



March 2011

The Economic Impact of the Dairy Market Stabilization Program on 2009 Dairy Markets

FAPRI-MU Report #04-11

Published by FAPRI–MU, 101 Park DeVille Drive, Suite E; Columbia, MO 65203 in March 2011.
FAPRI–MU is part of the College of Agriculture, Food and Natural Resources (CAFNR).

<http://www.fapri.missouri.edu>

Material in this publication is based upon work supported by the Cooperative State Research, Education and Extension Service; US Department of Agriculture, under Agreement No. 2009-03404.

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Any opinion, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the funding sources.

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Introduction

The National Milk Producers Federation (NMPF) released the Foundation For The Future (FFTF) program in 2010 as a replacement for many aspects of current federal dairy policy. The FFTF program contains four major provisions: the Dairy Market Stabilization Program (DMSP), the Dairy Producer Margin Protection Program (DPMPP), federal milk market order reform and elimination of both the Milk Income Loss Contract (MILC) program and the dairy price support program.

This report focuses only on the operation of the DMSP and does not include the other pieces of the FFTF program. This analysis attempts to quantitatively measure the monthly impact of the program during the tough economic times presented to the dairy industry in 2009. This is not the only historical period that would have had the DMSP in operation over the last decade but it is certainly the worst economic period both in terms of the length and depth of the downturn.

The DMSP is only in operation in periods of low producer margins. Once the program is initiated, producers do not receive payment for any milk they deliver above their DMSP allowable marketings level.

This program's operation will reduce excess milk supplies during low margin periods. Any time the DMSP reduces milk supplies below what would have happened without the program, farm-level milk prices will move higher than would have resulted without the DMSP.

In addition, the program will have the ability to make cheese purchases with any funds received from the forfeiture of producer milk payments when milk is delivered above DMSP allowable levels. These cheese purchases will provide further support to milk prices.

The DMSP has a strong penalty for milk marketed above the DMSP allowable level in periods of low margins, but the program does consider demand growth by allowing for upward adjustments to producers' DMSP base over time.

Judging how producers would respond or adjust their milk marketings to these program features is a difficult task given the unique operation of the DMSP. Producer behavior may depend in part on their expectation of how long the program will remain in operation. Although the industry has had other supply management programs in place previously, these examples do not provide much evidence to how producers will respond to this program.

DMSP Assumptions

There are three program functions important in the DMSP: 1) the calculation of a producer's base, 2) the level of reduction in allowable milk marketings relative to the base for alternative low margin outcomes, and 3) the use of funds generated when producers choose to deliver above their allowed levels.

In calculating a producer's base, this analysis starts with monthly state-level milk production for Arizona, California, Colorado, Florida, Idaho, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, New Mexico, New York, Ohio, Pennsylvania, Texas, Vermont, Washington and Wisconsin. The remaining states not listed above are combined into an "other states" category. Since individual producer data is difficult to compile for the entire U.S., these 19 states and the remaining states category are used as if they are 20 representative producers that have similar characteristics to the average of all producers in the area they represent.

This is an oversimplification and there will be individual producers that look very different than these state averages in terms of marketings growth over time. This statement is true across states and within states. For example, just because Vermont as a state will show only small effects from DMSP operation in 2009, it does not mean that individual producers in Vermont who are expanding milk output will be affected much differently from DMSP operation than producers who are expanding in other states.

The program will operate such that a producer can choose their base to be one of the following: 1) their marketings from the same month a year earlier, or 2) their three-month average marketings prior to the first month the program would be in effect. They will make that election at the start of each calendar year.

If you are a new or rapidly expanding producer, the previous three months may prove to be the best election. For other producers, picking the year ago marketings may be the best option since it will allow for some seasonality in their assigned marketing base that would not be captured if they elect to take the previous three months prior to the first month of DMSP operation.

Since this analysis is using aggregate state-level milk production, the choice of base does not have a large impact on the analysis. It is assumed that year ago milk marketings is chosen as the base for all 20 regional groupings.

The triggering of the program relates to the level of the FFTF margin. The FFTF margin is defined as the U.S. all milk price less calculated U.S. feed costs. U.S. feed costs are calculated as: $[1.192 \times \text{price of corn/bu.}] + [0.00817 \times \text{price of soybean meal/ton}] + [0.0152 \times \text{price of alfalfa hay/ton}]$. The U.S. all milk and alfalfa prices come from the National Agricultural Statistics Service with the United States Department of Agriculture while the corn and soybean meal prices are the monthly average of the nearby futures contract traded on the Chicago Board of Trade (CME Group).

Table one provides the trigger points for operation of the DMSP program. It is important to note that the trigger remains at the largest reduction level reached during the period that the DMSP operates. For example, if the FFTF margin fell below \$4, producers would only receive payment on 96% of their DMSP base or 92% of current marketings, whichever is greater, until two consecutive months with a

margin above \$6. Even if the FFTF margin were to climb above \$4 before reaching two consecutive months above \$6, the producer trigger would remain at 96% of the DMSP base. The marketings cap imposed by the DMSP is not relaxed as the FFTF margin climbs higher until the particular thresholds defined in the table are reached.

Producers may have choices to make in response to the DMSP triggering. They will not need to make any changes if they are planning to market below their allowable level of marketings. However, if their marketings were going to exceed the DMSP allowable level, they have a choice to make. They could choose to make no changes and market milk above the allowable level without being paid for that milk, or they could choose to make some adjustment to their milk marketings to either come closer to the allowable level or fall back to or below the allowable level.

Table 1. Operation of the DMSP Triggers.

If the FFTF margin (M) is:	The quantity of milk that can be marketed without penalty
\$6 > M > \$5 For two consecutive months	98% of the DMSP base or 94% of current marketings, whichever is greater
\$5 > M > \$4 For two consecutive months	97% of the DMSP base or 93% of current marketings, whichever is greater
\$4 > M For one month	96% of the DMSP base or 92% of current marketings, whichever is greater
The DMSP program ends when the FFTF margin is greater than \$6 for two consecutive months or the price in the United States for either cheddar cheese or nonfat dry milk is more than 20% above the world price for that same commodity for two months unless the FFTF margin is less than \$4.	

Gauging this individual producer behavior is difficult. Some may choose to deliver above the allowable level to build their base or to be prepared for larger marketings levels later in the year if they think the triggering of the DMSP will be short-lived. Beyond these kinds of exceptions, a price of zero for milk above their allowable level would suggest delivery only if the disposal cost of the excess milk exceeds the hauling cost the producer might face.

This analysis assumes that only 50% of milk that would have been produced above the allowable level is marketed. This is a critical assumption that is an important driver the analysis presented here. It is important to remember that if a larger proportion of milk was delivered than is assumed in this analysis, it would increase the amount of money that could be used for cheese purchases, but would lead to smaller milk supply reductions. On the other hand, if a lower proportion of milk is delivered, milk prices rise more quickly but there is less lift since cheese purchases will be less.

In reality, producers are going to make a choice each month regarding their overall milk production level and the quantity of that milk they wish to market when the DMSP operates. The choice will likely change from month to month depending on many factors that will be unique to each producer.

March is the first month that the DMSP would have been in operation in 2009, and it would be at the less than \$4 FTF margin trigger. Table two shows the percentage of milk marketings that would have been affected from operation of the DMSP in March.

Subsequent months in 2009 are not shown since the operation of the DMSP in March 2009 would have affected subsequent months' prices and potentially the level of DMSP operation. That is, one must factor into any analysis of the DMSP how the change in marketings and use of monies from producer deliveries above their DMSP base affects milk prices.

The monies that are generated from producer milk marketings that do not qualify for a payment are used to purchase cheese. The assumption used here is that monies collected in month t would be spent evenly in months (t + 1, t + 2 and t + 3). Also built into the analysis is that 10% of cheese purchases by the DMSP would displace commercial consumption. Some consumers would forgo market purchases and receive DMSP product instead. This leakage will largely depend on how the DMSP cheese purchases are dispersed and could be higher or lower than assumed here.

Table 2. March 2009 Marketings Affected by the DMSP Operation.

State	Percent of Milk Marketings Affected by DMSP Operation
Arizona	2.1%
California	0.4%
Florida	7.3%
Idaho	3.4%
Illinois	6.2%
Indiana	7.0%
Iowa	3.5%
Michigan	8.0%
Minnesota	5.6%
Missouri	4.0%
New Mexico	7.6%
New York	4.1%
Ohio	5.9%
Pennsylvania	3.7%
Texas	8.0%
Vermont	0.0%
Virginia	3.4%
Washington	0.0%
Wisconsin	5.2%
Other States	5.2%
United States	1.7%

The FAPRI Monthly Dairy Model

The FAPRI monthly dairy model is similar in structure to the annual model maintained by FAPRI but is simpler in its representation of the dairy industry. It is a structural approach that attempts to estimate the major behavioral relationships that exist in the industry. On the milk supply side, equations for dairy cows and milk yields are estimated for the major dairy-producing states and an “other U.S. states” category. On the retail demand side equations are estimated to reflect consumer behavior for dairy products. Linking milk supply and final domestic dairy demand are trade, policy and milk allocation behavioral equations.

In general, this monthly dairy model is more inelastic on both the demand and supply side than the annual FAPRI model, due to its monthly structure. The annualized supply side response of the monthly model is reasonably similar to the annual FAPRI model, while the demand component remains more inelastic.

The monthly dairy model is aligned to the historical 2009 observed values so that the DMSP scenario can be conducted relative to the actual historical values.

The Results of DMSP Operation in 2009

The DMSP begins operation for March 2009 milk marketings. The FFTF margin falls below \$4 in January 2009, which requires the Secretary of Agriculture to announce in early February that the program will commence starting March 2009.

To correctly analyze the impacts of DMSP over the 2009 period, the analysis needs to account for the milk price changes that will result from the program operation. For instance, if you take the historically observed FFTF margins for 2009, they would suggest that the DMSP operation begins in March and does not end until December 2009. But as a result of less milk marketings in March 2009 due to the program, milk prices rise relative to the historically observed level, which in turn increases the FFTF margin for March 2009 relative to what it was without the program.

Table three shows the historical or baseline 2009 monthly FFTF margins while the scenario shows the resulting FFTF margins and DMSP trigger levels once the milk price effects are taken into account. For example, the March 2009 FFTF margin increase by \$1.49 as a result of reduced milk marketings from the DMSP operation. Once the change in milk prices is factored into the analysis, DMSP is suspended more quickly, and when the program is triggered for a second time, it is at a less severe DMSP level.

Table 3. FFTF Margins under DMSP Operation in 2009.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline												
FFTF Margin	3.89	2.76	2.88	2.71	1.54	1.18	2.80	3.62	5.19	5.72	6.48	7.51
Scenario												
FFTF Margin	3.89	2.76	4.37	6.64	6.33	4.97	4.97	4.56	5.50	6.55	8.60	9.20
DMSP Trigger Level			1	1	1				2	2	2	

Note: DMSP Trigger Levels: **1** – $M < \$4$; **2** – $\$4 < M < \5 ; **3** – $\$5 < M < \6

Milk supplies are reduced under the operation of the DMSP. Recall that this analysis assumes that 50% of the milk above the allowed levels does not come to the marketplace. Figure one shows the percentage of milk production that would not be marketed as a result of operating DMSP. The maximum reduction in milk supplies from DMSP occurs in the first period of operation, with supplies declining by 2.0% to 2.5%. Figure one shows only the direct reduction of milk supply relative to milk produced from the operation of DMSP and does not include any milk production effects that occur as a result of DMSP operation. Figure two shows the change in milk marketings that occurs from DMSP operation, accounting for both milk production changes as well as the fact that not all milk produced would be marketed due to the DMSP. It shows that milk marketings actually exceed baseline levels slightly in June, July and August 2009 due to the higher returns generated from DMSP operation in March, April and May 2009 and no DMSP operation occurring in these months.

Figure 1. Percentage Reduction in 2009 Monthly Milk Production from DMSP Operation

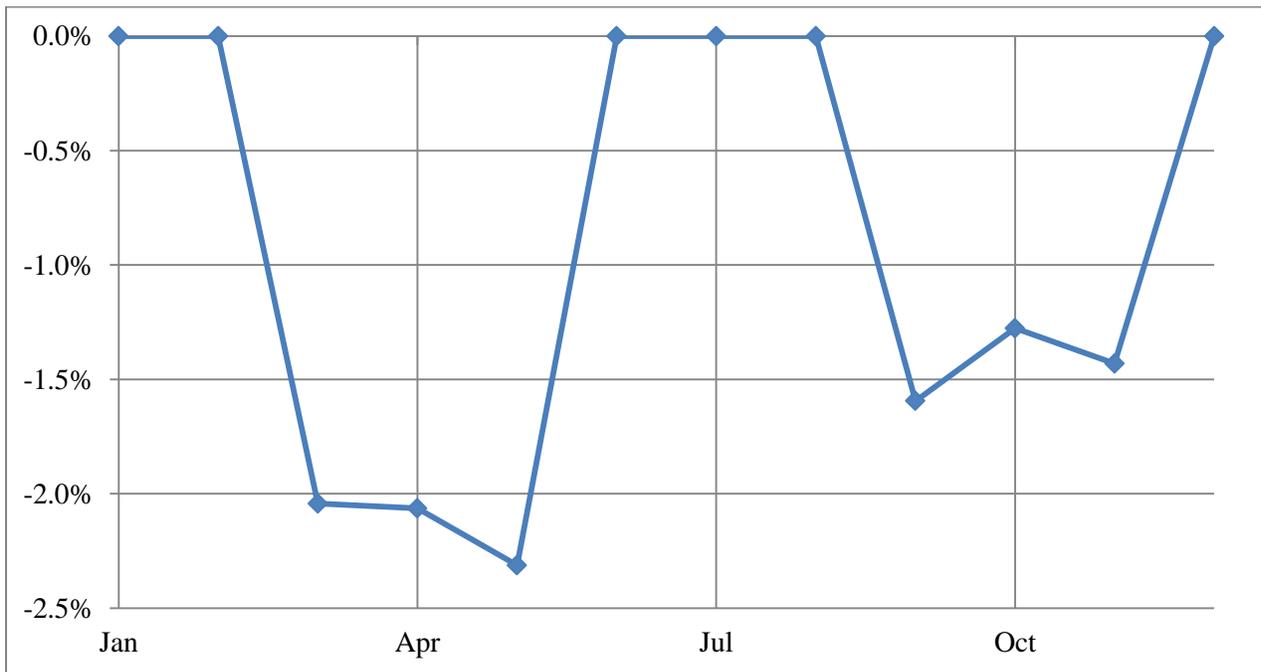
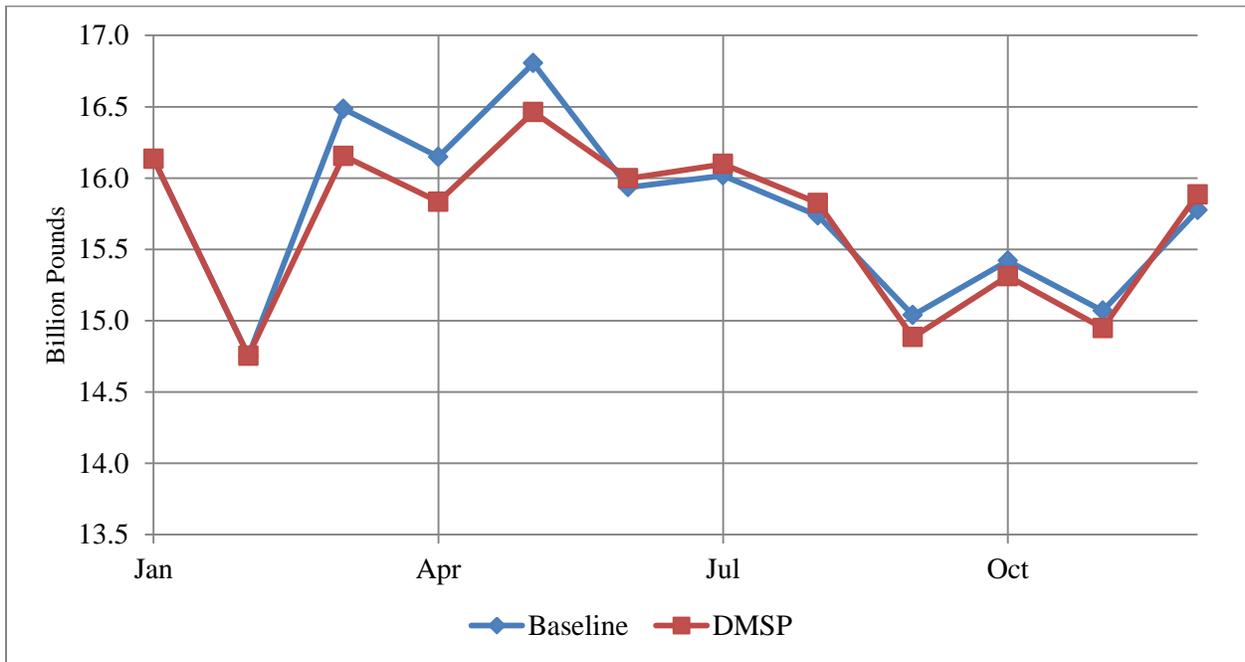
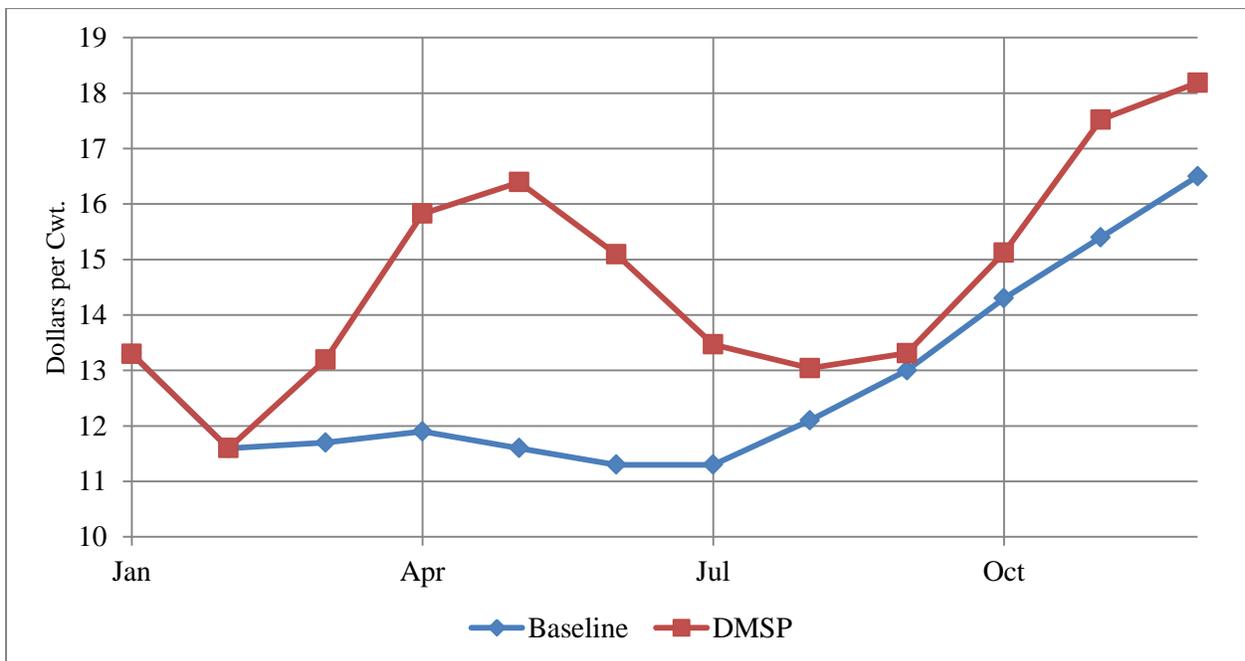


Figure 2. 2009 U.S. Milk Marketings from DMSP Operation



Milk prices remain above the baseline (or actually observed) 2009 monthly levels for every month starting in March 2009 under the DMSP scenario. There are two components responsible for the increase in milk prices relative to the baseline shown in figure three. First, the direct effect of operation of the DMSP reduces milk marketings and thus raises milk prices. Second, the portion of the program that takes monies generated from the above allowable marketings and purchases cheese also increases milk prices.

Figure 3. 2009 U.S. All Milk Price from DMSP Operation



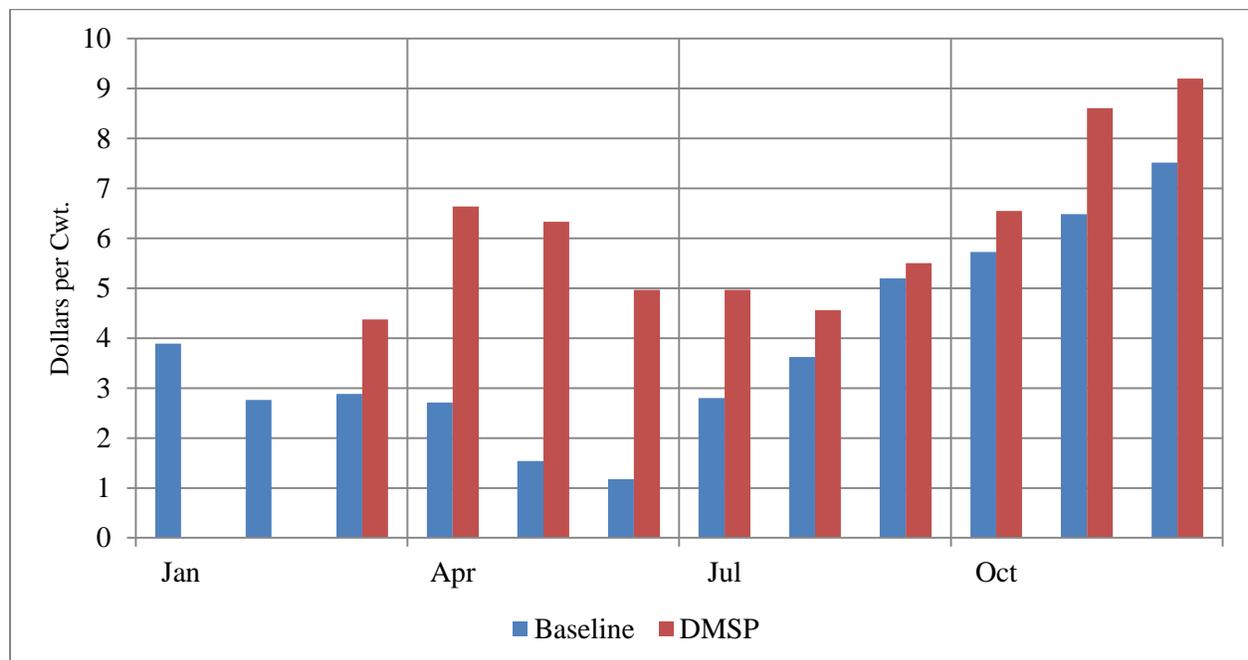
Cheese purchases under the DMSP are important to the results shown here. For example, revenues generated from milk marketings above allowable levels average \$52.5 million over the March through May 2009 period and \$32.9 million over the September through November 2009 period. Cheese purchases start in April 2009 and continue for every month of 2009 except September. Cheese purchases average 12 million pounds a month over the April to December 2009 period.

Assuming that cheese can be purchased for the current wholesale cheese price plus \$0.25 per pound to cover other costs in moving the purchased product to a final consumer, the analysis estimates that the program purchases 25 million pounds of cheese in one month during 2009. Given the very inelastic nature of the dairy industry, the purchase of 25 million pounds of cheese generates a larger producer milk revenue change than the actual cost of the cheese purchases. In fact, if the 25 million pounds of cheese had not been purchased, dairy producers would have seen milk revenue fall by \$150 million relative to the results shown here, suggesting that the investment in cheese purchases made by the DMSP increased producer revenue by three times the cost of those cheese purchases.

Summary

The operation of the DMSP will raise FFTF margins as a result of curbing excess milk supplies and using program monies to purchase cheese from the marketplace. Figure 4 shows the FFTF margin using actual 2009 data relative to the FFTF margin that would have occurred due to the market adjustments of smaller milk supplies and cheese purchases as a result of the DMSP program. The operation of the program raises the margin significantly over the actual observed values in 2009.

Figure 4. 2009 FFTF Margin under DMSP Operation



It is estimated that the operation of the DMSP in 2009 resulted in the following:

- 1) Reduced milk supplies during the months that the DMSP operated,
- 2) an increase in milk prices and thus FFTF margins by \$2.21 per cwt over the March through December 2009 period,
- 3) an increase in dairy cash receipts of \$3.4 billion over the March through December 2009 period,
- 4) less binding DMSP marketing limitations would have occurred due to increased milk prices and FFTF margins than those that are calculated from purely examining observed 2009 data, and
- 5) cheese purchases which allowed for additional FFTF margin recovery in the months milk marketings were not restricted.

These results are:

- 1) sensitive to the period of analysis and represent only what the industry would have experienced under the program had the DMSP been operational during 2009, and
- 2) dependent on a number of assumptions, perhaps the most important of which is expected producer behavior under the DMSP.