Schwart, Jr., is an Extension Economist, John Holt is a Visting Professor, and James W. Richardson is a Professor, in the Department of Agriculutral Economics at Texas A&M University; Dalton H. Garis is a Fellow in the Department of Food and Resource Economics at the University of Florida.

Working Paper 91-3 in the Agricultural and Food Policy Center, Department of Agricultural Economics, Texas A&M University.

differential was $1.02 and post-1985 farm bill level is $1.10 per cwt. The Grade A differential was originally established to encourage farmers to upgrade their facilities to produce Grade A milk—suitable for fluid consumption. Grade A milk meets higher sanitation standards required for milk to be used in fluid consumption (McDowell et al.). To accomplish this objective, the Grade A differential was set at a level which would cover the added cost of producing Grade A milk as opposed to Grade B milk. Only manufactured products (butter, nonfat dry milk, and cheese) are made from Grade B milk. Technological change and increased sanitation requirements for Grade B milk now raise questions of whether it still costs more to produce Grade A milk.

(2) The transportation differential based on distance from Eau Claire, Wisconsin. Prior to the 1985 farm bill, the transportation differential was $0.15 per cwt. per 100 miles. In a controversial provision, the 1985 farm bill increased the transportation differential on a selective market basis. Controversy arose from the selectivity of the increase, a simultaneously mandated reduction in the milk price support level, and the installment of a temporary production control program referred to as dairy termination. The increased distance differential tended to average about $0.23 per cwt. per 100 miles, but was not uniform over all federal order markets.

In May 1986, the Texas order Class I differential rose from $2.32 to $3.28 per cwt. while the New Mexico differential remained at the pre-1985 farm bill level of $2.35 per cwt. During the period 1983 to 1989, Texas and New Mexico milk production increased more rapidly than did production in the rest of the nation, (i.e. 29.7 percent and 32.5 percent, respectively, compared to 3.3 percent for the United States (USDA, April 1990). For example, the increased milk production was sufficiently rapid from 1986 to 1987 that the blend price for the Texas market only increased by $0.25 per cwt. despite the $0.96 per cwt. increase in the Class I price (USDA, Federal Milk Order Market Statistics). The rapid increase in Texas production during the 1980s has been attributed to relatively low production costs—not to the federal order price increase. It has been suggested that reduced costs can be attributed to the accelerated conversion of the Southwest dairy industry from smaller farms (less than 125 milk cows) to larger farms (over 250 milk cows) and from a pasture and foraged based system to drylot dairying in which most feedstuffs are purchased (Seton; Schwart).

In retrospect, this conversion of dairies from pasture to drylot operated throughout the 1980s, resulting in progressively lower costs of production across all sizes of farms in Texas and New Mexico relative to other milk production regions (USDA, August 1990). Yet many small dairy farms remain in Texas and New Mexico. The percentage of dairy farms in Texas and New Mexico that have fewer than 250 cows is 88 and 33 percent, respectively (Table 1).

The combined effect of increased Texas and New Mexico production and the end to rapidly growing

Table 1. Comparison of Milk Production and Its Relationship to Number of Milking Cows and Dairy Farms for Texas and New Mexico, 1989

Farm Size: Number of Cows	Number of Producers	Milk Pounds	Butterfat Pounds	Percent of Total Milk	Percent of Total Producers
Texas:					
0-125	1,366	141,332,878	4,810,350.28	30.13	63.18
126-250	541	139,683,519	4,821,118.22	30.01	25.03
251-500	181	92,886,603	3,269,818.88	19.94	8.37
501-750	43	40,158,951	1,423,703.76	8.62	1.99
751-1,000	16	20,919,634	729,158.87	4.49	.74
1,001-Over	15	31,737,909	1,099,388.65	6.81	.69
Total	2,162	465,719,494	16,153,538.66	100.00	100.00
New Mexico:					
0-125	13	1,231,716	41,538.84	1.16	13.83
126-250	18	6,496,871	219,856.44	6.14	19.15
251-500	20	12,758,024	448,870.99	12.06	21.28
501-750	10	11,253,410	383,867.45	10.64	10.64
751-1,000	11	17,461,079	589,120.04	16.50	11.70
1,001-Over	22	56,597,663	1,963,361.10	53.50	23.40
Total	94	105,798,763	3,646,614.86	100.00	100.00

Source: Texas Order Market Administrator, *Texas Milk Market Report, June 1989* and additional information provided by the Texas Order Market Administrator.

demand reduced the Class I utilization for Texas and New Mexico milk from 68 percent each in 1985 to 56 and 58 percent, respectively, in 1989 (USDA, Federal Milk Order Market Statistics). In 1980, Class I utilization was as high as 77 percent for Texas and 63 percent for New Mexico (USDA, Federal Milk Order Market Statistics).

USDA cost of production data indicate that in 1989, Texas' total economic costs were $14.39 per cwt. compared with $13.90 per cwt. in the Upper Midwest where farmers had only a $1.20 per cwt. Class I differential compared with $3.28 in Texas. In other words, the ratio of the Class I differential to the cost of production was 0.09 in the Upper Midwest and 0.23 in Texas. The USDA does not provide cost estimates for dairies in New Mexico. However, New Mexico dairies have about the same characteristics and structure (i.e. dry lot and low investment per cow) as dairies in the Pacific region (California, Oregon, and Washington), which had total economic costs of $11.17 per cwt. in 1989 (USDA, August 1990).

METHODOLOGY AND SCENARIOS ANALYZED

The present study utilized data from one moderate-sized and one large farm for each of two major production regions of Texas (Stephenville and Sulphur Springs) and data from one large dairy for Las Cruces, New Mexico. Data to describe representative farms were developed using panels of producers in each of the areas. Panels made up of farmers from moderate sized and large dairies were interviewed to collect the descriptive, cost, production, and financial data of dairies typical of their size category. These producers subsequently participated in telephone conference calls designed to validate the data describing their farms and the accuracy of projections in terms of costs and revenue experienced under alternative price scenarios. Table 2 contains a brief description of the five representative farms.

These farms were simulated over a six-year period (1990-1995) using the Farm Level Income Tax and Policy Simulation Model (FLIPSIM) developed by Richardson and Nixon and modified for dairy by Yonkers. The FLIPSIM model is a firm-level Monte Carlo simulation model which simulates the annual production, marketing, financial, income tax, and dairy herd management activities of a dairy/crop farm.[1] Crops produced on the farm were assumed to be fed to the dairy herd or sold as cash crops. If crops exceeding herd feed requirements were produced, the excess crops were sold at prevailing prices. Shortfalls in crop production for feed required for the dairy herd were to be met by purchasing feeds. Dairy herd feed requirements not produced on the farm such as soybean meal, whole cottonseed, and calf starter were to be purchased at prevailing market prices.

The size of the dairy herd was assumed to remain constant across the planning horizon for all policy scenarios to allow direct comparison. The cost of maintaining the herd size was endogenized over the planning horizon by calculating the costs of raising and/or buying replacements. Feed costs, milk prices, crop prices and cattle prices are stochastic in the model to account for price-risk faced by producers.

Table 2. Characteristics of Representative Texas and New Mexico Dairy Farms Utilized in Class I Differential Analysis

Location	Herd Size	Land	Facilities: Housing	Facilities: Milking	Feed Produced	Initial Assets	Initial Equity	Total Farm Cash Expense
	(Cows Milked)	(Acres)				--- ($1,000)---		($/cwt.)
Texas:								
Stephenville - Moderate	300	303	Drylot	Parlor	Forage	1,025.7	862.5	14.79
Stephenville - Large	720	160	Drylot	Parlor	None	1,359.1	1,138.3	10.79
Sulphur Springs - Moderate	180	200	Freestall	Parlor	Pasture	660.8	567.2	14.17
Sulphur Springs - Large	812	400	Freestall	Parlor	Pasture	2,039.6	1,734.7	12.46
New Mexico:								
Las Cruces - Large	1,600	150	Drylot	Parlot	Forage	5,028.9	4,225.6	13.51

[a]Total farm cash expense includes the cost of raised feed fed to livestock, cash expenses for milk production, purchased feeds, hired labor, fixed farm overhead cash costs and actual interest expenses assuming 10 percent debt on all assets.

[1] See Richardson and Nixon for a description of the crop and accounting sections of the model.

This component of the model causes the value of the dairy herd (cows, calves, heifers and bulls) to vary from year to year as cattle prices vary.

Crop yields and milk production per cow are also stochastic variables in the model. A multivariate empirical probability distribution of prices and yields was developed for each representative dairy farm using the most recent 10 years of data for the random variables. Annual values for crop and cattle prices come from the July 1990, Food and Agricultural Policy Research Institute(FAPRI) baseline. Annual milk prices for the alternative scenarios are developed by adjusting the July 1990 FAPRI milk price for the assumed policy changes. All other variables describing the representative farms remain constant from one scenario to the next. Thus in the traditional comparative statics paradigm, all changes in the output variables are a result of the assumed milk price changes.

All of the representative dairies were analyzed under the assumption of 10 percent long-term and 10 percent intermediate-term initial debt. Low debt levels were used to assure survivability of all of the farms over the study period.[2] As mandated in the 1985 farm bill, milk price support reduction was triggered when it was projected the government would acquire the equivalent of 5 billion pounds of milk (GAO). The FAPRI milk price forecast incorporates this milk price support reduction based on their projections of CCC removals.

The impacts of six Class I differential policy scenarios were evaluated with the initial producer blend prices computed on the basis of 56.2 percent and 57.6 percent Class I fluid utilization for Texas and New Mexico, respectively.[3] The scenarios are:

(1) **BASE.** Current federal order policy with a Class I differential of $3.28 per cwt. for Texas dairies and $2.35 per cwt. for New Mexico dairies as provided for in the 1985 farm bill yields 1990 producer blend prices of $14.72 and $14.23, respectively. The Class III price ($12.86 per cwt.) is the M-W price projected by FAPRI. The Class II price equals the Class III price plus a fixed differential of 10 cents per cwt.

(2) **No DD.** Eliminate the distance differential and retain only the Grade A differential of $1.10 per cwt for a 1990 blend price of $13.49 in Texas and $13.51 in New Mexico.

(3) **Move BP.** Move the basing point from Eau Claire, Wisconsin to Springfield, Missouri with corresponding adjustments in the Class I differentials. Other than Texas and New Mexico, Springfield is the location closest to Texas that is currently producing surplus milk. The Southwest Plains federal order, of which Springfield is a part, had a Class I utilization of 44 percent in 1989. The distance differential was calculated by subtracting the Springfield to Eau Claire distance differential from the Texas/New Mexico to Eau Claire differential and adding the Grade A differential. The 1990 blend prices would be $14.11 in Texas and $13.60 in New Mexico.

(4) **ALL-MILK.** Adjust the milk price to reflect the all-milk wholesale price. The all-milk wholesale price is the average price paid for all milk at the first handler (processing) level (GAO). This alternative would reflect a policy of a flat federal order minimum price throughout the United States with no price discrimination at the all-milk wholesale level. In other words, all milk producers would be assured the same minimum price at the current average level. This alternative would have resulted in a 1990 price of $14.23 for both Texas and New Mexico, based on FAPRI projections.

(5) **M-W.** Eliminate the entire Class I differential resulting in a price equal to the Minnesota-Wisconsin price of $12.86 (FAPRI). Also implied is the elimination of the Class II differential. This alternative would lower the minimum level of federal order prices and producer returns by the amount of price discrimination currently practiced in federal orders. The resulting price might approximate a general consumer acceptance of reconstituted milk with no down allocation provisions (e.g. pricing unneeded milk from distant markets in a lower price class regardless of its use). The M-W is an estimate of the average price per cwt. paid to farmers for Grade B milk in Minnesota-Wisconsin.

(6) **Pre-1985.** Return the Class I differential to the pre-1985 farm bill levels. This alternative would apply only to Texas because the New Mexico Class I differential was not changed in the 1985 farm bill. The 1985 farm bill increased

---

[2] The total number of solvent iterations is required to be equal across all farms to allow comparison of relevant statistics.

[3] The fluid utilizations for Texas and New Mexico were 1989 averages calculated from *Federal Milk Order Market Statistics: 1989 Annual Summary.* The utilizations were held constant over the 1990 to 1995 period. The Class I, II, and III utilizations for Texas were .562, .187, and .251 respectively. The Class I, II, and III utilizations for New Mexico were .576, .186, and .238 respectively.

the Texas order Class I differential from $2.32 to $3.28. The 1990 blend price in Texas under this alternative was $14.18.

These options were chosen to cover the spectrum of GAO policy recommendations.

Note that these options assume away any over-order premiums benefits in terms of producer receipts. Premiums that are charged are assumed to cover only the cost of services. In other words, it is assumed that the producer price equals the federal order blend price. This conclusion is based on the decline of Class I utilizations in Texas and New Mexico over the past decade. For example, the Class I utilization in Texas has decreased from a high of .807 in 1979 to .562 in 1989 (USDA, Federal Milk Order Market Statistics). The New Mexico Class I utilization has declined from .80 in 1975 to .576 in 1989 (USDA, Federal Milk Order Market Statistics).

In recent years, due to the lack of surplus processing facilities, there has been more milk moving out of the region than has been moving into the region. Accordingly, competitively determined prices would be expected to approximate the federal order prices. Questions have arisen as to whether in the absence of the distance differential, the market might generate an over-order price that exceeds the costs of services supplied by the cooperative. It was concluded that the existence of a competitively determined price that is substantially above the federal order price is highly unlikely.[4]

Impacts of these six scenarios on the five representative farms are measured utilizing four criteria:

(1) *Probability of increasing equity*: Probability that the farm will experience an increase in net worth after adjusting for inflation. This is calculated by dividing the present value of ending new worth (PVENW) by the beginning net worth (BNW) estimated for each of the 100 iterations simulated. The probability of increasing equity is the percent of the iterations in which the ratio of PVENW/BNW is greater than 1.

(2) *Average present value of ending net worth (PVENW) as a percent of Beginning Net Worth:* The value indicates the percentage gain (loss) in real equity over the six year period.

(3) *Percent change in average annual cash receipts:* The percent change in average annual cash receipts of the remaining five alternatives from the BASE situation.

(4) *Average annual net cash dairy income*: This value is the average of annual net cash farm income (receipts minus cash production costs) minus the cost of purchased replacements.

RESULTS BY FEDERAL ORDER POLICY OPTION

Table 3 summarizes the impacts of each policy option on the five representative farms. As expected, all of the representative farms were in better financial condition under the **BASE** situation (e.g. higher milk prices) than any of the alternatives. The **ALL-MILK, Pre-1985,** and **Move BP** alternatives had the smallest impact on the dairies while the **No DD** and **M-W** alternatives would put all of the dairies except the Las Cruces dairy in a position where they had little or no chance of increasing equity (growth). The results indicate that all five farms experience reduced net cash dairy income under the five alternatives relative to the current program (**BASE**) (Table 3). Recall that the New Mexico Class I differential was not changed in the 1985 farm bill so the pre-1985 option was omitted from Table 3 to avoid redundancy. The distance differential is much more important to economic viability in Texas, where the distance differential is $2.18 per cwt. as opposed to New Mexico where it is $1.23 per cwt.

BASE

Under the **BASE** situation, only the large Stephenville and Las Cruces dairies have a good chance of increasing equity. The moderate size Sulphur Springs dairy was the only dairy of the five that did not maintain most of its equity, losing over 50 percent of its equity during the study period. This result occurred because the moderate size Sulphur Springs dairy had a negative average annual net cash dairy income (-$5,490). The other four farms all experienced positive annual average net dairy cash farm income with the Las Cruces dairy having the highest at $812,410.

No DD

Eliminating the distance differential while retaining the current Grade A differential would virtually eliminate the probability of increasing real net worth

[4] In reality this assumption reflects the root of a controversy that is currently brewing between dairy economists in the Upper Midwest and in more distant markets to the East and South. The GAO report contends, as assumed here, that the surplus has recently become sufficiently large that there is no basis for a transportation differential — Texas has in essence become comparable to California basing point. Babb and Novakovic find using spacial equilibrium models based on supply data from past time periods that there would be a distance differential and, therefore, an over-order premium. In reality, based on current market conditions the regional alignment of free market prices is unknown. In other words, these results should be taken as a point of departure for future analyses.

Table 3. Simulation Results of the Impacts of Alternative Federal Order Policies on the Five Representative Dairy Farms in Texas and New Mexico

Location	BASE[a]	No DD	Move BP	M-W	ALL-MILK	Pre-1985
Texas, Stephenville - Moderate	14	0	0	0	0	0
Probability of increasing equity (percent)	93.9	79.3	85.4	75.9	85.1	86.3
Avg. PVENW as % of Beginning New Worth (percent)	677,260	-7.7	-3.9	-11.8	-4.2	-3.4
% change in avg. annual cash receipts[b] (percent)	51,120	-8,940	21,570	-39,390	19,710	25,140
Average annual net cash dairy income (dollars)						
Texas, Stephenville - Large	96	8	72	0	68	77
Probability of increasing equity (percent)	135.3	79.7	107.7	50.6	105.8	110.9
Avg. PVENW as % of Beginning New Worth (percent)	1,897,070	-8.1	-4.1	-12.4	-4.4	-3.6
% change in avg. annual cash receipts[b] (percent)	303,500	147,430	226,150	58,450	220,530	235,230
Average annual net cash dairy income (dollars)						
Texas, Sulphur Springs - Moderate	0	0	0	0	0	0
Probability of increasing equity (percent)	49.5	28.3	37.7	21.3	37.0	39.0
Avg. PVENW as % of Beginning New Worth (percent)	442,820	-7.1	-3.5	-10.8	-3.8	-3.1
% change in avg. annual cash receipts[b] (percent)	-5.490	-45,460	-25,610	-65,520	-26,830	-23,230
Average annual net cash dairy income (dollars)						
Texas, Sulphur Springs - Large	6	0	0	0	0	0
Probability of increasing equity (percent)	72.2	30.7	52.1	13.8	50.5	54.5
Avg. PVENW as % of Beginning New Worth (percent)	2,048,390	-8.0	-3.9	-12.3	-4.3	-3.5
% change in avg. annual cash receipts[b] (percent)	123,920	-77,260	27,880	-185,850	21,200	39,660
Average annual net cash dairy income (dollars)						
New Mexico, Las Cruces - Large	100	100	100	90	100	N/A
Probability of increasing equity (percent)	148.6	127.6	130.2	109.2	143.9	
Avg. PVENW as % of Beginning New Worth (percent)	4,741,200	-4.7	-4.1	-8.8	-1.1	
% change in avg. annual cash receipts[b] (percent)	812,410	592,030	619,590	392,540	761,600	
Average annual net cash dairy income (dollars)						

[a]BASE is the post-1985 farm bill Class I differential. No DD is the BASE less the distance differential. Move BP is the BASE situation with the basing point moved from Eau Claire, Wisconsin to Springfield, Missouri. The M-W alternative eliminates the Class I and II differentials (Minnesota-Wisconsin Grade B milk price). ALL-MILK is a price adjustment so that the milk price reflects the all milk wholesale price. Pre-1985 is the Class I differential in effect before the 1985 farm bill.

[b]The BASE value is the actual dollar amount of cash receipts, and cash receipts for all other scenarios are expressed as a percent of the BASE.

on all of the representative dairy farms except the Las Cruces dairy. All of the representative dairies lose some income relative to the **BASE**. However, the moderate size Stephenville dairy, along with the moderate and large Sulphur Springs dairies have negative average annual net cash dairy income due to the lower effective milk price. Both Sulphur Springs dairies lose more than two-thirds of their initial equity over the period 1990 to 1995. The remaining three dairies maintain most of their equity with the Las Cruces dairy actually increasing its equity by 27.6 percent.

Move BP

The alternative of moving the basing point from Eau Claire to Springfield leaves only the large Stephenville and Las Cruces dairies in a position to increase or maintain their equity. Relative to the BASE, this strategy would only decrease cash receipts a small amount (e.g. ranging from -3.5 percent to -4.1 percent). All the dairies except the moderate size Sulphur Springs dairy had positive average annual net cash dairy income over the six-year period as a result of the relatively small percentage decrease in cash receipts.

ALL-MILK

The results of the **ALL-MILK** alternative were about the same as those of moving the basing point. The large Stephenville and Las Cruces dairies had a good chance of increasing equity, while the other dairies had virtually no chance. Again, the large Stephenville and Las Cruces dairies increased their real equity over the study period by 5.8 and 43.9 percent, respectively. All of the dairies lost net cash dairy income relative to the **BASE**, with net income remaining positive for all dairies except the moderate size Sulphur Springs dairy.

M-W

This policy alternative had the most adverse impact on all of the dairies. Only the Las Cruces dairy was likely to increase and/or maintain its equity. Cash receipts decreased 10.8 to 12.4 percent for the Texas dairy farms and less than 9 percent for the Las

Cruces dairy. The large Stephenville and Las Cruces dairies were still able to earn average annual net cash dairy incomes of $58,450 and $392,540, respectively. The moderate size Stephenville dairy along with the moderate and large Sulphur Springs dairies experienced negative annual net cash dairy income under the **M-W** alternative.

Pre-1985

Returning the Class I differential to pre-1985 farm bill levels would affect only the Texas dairies. This alternative leaves only the large Stephenville farm in a sound financial position. The remaining three dairies lose equity under this alternative with the moderate size Sulphur Springs dairy losing 61 percent of its beginning net worth. The large Stephenville dairy did relatively well over the study period.

RESULTS BY REGION

A principle objection to the GAO proposal has been that it would put many southern farms out of the dairy business. This appears to be the case for the moderate size farms in both Texas production regions.

Stephenville Farms

The large Stephenville dairy demonstrates substantial resilience to changes in federal order policy while the moderate dairy was placed in financial difficulty by any change from the **BASE**. For example, the moderate size dairy had no chance of increasing equity in any of the alternatives because it only had a 14 percent chance under the **BASE** situation. The large dairy had three options in which it had a relatively good chance of increasing equity (**Move BP**, **ALL-MILK**, and **Pre-1985**).

However, while the large dairy had a better chance to increase equity under the policy alternatives, the moderate size dairy lost about the same amount of equity regardless of the policy while the large dairy lost as much as 49.4 percent under the **M-W** alternative. Cash receipts were affected about the same for both dairies. For example, rolling back the Class I differential to pre-1985 farm bill levels reduced cash receipts by 3.4 and 3.6 percent for the small and large dairies, respectively.

As elements of the current Class I differential were successively reduced or eliminated, net cash dairy income declined under all of the alternatives (Table 3). Under the **No DD** and **M-W** alternatives, the moderate size dairy had negative annual net cash dairy income. If there was no distance differential but the Grade A differential was retained, income for the large Stephenville dairy fell by 49 percent compared to the **BASE** policy.

Sulphur Springs Farms

As in the case of Stephenville, the large farm realized greater gains (smaller losses) than the moderate size farm under the alternative pricing policies. Neither farm had a very good chance of increasing its equity under any of the policies. The smaller farm was much less profitable, experiencing losses in equity under all options including the current policy. Under the most extreme option of completely eliminating the beneficial price discrimination (**M-W**), the moderate size and large Sulphur Springs dairies lost practically all of their equity at the end of the six year period. As would be expected, the lower milk prices associated with the five policy alternatives led to lower annual cash receipts for both Sulphur Springs farms. The moderate size dairy had a negative average annual net cash dairy income under all alternatives including the **BASE**. The large dairy had negative annual net cash dairy income under the **No DD** and **M-W** alternatives. The large dairy was very reliant on the distance differential for economic viability.

The Sulphur Springs results indicate that the East Texas milk production region was more adversely affected than the Stephenville dairies by a change in federal order Class I pricing policy. The moderate size East Texas dairy farm was operating on the margin, with major policy changes increasing the danger of the farm losing equity and being put out of business. These farms would need either to grow, cut costs, or exit from dairying.

New Mexico Farm

The New Mexico dairy was almost certain to increase real equity under any of the alternatives analyzed. The average present value of beginning net worth as a percent of ending net worth increased under all of the alternatives, being highest under the **ALL-MILK** and lowest under the **M-W** alternative. Average annual cash receipts fell by less than on any of the Texas farms due to greater production and less reliance on the Class I differential. Average annual net cash dairy income was positive under all of the policy alternatives, however, it decreased by half under the **M-W** alternative.

Because smaller farmers in Texas and New Mexico tend to have higher costs, they were the most adversely affected by a change in federal order policy. These smaller farms constitute a majority of Texas dairies, so large numbers of producers would likely be affected. A smaller percentage of dairy farms in New Mexico milk fewer than 250 cows (Table 1); consequently, the number of producers in New Mexico affected by the proposed policy change would be small. Further study is needed to determine:

(1) The number of farms which are likely to experience severe adversities with a change in federal order policy. Available data indicates that 63 percent of the farms in the Texas order milk less than 125 cows (1,366 farms) and produce 30 percent of the milk as indicated in Table 1 (Texas Milk Market Administrator). These are the farms which would most likely experience losses of income and net worth.
(2) The location of farms likely to experience losses in income and net worth. The present study would tend to indicate that many of these farms may be located in East Texas. Further study could easily verify this point.
(3) The existence of other factors which could affect the results of this analysis. For example, what could be done through an aggressive research and extension program to improve the competitive position of smaller and moderate size dairies? What impact would impending technologies, such as BST, have upon the Texas dairy industry in terms of the competitive position of different sizes and types of farms as well as aggregate cost levels? What impact would environmental policy changes have on the costs and concentration of milk production in Texas?

SUMMARY AND IMPLICATIONS

The study indicates that representative farms in New Mexico will survive and prosper under an assortment of federal order policy alternatives. In general, the large farms in the region tend to earn sufficient incomes to prosper due to their economies of size.

While incentives for expansion remain strong for the moderate size dairies in Sulphur Springs and Stephenville, any federal order policy change which reduces the blend price would take its toll. Smaller dairies are presently using up their equity. In a positive sense, this study clearly indicates that larger representative dairies in New Mexico and Texas can compete even under the most stringent and adverse federal order pricing policy scenarios. Questions arise as to how the overall Texas industry can be made equally competitive. The bulk of the dairies in Texas are moderate size and if their costs are similar to the Stephenville and Sulphur Springs dairies, they would have problems being competitive under less favorable federal order pricing policies.

It should not be surprising that all dairy farms in Texas are not earning large profits. Economic realities indicate that:

(1) The current federal order pricing system provides an umbrella of protection for some farms.

(2) At the margin, the costs of the least profitable dairies tend to equal the price of milk. If the price is lowered some farms will almost inevitably be put out of business.

While this research raises further questions regarding the economic impacts of current federal milk marketing order policy, it is by no means the final answer. Babb correctly points out that spatial equilibrium models are required to determine the geographic structure of prices one would expect under competitive conditions. However, this study indicates that the dairy industry is changing sufficiently rapidly that such spatial equilibrium analyses must be based on current and even projected changes in milk production. Analyses based on data collected when the 1985 farm bill was enacted may have little or no relevance to the implementation of the 1990 farm bill (Pratt, Keniston and Novakovic).

REFERENCES

Babb, E. M. *Future of Dairy Marketing Orders,* Food and Resource Economics Department, Staff Report 363, University of Florida, July 1989.

Buxton, B. M., T. McGuckin, R. Selley, and G. Willett. *Milk Production: A Four-State Earnings Comparison.* Washington D.C.: USDA, ERS, Ag. Econ. Rep. No. 528, February 1985.

Food and Agricultural Policy Research Institute. *FAPRI July 1990 Forecast: Macro, Prices Paid Indices and Cost of Production.* Iowa State University and University of Missouri-Columbia, Staff Report, July 1990.

Garis, D. H. "Economic Impacts of Removing the Distance Differential on Texas Dairy Farms." M.S. thesis. Texas A&M University, 1989.

McDowell, H., A. M. Fleming, and R. F. Fallert. *Federal Milk Marketing Orders: An Analysis of Alternative Policies,* Washington D.C.: USDA, ERS, Ag. Econ.Rep. No. 598, September 1988.

Pratt, J., M. Keniston and A. Novakovic. *Geographic Price Relationships in the U.S. Fluid Milk Industry: A Mathematical Programming Analysis.* Cornell Ag. Econ. Staff Paper No. 89-16, May 1989.

Richardson, J. W., and C. J. Nixon. *Description of FLIPSIM V: A General Firm Level Policy Simulation Model.* Texas Ag. Exp. Sta. Bull., B-1528, Texas A & M University, 1986.

Schwart, R. B. "Texas Moves Ahead in Dairying", *Hoard's Dairyman,* Vol. 133, No. 12, July 1988.

Seton, N. J. "Future Growth In the Texas Dairy Industry." M.S. thesis, Texas A&M University, May 1986.

Texas Milk Market Order Administrator. *Texas Milk Market Report.* Texas Milk Marketing Order, Federal Order 126, Vol. 55, No. 6, June, 1989.

U.S. Department of Agriculture. *Dairy: Situation and Outlook Report.* Washington D.C.: USDA, ERS, DS-424, April 1990.

U.S. Department of Agriculture. *Economic Indicators of the Farm Sector: Costs of Production — Livestock and Dairy, 1989.* Washington D.C.: USDA, ERS, ECIFS 9-1, August 1990.

U.S. Department of Agriculture. *Federal Milk Order Market Statistics: Annual Summary.* Washington D.C.: Agricultural Marketing Service, various issues 1980-89.

U.S. General Accounting Office (GAO). *Milk Marketing Orders: Options for Change.* Washington D.C.: GAO/RCED, 88-9, March 1988.

Yonkers, R. D. "Impacts of Exogenously-Determined Variables on Dairy Farms: A Simulation Modeling Approach." Ph.D. thesis. Texas A&M University, 1989.