TESTIMONY OF DR. SCOTT BROWN

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BEFORE THE
SUBCOMMITTEE ON LIVESTOCK, DAIRY, AND POULTRY,
COMMITTEE ON AGRICULTURE,
U.S. HOUSE OF REPRESENTATIVES

LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, D.C.
APRIL 26, 2012

Chairman Rooney, Ranking Member Cardoza and Members of the Subcommittee, thank you for the opportunity to appear today to discuss dairy program alternatives for the 2012 Farm Bill. The concept of protecting dairy producer margins gained substantial interest due to the combination of extremely high feed costs and low milk prices the industry experienced in 2009. The annual decline in 2009 U.S. milk receipts of $10.5 billion set a record for data going back to the early 1920s. Even in percentage terms, the 43 percent reduction in 2009 milk receipts had never been experienced by the dairy industry before. The 2009 record event is just another cyclical low that the industry has experienced on a more regular basis over the last decade. This recent cycle of record high and low milk receipt changes has left the industry searching for mechanisms to help stabilize producer finances. The volatility dairy producers have experienced in the last few years often made what appeared to be good financial decisions turn into tough financial results when the markets for feed and milk products moved so quickly.

This led to the policy development process undertaken by the National Milk Producers Federation that resulted in the original concept of Foundation for the Future. Many of these original concepts were first introduced in Congress by House Agriculture Committee Ranking Member Collin Peterson, D-Minnesota, and Representative Mike Simpson, R-Idaho, as the Dairy Security Act of 2011(DSA2011).

The major features of the DSA2011 program as modified in this analysis that must be discussed to interpret how the program will operate are the base program and the supplemental program under the Dairy Producer Margin Protection Program and the Dairy Market Stabilization

Program. It remains important to highlight the MDSA2011 program is a voluntary program and that producers can choose whether to participate in the program. A dairy producer who chooses margin protection under DPMPP is subject to the provisions of DMSP and is eligible for payments under the base and/or supplemental programs. The particular assumptions used for my analysis of the program are contained in the full report that is attached to my testimony.

Every component of the proposed dairy program hinges on the margin defined by the program. It is important to understand the construction of the MDSA2011 margin and how it has moved historically. The margin calculation used here is the same as the margin in the recently released Senate Agriculture Committee farm bill language. One way to look at the construction of the margin is to compare the milk price used in the margin calculation relative to the feed components of corn, soybean meal and alfalfa. The relative movements in these two parts of the margin calculation are critical. The tendency for these components to move together can be seen in the current graph. The correlation between the milk price and feed cost is 0.64 over the 1980 to 2011 period. The measure of the correlation between these data series is sensitive to the time period chosen. Eliminating 2011 from the calculation reduces the correlation to near 0.50. Higher correlation reduces government outlays and operation of the program features.

The next figure shows the historical MDSA2011 margin using actual observations of the milk and feed price components. It is important to understand that these margin outcomes would have changed had the MDSA2011 program been in operation. The figure highlights the abrupt change that occurred in the margin from late 2007 to mid-2009. Over the 1980 to 2011 period, the MDSA2011 margin averaged $8.30 per hundredweight and over the 2000 to 2011 period it averaged $8.60 per hundredweight.

Analysis of the MDSA2011 program depends on the level of participation in the program. To move beyond a simple assumption on producer participation in the program or a range of participation levels, the representative farm model maintained at Texas A&M University by the Agricultural and Food Policy Center (AFPC) was used to determine which of the AFPC dairy farms would participate and at what level of supplemental coverage to maximize their net cash income. Their report is attached to my testimony. Given the results from the representative farms model, the aggregate model was calibrated to assume that 70 percent of the milk produced in the country would be from operations participating in the MDSA2011 program and that

participating milk would purchase supplemental coverage at $6.50 at a 90 percent supplemental program base coverage level.

My analysis of the MDSA2011 scenario hinges on a forward-looking baseline that allows for a point of comparison for this analysis. This baseline is very similar to the long-term baselines constructed by USDA and the Congressional Budget Office. On average the MDSA2011 baseline margin averages $9.50 per hundredweight. The baseline uses a stochastic approach so that the effects of the policy proposal can be evaluated over different market conditions.

The MDSA2001 results show that milk supplies are on average only 0.1 percent below baseline levels under the MDSA2011 scenario. My report shows only a very modest impact on milk output from operation of the MDSA2011 program.

Dairy product export levels are also down slightly under the scenario. The next graph shows that nonfat dry milk exports have an average decline of 4 million pounds, which is a decline of 0.3 percent under the MDSA2011 scenario. There has been much industry discussion on the effects of DMSP on U.S. dairy exports. Two factors drive the small impacts shown here. First, the stochastic output from the analysis shows DMSP operation does not occur often. In only about 7.5 percent of the months across all 500 stochastic alternatives is the program operational. Second, when the DMSP operates, it lasts a very short period of time because of the world price triggers built into the MDSA2011 language. None of the 500 outcomes show long-term multi-year operation of DMSP. The largest single-year decline in nonfat dry milk exports is about 25 million pounds in any of the 500 outcomes. This decline is in comparison to 1.3 billion pounds of nonfat dry milk exports occurring under the baseline and is a less than 2 percent decline.

The next figure provides an indication of the probability of a base program and $6.50 supplemental program payment in the first year and midway through the analysis period. There is an 18 percent chance of a base program payment being made in 2012 and that probability decreases to a 7 percent chance of a base program payment in 2017. The probability of receiving a $6.50 supplemental program payment in 2012 is 61 percent and declines to 30 percent in 2017. The higher probabilities associated with the supplemental program highlights the important choices producers will make each year regarding supplemental coverage. This is likely the most important feature that allows producers to reduce their risk of experiencing low margins.

Another way to measure the reduction in volatility from operation of the MDSA2011 program is to look at the variance in the baseline margin versus the margin under MDSA2011. This figure shows that the program results in about a $0.75 reduction in margin variance under the program's operation. It is primarily the lift in low margin outcomes provided by the MDSA2011 program that results in the reduction in margin variance shown in the figure.

In summary, the analysis of the MDSA2011 program shows that:

1) The combination of program features, DMSP and DPMPP, reduces margin volatility in the dairy industry,

2) There are only small milk supply effects on average,

3) Producer margins increase on average with the most lift in producer margins occurring in low margin environment outcomes,

4) Dairy product trade is only slightly lower on average as a result of the DMSP triggers for U.S. to world dairy product price differences,

5) Milk and dairy product prices have small increases as a result of smaller milk supplies, and

6) There are not long periods of program operation for either DPMPP or DMSP.

Thank you for the opportunity to discuss the quantitative effects of the MDSA2011 program. I look forward to providing further clarification on my analysis and answer any questions you have about the MDSA2011 program.

Modified Dairy Security Act Provisions

- Producer participation is voluntary
- Dairy Producer Margin Protection Program (DPMPP)
  - Base Program – 80% historical base, margin < $4 triggers payments
  - Supplemental Program – Producer can buy-up margin coverage, up to $8 coverage, lower premiums for the first 4 million pounds, supplemental base adjusts, 25 to 90% annual coverage choice
- Dairy Market Stabilization Program (DMSP)
  - Producer milk marketings capped when margins < $6
  - U.S. to world price triggers kick out the program

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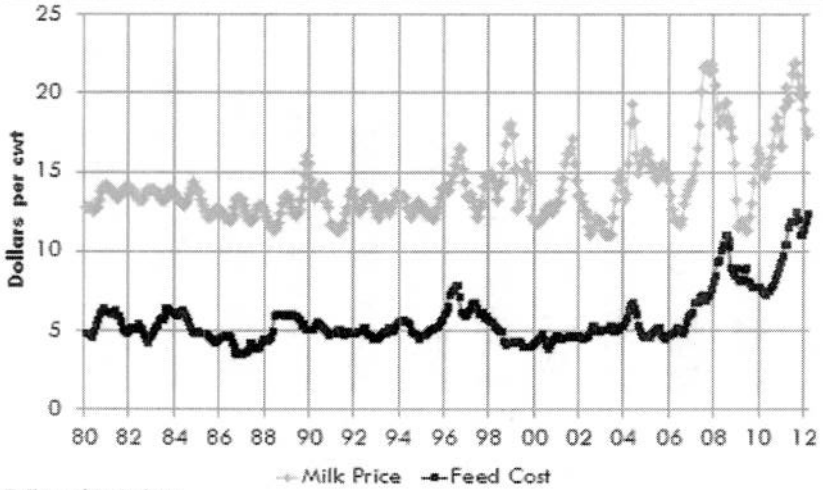
The Correlation Between Feed and Milk Prices is Important



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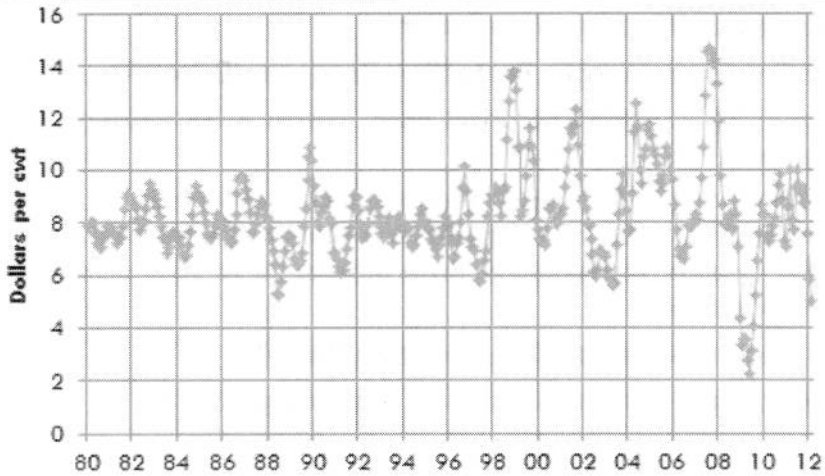
Modified DSA2011 Margin



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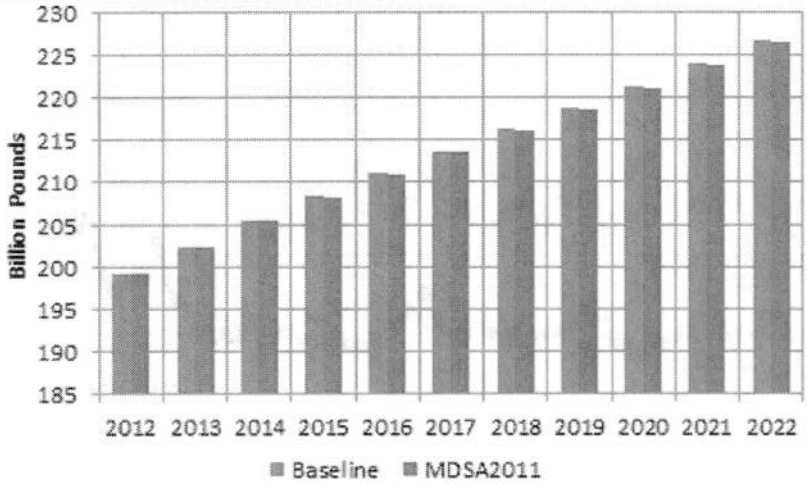
U.S. Milk Production



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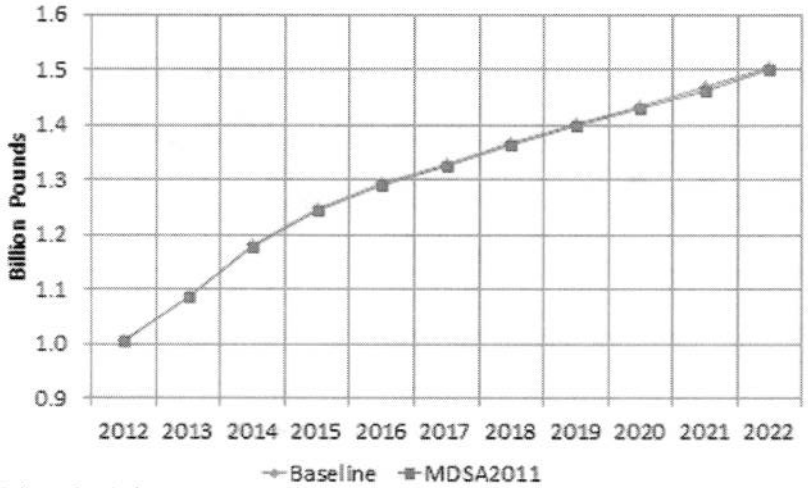
U.S. Nonfat Dry Milk Exports



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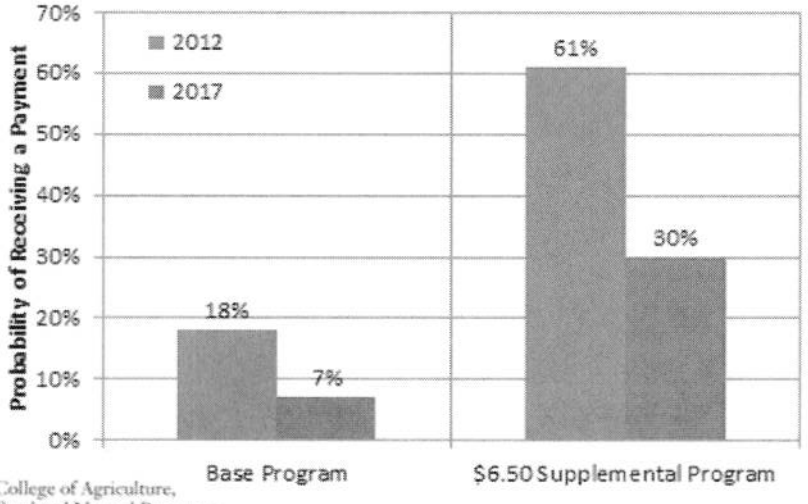
Probability of DPMPP Payments



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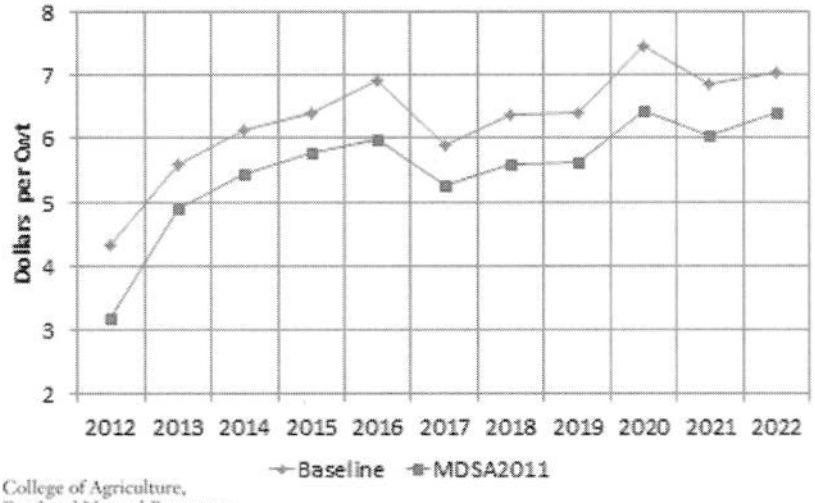
Margin Variance Declines Under MDSA2011, Program Lifts Low Margins



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The Effects of a Modified Dairy Security Act of 2011 on Dairy Markets

April 2012

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The Effects of a Modified Dairy Security Act of 2011 on Dairy Markets

Introduction

The concept of protecting dairy producer margins gained substantial interest due to the combination of extremely high feed costs and low milk prices the industry experienced in 2009. The annual decline in 2009 U.S. milk receipts of $10.5 billion set a record for data going back to the early 1920s. Even in percentage terms, the 43 percent reduction in 2009 milk receipts had never been experienced by the dairy industry before. The 2009 record event is just another cyclical low that the industry has experienced on a more regular basis over the last decade. This recent cycle of record high and low milk receipt changes has left the industry searching for mechanisms to help stabilize producer finances.

At the same time that milk receipts made record movements, feed costs skyrocketed. The season average price of corn in 2005 was $2.00 per bushel. The current USDA estimate for the 2011 corn price is $6.20 per bushel, a threefold increase. Over the same timeframe, soybean meal and alfalfa prices have doubled. Weather, strong domestic demand for crops including the demand by the biofuels sector and strong international demand for U.S.-produced crops have all provided the recipe for the record-feed costs the dairy industry faces today.

The combination of low milk prices and high feed costs has taken a large bite out of dairy producer equity and substantially lowered dairy producers' balance sheets in the past few years. It will take years to recoup this lost equity. The increase in equity many dairy producers experienced in 2007 helped blunt the severe events of 2009 but by no means provided an offset for the 2009 downturn.

The volatility dairy producers have experienced in the last few years often made what appeared to be good financial decisions turn into tough financial results when the markets for feed and milk products moved so quickly. This has led to discussion and evolution of dairy policy alternatives that provide dairy producers with margin protection.

The National Milk Producers Federation (NMPF) went through a policy discussion process that resulted in the release of the Foundation for the Future (FFTF) program in late 2010. FFTF reframes the current set of federal dairy support policies into two major new policy pieces. The Dairy Producer Margin Protection Program (DPMPP) provides payments to dairy producers when the defined margin of milk price less feed costs falls below a specified level. The Dairy Market Stabilization Program (DMSP) is a program that manages milk supplies when dairy producer margins fall below a specified level.

The DPMPP provides a firmer floor than current dairy programs for producers in periods of low margins and allows some flexibility in the level of protection by allowing producers to buy higher margin coverage levels for additional premiums paid. The DMSP works in conjunction with the DPMPP through

a managed supply approach and allows a low margin environment to be corrected more quickly than would otherwise occur, resulting in higher milk prices for producers and reducing government outlays for the DPMPP.

Legislation was introduced in the House of Representatives by House Agriculture Committee Ranking Member Collin Peterson, D-Minnesota, and Representative Mike Simpson, R-Idaho, in mid-2011 that incorporated many of the components found in the FFTF program. The Dairy Security Act of 2011 (DSA2011) has received much discussion regarding its potential effects on dairy markets.

Further developments to the original DSA2011 language have occurred as House and Senate Agriculture Committees work on the next farm bill. This paper examines a set of modifications to the original DSA2011 language that incorporate changes that have been discussed by House and Senate Agriculture Committees as they draft new farm bill language. This analysis will refer to a modified DSA2011 (MDSA2011) proposal as it incorporates the changes discussed by Agriculture Committees. Many of the modifications in this analysis are similar to those found in the recently released Senate Farm Bill Committee Print.

Margin Calculation Is Critical To Program Operation

Every component of the proposed dairy program hinges on the margin defined by the program. It is important to understand the construction of the MDSA2011 margin and how it has moved historically. The original margin was developed through NMPF's FFTF policy process and is meant to reflect both the revenue and feed cost of milk production. The MDSA2011 margin is defined as:

Margin = U.S. all milk price (USDA/NASS)

- 1.0728 x U.S. corn price (USDA/NASS)
- 0.00735 x soybean meal price (USDA/AMS, Central IL)
- 0.0137 x U.S. alfalfa price (USDA/NASS).

The margin is calculated on a monthly basis with program triggers based on combinations of these monthly margins.

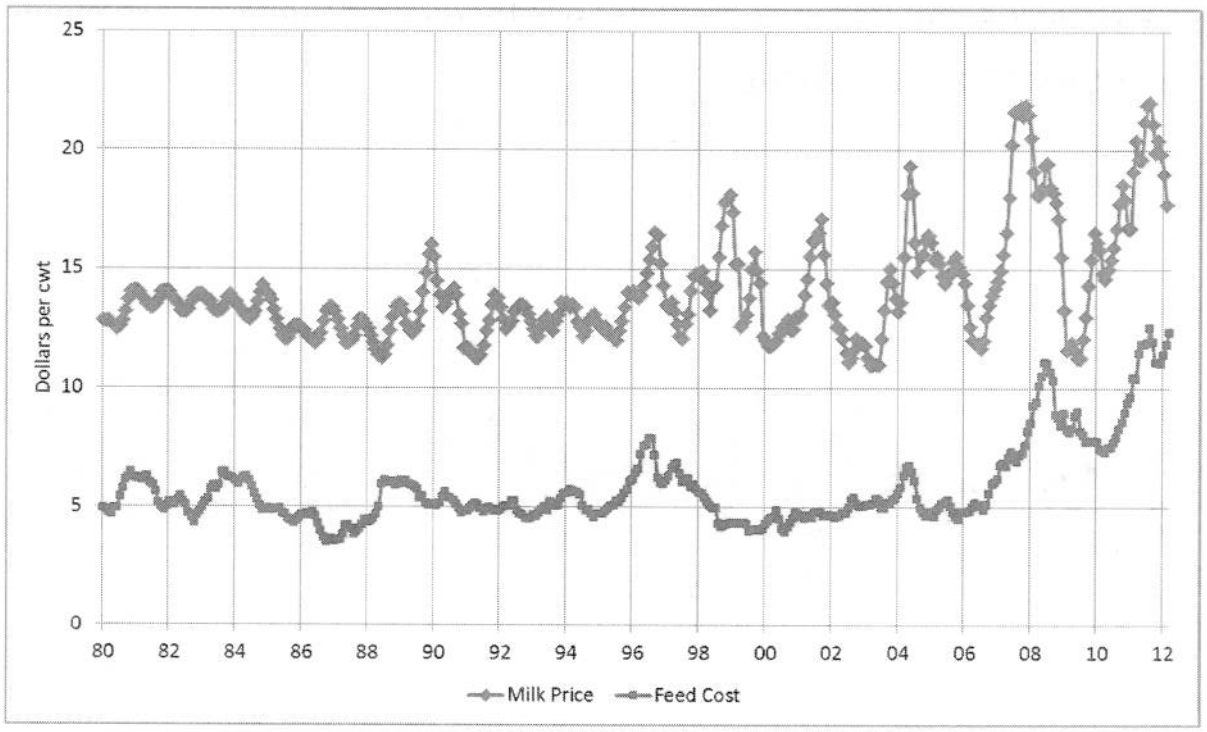
One way to look at the construction of the margin is to compare the milk price used in the margin calculation relative to the feed components of corn, soybean meal and alfalfa. Figure one provides a comparison of feed costs to the milk price for the last three decades. There are many important points to focus on in this graph.

First, both milk prices and feed costs have increased in volatility in the past several years. The volatility in milk prices began to occur in the mid-1990s with feed costs showing much of their rise in just the past six years.

Second, the relative movements in these two parts of the margin calculation are critical. The tendency for these components to move together can be seen in figure one, which reduces volatility in the margin itself. When both milk prices and feed costs are either low or high at the same time there is less movement in the margin than if the margin was only based on milk prices or feed costs.

Correlation measures provide a way to quantitatively assess the extent to which variables move together without requiring a linear relationship in the variables. Correlation coefficients vary from positive one (a perfect relationship between the variables) to negative one (a completely inverse relationship). A zero correlation implies no relationship between the variables.

Figure 1. Components of the MDSA2011 Margin



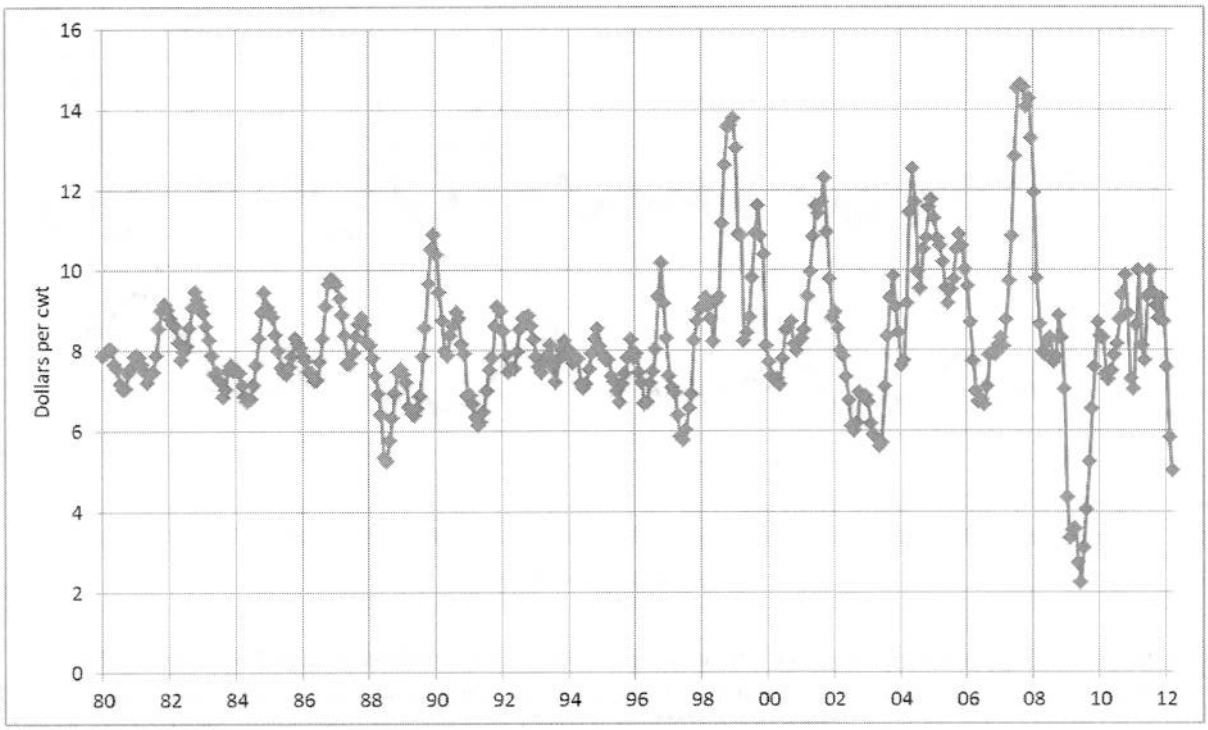
In the case of figure one, the correlation between the milk price and feed cost is 0.64 over the 1980 to 2011 period. The measure of the correlation between these data series is sensitive to the time period chosen. Eliminating 2011 from the calculation reduces the correlation to near 0.50. Regardless of the chosen timeframe, the correlation remains near 0.50 or higher. This level of correlation corresponds to the portion of the cost in producing 100 pounds of milk that is attributed to feed costs. The stochastic analysis used in this report has a correlation of about 0.45 between milk prices and feed costs.

It is important to reiterate that this level of correlation does not imply a perfect direct relationship between feed costs and milk prices. That is, there are times where movements in one of the variables are not mimicked by the movement in the other. However, the measure of correlation suggests that often these series do tend to move together.

Knowledge of the correlation between the two profitability components is imperative as background information for industry discussion regarding the effects of MDSA2011. If the correlation between the two components of the margin calculation is ignored, the effects of the program will be overstated. This margin discussion is not meant to suggest that the industry cannot experience very low or very high margins, but that the probability of these events occurring are reduced when the correlation between milk price and feed costs are factored into analysis of the program.

Figure two shows the historical MDSA2011 margin using actual observations of the milk and feed price components. It is important to understand that these margin outcomes would have changed had the MDSA2011 program been in operation. Figure two highlights the abrupt change that occurred in the margin from late 2007 to mid-2009. Over the 1980 to 2011 period, the MDSA2011 margin averaged $8.30 per hundredweight and over the 2000 to 2011 period it averaged $8.60 per hundredweight.

Figure 2. MDSA2011 Historical Margin



Analysis of the MDSA2011 Provisions

This report provides analysis of a MDSA2011 program that was constructed based on discussion with Agriculture Committees. This portion of the report will focus on the baseline used to measure the quantitative effects of the MDSA2011 program, assumptions about the modified program features of MDSA2011 and the empirical results found from enacting the MDSA2011 program.

The Baseline

The baseline used in this analysis is a ten-year forward-looking baseline that is conditioned on factors such as feed costs, other dairy input costs, real U.S. income growth and global dairy markets. The baseline was constructed in January 2012 and does not incorporate market information available since the first of the year. The policy assumptions used in the baseline are a continuation of current dairy programs and include the reduced MILC program parameters that begin in September, 2012.

Table 1. Stochastic Dairy Baseline

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Dairy Cows (thou.)	9,240	9,237	9,259	9,276	9,287	9,298	9,306	9,315	9,329	9,344	9,361
Milk Yield (pounds)	21,550	21,903	22,194	22,459	22,724	22,986	23,234	23,491	23,730	23,983	24,214
					(Million pounds)						
Milk Production	199,125	202,316	205,492	208,329	211,050	213,719	216,215	218,832	221,380	224,089	226,659
Dairy Product Production											
Cheese	10,779	11,034	11,263	11,474	11,687	11,889	12,088	12,293	12,494	12,710	12,917
Butter	1,891	1,932	1,966	1,987	2,006	2,026	2,043	2,062	2,079	2,096	2,116
Nonfat Dry Milk	1,868	1,963	2,076	2,169	2,240	2,311	2,372	2,436	2,502	2,566	2,638
Dairy Exports											
Cheese	340	360	379	392	404	414	425	434	444	454	475
Butter	108	116	123	123	119	121	120	120	119	121	121
Nonfat Dry Milk	1,005	1,088	1,182	1,249	1,295	1,331	1,369	1,404	1,435	1,468	1,506
Milk Prices					(Dollars per cwt)						
U.S. All Milk	18.91	19.10	18.97	18.92	19.07	19.07	19.19	19.24	19.32	19.32	19.57
Class III	17.26	17.42	17.13	17.00	17.12	17.14	17.29	17.37	17.43	17.52	17.73
Class IV	16.89	17.08	17.15	17.23	17.36	17.42	17.48	17.50	17.53	17.46	17.74
MDSA2011 Margin	7.88	9.48	9.78	9.71	9.70	9.62	9.64	9.64	9.81	9.88	10.22
Wholesale Dairy Product Prices					(Cents per pound)						
Cheese	165.9	169.5	168.5	168.9	170.0	170.3	171.8	172.6	173.2	174.3	176.2
Butter	171.4	163.2	158.3	159.5	159.7	161.0	162.2	163.0	164.5	163.0	167.1
Nonfat Dry Milk	142.4	148.7	151.9	152.2	153.6	153.6	153.7	153.6	153.2	153.1	154.4

These numbers represent the averages of the 500 outcomes.

This baseline uses a stochastic approach in determining the forward-looking path for the dairy variables shown in table one. The stochastic approach draws 500 alternatives for the conditioning variables in determining the dairy baseline. The draws incorporate historical distributions of the conditioning factors to make certain any historical correlation in these conditioning factors is included. The averages presented in table one show a much smoother path than the dairy industry has experienced the last

several years. However, any of the 500 individual outcomes that determine the average shown in the table will show volatility similar to what the industry has recently experienced.

The baseline outlook for the dairy industry shows that milk prices rise on average over the period. With growing international demand for U.S. dairy products in the baseline, exports of U.S. dairy products grow. Feed costs remain above long-term historical averages. The baseline shown here is similar to the recent long term forecasts released by USDA and the Congressional Budget Office.

To highlight that this stochastic baseline has a wide range of dairy outcomes, table two shows the distribution of U.S. all milk prices in the baseline. For example, table two shows that in 2012 there is a five percent chance the all milk price will be below $15.60 or above $22.35 per cwt. Further, the table shows that there is a ten percent chance that the all milk price falls below $16.23 or above $21.42 per cwt in 2012. The stochastic approach taken in the baseline and subsequent analysis is important in determining the effects of a policy alternative across a range of market outcomes.

Table 2. Distribution of U.S. All Milk Prices

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
					(Dollars per cwt)						
Stochastic Average	18.91	19.10	18.97	18.92	19.07	19.07	19.19	19.24	19.32	19.32	19.57
Percentiles											
5%	15.60	15.80	15.83	15.53	15.73	15.86	15.77	15.62	15.72	15.80	15.95
10%	16.23	16.39	16.45	16.30	16.34	16.54	16.46	16.50	16.36	16.39	16.72
20%	17.25	17.31	17.20	17.05	17.15	17.36	17.29	17.40	17.29	17.38	17.65
30%	17.81	17.93	17.83	17.66	17.82	18.01	17.90	18.04	18.08	18.26	18.30
40%	18.34	18.48	18.28	18.22	18.54	18.37	18.51	18.67	18.56	18.76	18.95
50%	18.86	18.97	18.82	18.76	18.94	18.93	19.09	19.16	19.15	19.30	19.53
60%	19.38	19.57	19.43	19.20	19.54	19.45	19.65	19.72	19.75	19.79	20.06
70%	19.97	20.17	19.91	20.00	20.17	20.08	20.33	20.29	20.37	20.41	20.57
80%	20.55	20.77	20.70	20.76	20.95	20.86	21.13	20.96	21.16	21.10	21.32
90%	21.42	21.78	21.65	21.86	21.93	21.80	22.10	21.94	22.32	22.10	22.43
95%	22.35	22.55	22.52	22.81	22.72	22.58	23.10	22.86	23.68	23.02	23.50

MDSA2011 Assumptions

There are three main features of the MDSA2011 program that must be discussed to interpret how the program will operate: the Base Program, the Supplemental Program and the Dairy Market Stabilization Program. It remains important to highlight the MDSA2011 program is a voluntary program and that producers can choose whether to participate in the program.

A dairy producer who chooses margin protection under DPMPP is subject to the provisions of DMSP and is eligible for payments under the base and/or supplemental programs. Program participation also carries an annual administrative fee that depends on the quantity of milk marketed by the operation.

The base program provides a payment to a dairy producer based on the calculated margin for a two-month period as stipulated in the legislative language. Any time this margin calculation falls below $4 per cwt, the producer receives a payment equal to the difference between the reported margin and $4, up to a payment rate cap of $4. The payment rate cap does not allow a larger payment if the calculated margin falls below zero. The payment rate is applied to a producer's base program quantity which is calculated as 80 percent of their historical base (historical base defined as the largest of the previous three year's milk marketings). The base for base program payments does not grow over time. There are options for new producers to obtain base for base program purposes in the language.

The supplemental program provides dairy producers the opportunity to buy-up to higher levels of margin coverage in return for the dairy producer paying a premium for that additional coverage. A dairy producer has the option each year to participate in the supplemental program. That is, they can opt in and out of the supplemental program on an annual basis. A dairy producer can also choose the level of their supplemental program base they wish to cover in the range of 25 to 90 percent.

A difference in the supplemental base quantity from the base program base quantity is that it will adjust based on a dairy producer's annual production from the previous year. This will have the effect of allowing dairy producers who are growing to obtain additional supplemental coverage on their growing milk supplies. The premium required to be paid by producers for supplemental program coverage depends on their level of milk production and is show in table three. There are lower premiums available for a producer's first 4 million pounds of milk marketings.

Table 3. Supplemental Premium Levels Based on Milk Marketings

	Supplemental Premium Rate	
Coverage Level	First 4 million lbs	Above 4 million lbs
$4.50	$0.010	$0.015
$5.00	$0.025	$0.036
$5.50	$0.040	$0.081
$6.00	$0.065	$0.155
$6.50	$0.100	$0.230
$7.00	$0.434	$0.434
$7.50	$0.590	$0.590
$8.00	$0.922	$0.922

The DMSP is the remaining important feature of the MDSA2011 provisions. If the margin is less than $6 for two consecutive months or less than $4 for one month, the DMSP will then operate a month after notification by USDA to dairy producers. A producer must annually choose whether to have his/her DMSP production base calculated as the average of the previous three months of milk marketings prior to notification of DMSP operation or milk marketings from the same month in the previous year. Individual growth plans will affect that choice as will the producer's seasonal production pattern.

The program has three levels of market stabilization targets that producers will face when the program operates. If the margin is between $5 and $6, a producer will be paid on 98 percent of his/her DMSP base, with the maximum payment cut capped at 6 percent of total marketings. A margin between $4 and $5 results in only 97 percent of his/her DMSP base receiving payments with a maximum cut of 7 percent of total marketings, while a margin below $4 results in only 96 percent of the DMSP base receiving payments with a maximum cut equal to 8 percent of total marketings.

A producer can choose to deliver milk above his/her allowed level (percentage of DMSP base) but the producer will not be paid for any milk delivered above the allowed level. Handlers will remit the monies collected on milk delivered above allowed levels to USDA to fund dairy commodity donations.

The DMSP operation ceases when the margin is above $6 for two consecutive months, or when the margin is between $5 and $6 for two consecutive months and either the U.S. cheddar or skim milk powder price exceeds the world equivalent price, or the margin is between $4 and $5 for two consecutive months and the U.S. cheddar or skim milk powder price exceeds the world equivalent price by more than 5 percent, or if the margin is below $4 and either the U.S. cheddar or skim milk powder price exceeds world prices by more than 7 percent for two consecutive months.

Producer Participation in the MDSA2011 Program

The development of this dairy safety net alternative has raised many questions about how producers choose to participate in the program. Important tradeoffs exist between potential DMSP operation, which could reduce the quantity of milk producers receive payments for, and the margin protection offered by the DPMPP. Under DPMPP, producers face the additional choice of whether to add supplemental margin coverage to their program. These choices provide producers a lot of flexibility in how they choose to participate in the MDSA2011 program. The range of choices goes from no program participation to full supplemental coverage on top of the base program option. Figuring out program participation under this flexible scheme can prove challenging. Most of the analysis done to date has made educated assumptions about producer participation given the economic incentives that are available. This can lead to generalizations that sometimes do not hold well when the program is actually implemented.

To move beyond a simple assumption on producer participation in the program or a range of participation levels, the representative farm model maintained at Texas A&M University by the Agricultural and Food Policy Center (AFPC) was used to determine which of the AFPC dairy farms would participate and at what level of supplemental coverage to maximize their net cash income. This approach may allow for a better estimate of program participation in the MDSA2011 program.

The structural aggregate model was simulated with the representative farms model until program participation was in agreement between the farm-level and aggregate level structures. Given the results (see the April 2012 Texas A&M study, http://www.afpc.tamu.edu) from the representative farms model, the aggregate model was calibrated to assume that 70 percent of the milk produced in the country

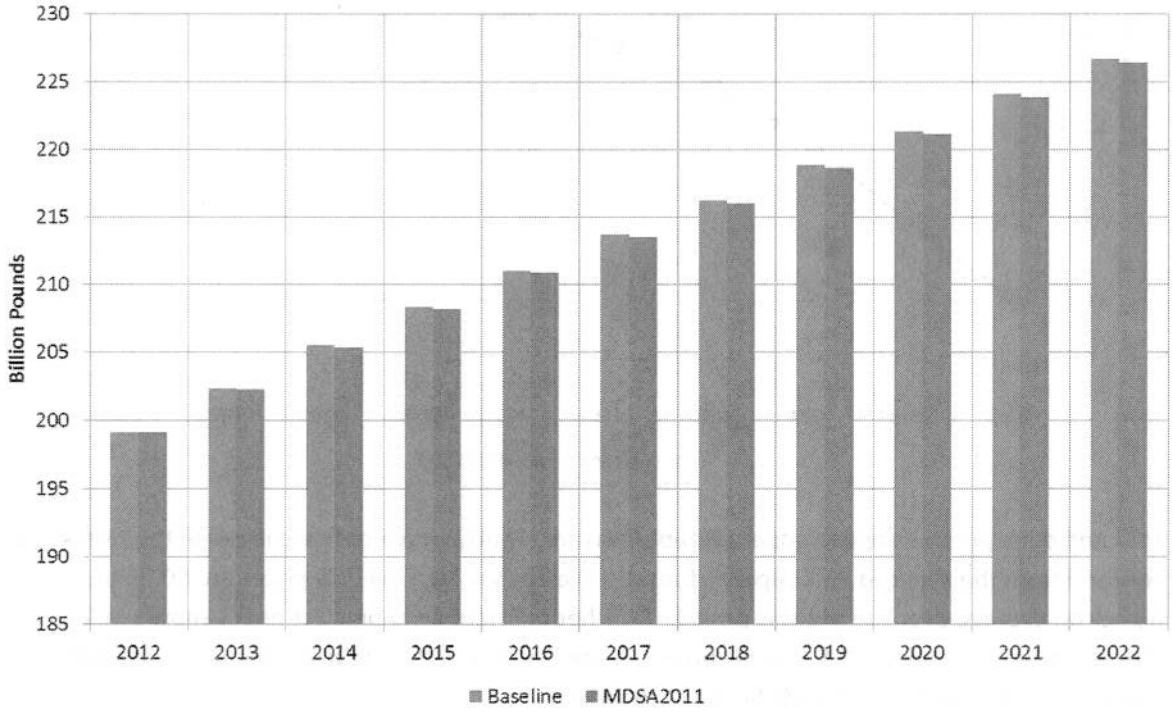
would be from operations participating in the MDSA2011 program and that participating milk would purchase supplemental coverage at $6.50 at a 90 percent supplemental program base coverage level.

The participation outcome will affect how the MDSA2011 program will operate, but from the representative farms model and contact with the dairy producers that constructed these AFPC panel farms, it appears participation will be an attractive economic choice for many producers. These results mimic closely the participation levels found by CBO in their analysis of DSA2011 proposals.

Aggregate Results from the MDSA2011 Program

The analysis of the MDSA2011 language assumes the program to be in effect over the 2012 to 2022 period. Appendix tables A.1 and A.2 at the end of this report provide the average effects of operation of the MDSA2011 program on dairy markets. There are several interesting model outcomes from the analysis of the program. In general, these appendix tables show very small changes in average outcomes of all variables. Figure three shows that milk supplies are on average only 0.1 percent below baseline levels under the MDSA2011 scenario.

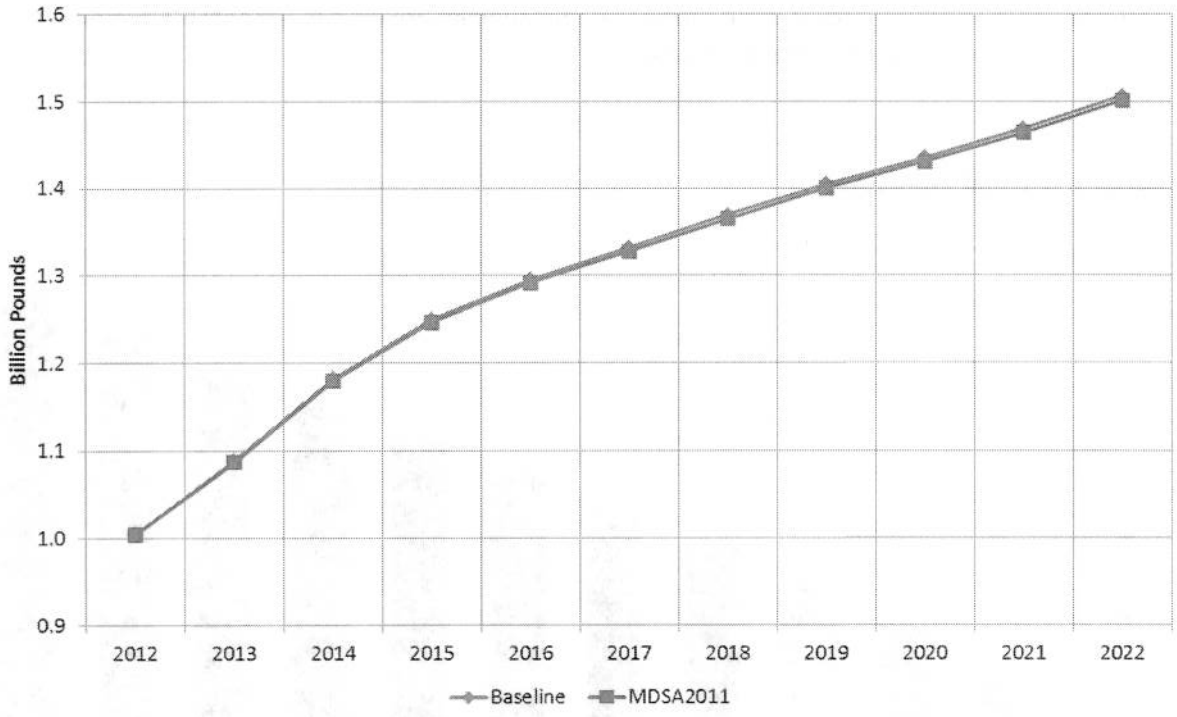
Figure 3. U.S. Milk Production



As a result of the small changes in milk supplies, dairy product output is little changed under the scenario as well. All three major dairy products have declines of 0.2 percent or less throughout the analysis.

Dairy product export levels are also down slightly under the scenario. Figure 4 shows that nonfat dry milk exports have an average decline of 4 million pounds, which is a decline of 0.3 percent under the MDSA2011 scenario. There has been much information presented on the effects of DMSP on U.S. dairy exports. Two factors drive the small impacts shown here. First, the stochastic output from the analysis shows DMSP operation occurs only about 7.5 percent of the time. Second, when the DMSP operates, it lasts a very short period of time because of the world price triggers built into the MDSA2011 language. None of the 500 outcomes show long-term multi-year operation of DMSP. The largest single-year decline in nonfat dry milk exports is about 25 million pounds in any of the 500 outcomes.

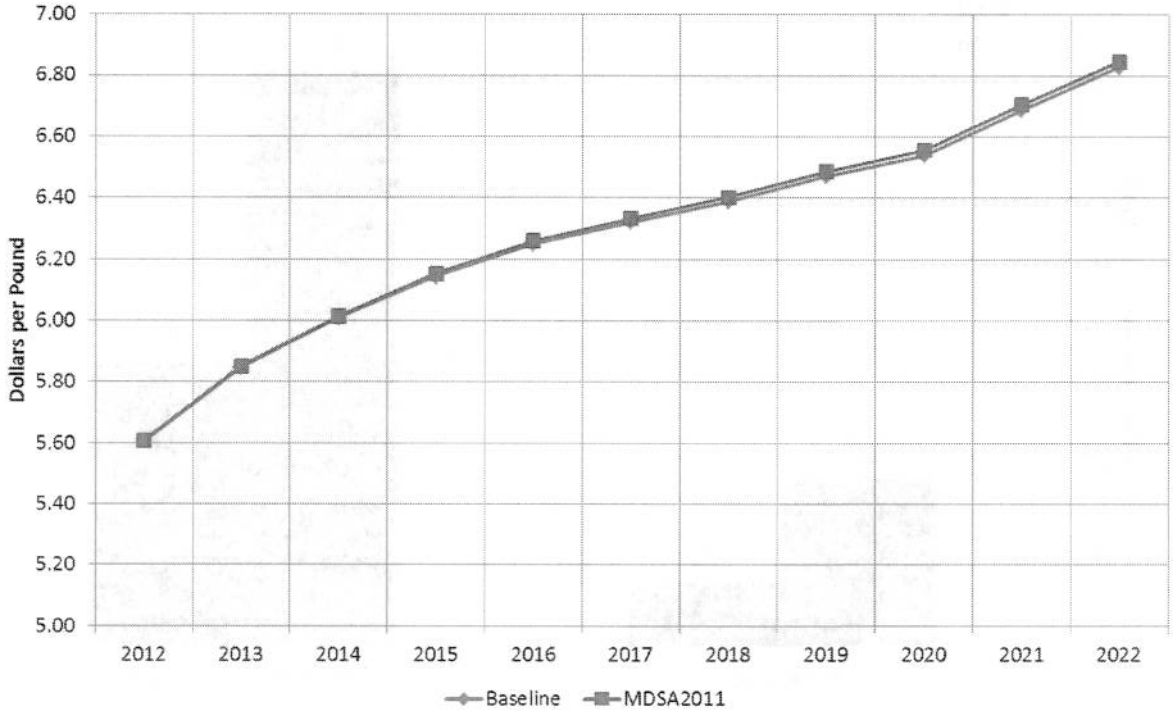
Figure 4. U.S. Nonfat Dry Milk Exports



Milk and dairy prices shown in appendix table two are slightly above baseline levels in the MDSA2011 scenario from the reduced milk supplies found in the analysis. U.S. all milk prices are $0.05 per cwt higher on average over the analysis period. All other milk and dairy product prices show similar movements as seen in the U.S. all milk price. Figure five shows that retail cheese prices are little changed on average under the MDSA2011 scenario.

There has been interest in the effects on milk prices when the margin protection program is making payments. This analysis shows that the combination of DMSP and DPMPP work together

Figure 5. U.S. Retail Cheese Prices



in a way that reduces the downward pressure on milk prices during times of payments under DPMPP. In fact, the largest single-year decline in the U.S. all milk price relative to the baseline over the 500 outcomes was only $0.23 in this analysis. This decline in the all milk price is associated with a period where margin payments occurred.

Figure six provides an indication of the probability of a base program and $6.50 supplemental program payment in the first year and midway through the analysis period. According to figure six there is an 18 percent chance of a base program payment being made in 2012 and that probability decreases to a 7 percent chance of a base program payment in 2017. Figure six shows that the probability of receiving a $6.50 supplemental program payment in 2012 is 61 percent and declines to 30 percent in 2017.

Although base program coverage comes with only an administrative cost to producers, the probability of receiving a large payment from the base program is small. Buying additional coverage increases the probability of receiving a payment from the supplemental program. Again, this analysis assumes that 70 percent of milk has supplemental coverage at the 90 percent supplemental base coverage level. The cost of this coverage, i.e., the premium, is $0.23 per cwt for producer marketings above 4 million pounds. In 2012, the average supplemental program payout is $0.41 per cwt while in 2017 it is $0.15 per cwt.

Figure seven provides a summary of how the MDSA2011 affects margins. This graph represents U.S. average effects and the graph does depend on program participation. This is an aggregate outcome

Figure 6. Probability of Receiving a Payment from DPMPP, 2012 and 2017

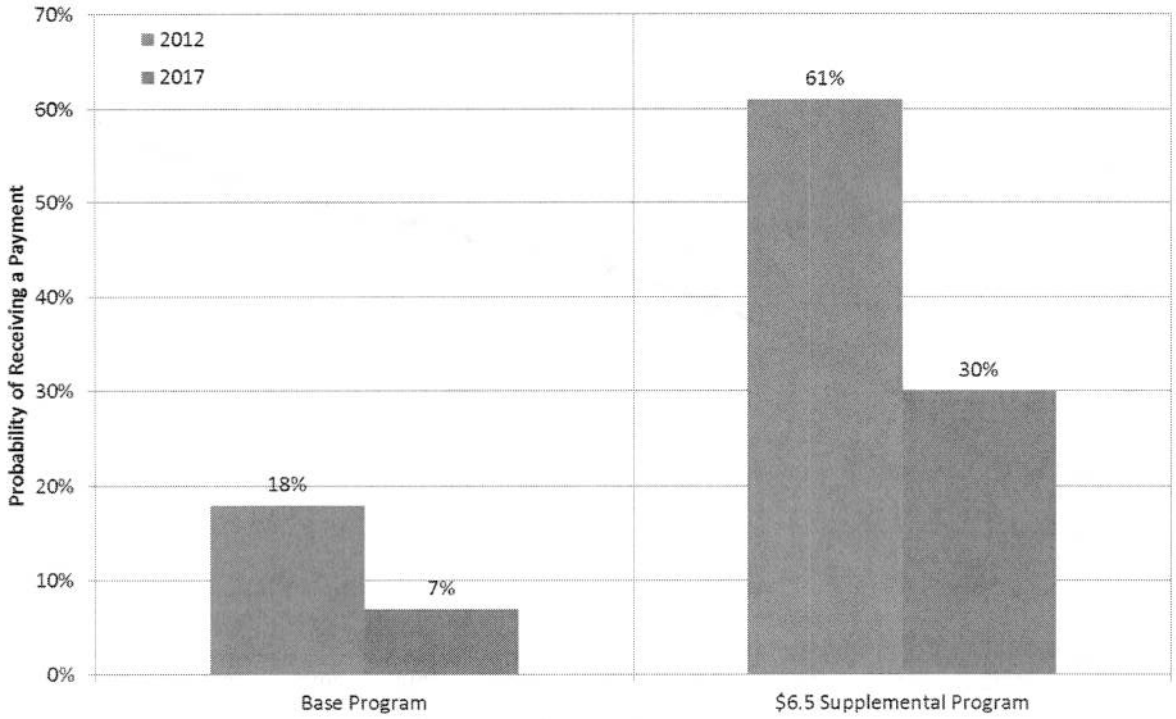
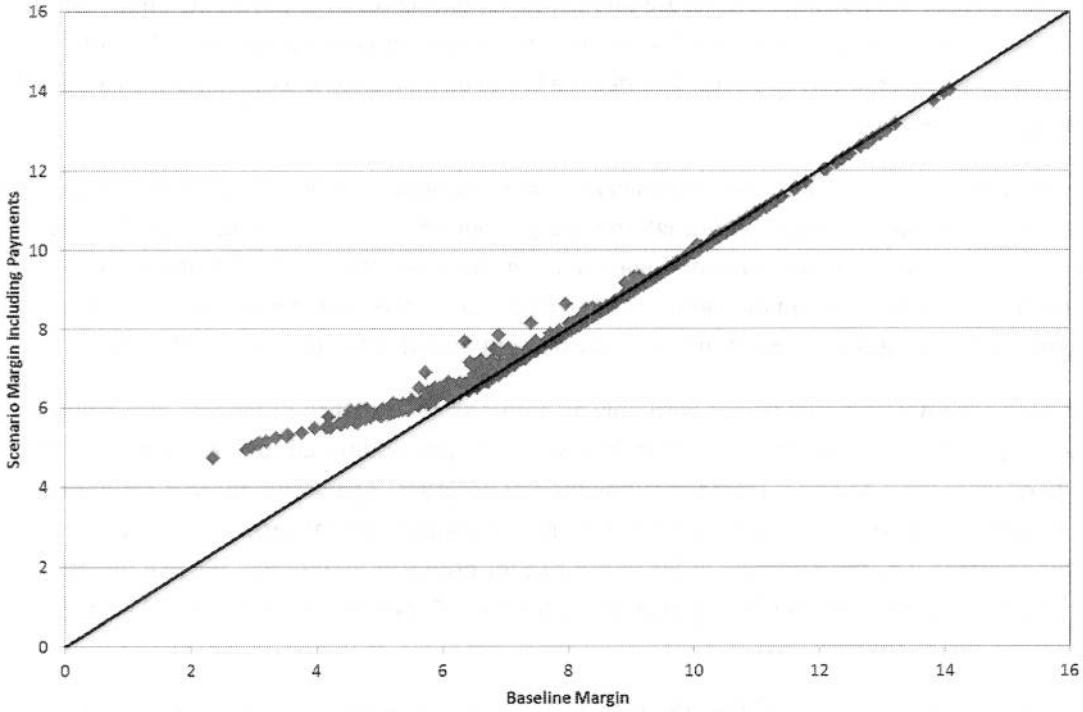


Figure 7. Average U.S. 2012 Margin Level, Baseline versus the MDSA2011Program

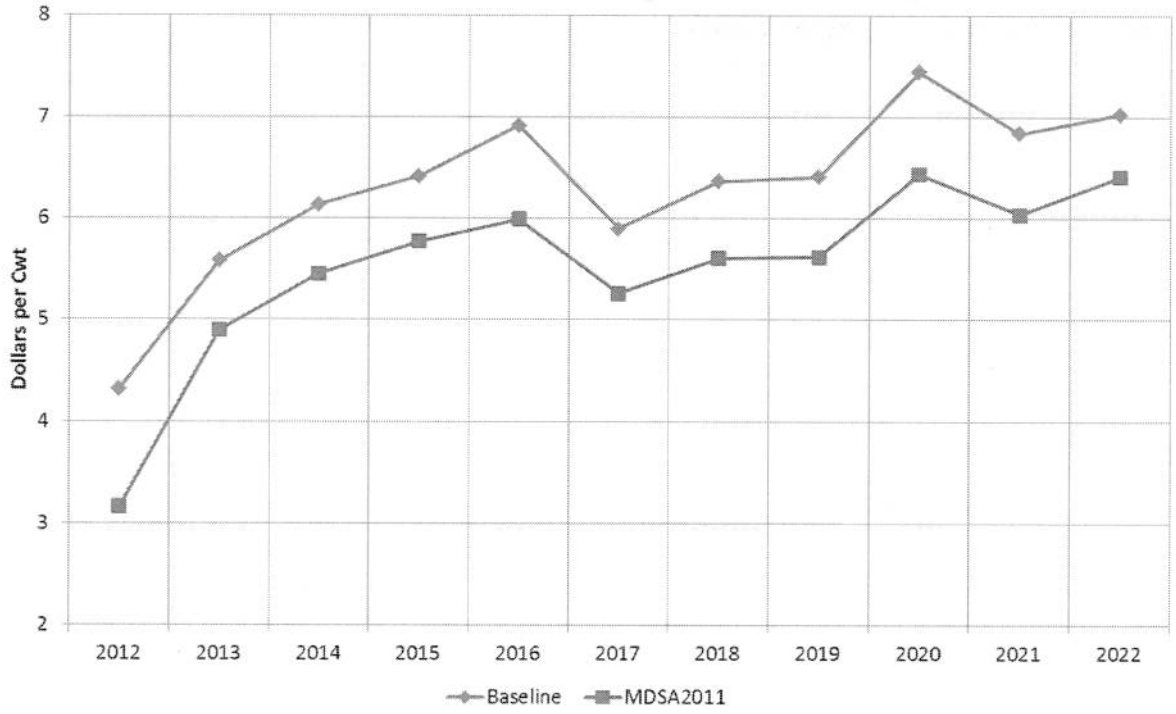


and individual producer outcomes will depend on their program participation choice. The baseline margin outcomes are found on the horizontal axis while the MDSA2011 margin outcomes are plotted on the vertical axis. The DSA2011 margin outcomes include market, premiums and program payments. When an outcome falls to the left of the 45 degree line shown on the graph, the MDSA2011program has raised that margin outcome relative to the baseline. When the outcome falls to the right of the 45 degree line, the baseline outcome exceeds the scenario margin outcome.

The graph shows that in low margin outcomes, the combination of DMSP and DPMPP raises the margin outcome relative to the baseline. The lowest outcome on the graph shows the MDSA2011 program raised the margin by nearly $3 per cwt. On the upper end of baseline margins, producers are paying premiums for the supplemental coverage and do not see DPMPP payments so the margin under the MDSA2011 program is below the baseline margin outcomes by the cost of the premium they pay. From a margin perspective, the MDSA2011 increases low margin outcomes through payments and market stabilization. Supplemental program premiums paid in high margin periods provides slightly lower margin outcomes. The combination implies less volatility in margins than occurs with a continuation of current programs.

Another way to measure the reduction in volatility from operation of the MDSA2011 program is to look at the variance in the baseline margin versus the margin under MDSA2011. Figure 8 shows that the program results in about a $0.75 reduction in margin variance under the program's operation. This figure shows the lift in low margin outcomes provided by the MDSA2011 program results in the reduction in variance.

Figure 8. Producer Margin Variance



Summary

In summary, the analysis of the MDSA2011 program shows that:

1) The combination of program features, DMSP and DPMPP, reduces margin volatility in the dairy industry,
2) There are only small milk supply effects on average,
3) Producer margins increase on average with the most lift in producer margins occurring in low margin environment outcomes,
4) Dairy product trade is only slightly lower on average as a result of the DMSP triggers for U.S. to world dairy product price differences,
5) Milk and dairy product prices have small increases as a result of smaller milk supplies, and
6) There are not long periods of program operation for either DPMPP or DMSP.

The analysis shown here provides a robust look at how the program operates across both low and high market price environments. This approach is important to gain a full understanding of how the program interacts with various market outcomes. Any time a program is keyed off of a margin that includes input and output prices, the analysis needs to carefully incorporate the correlation that occurs between these different prices. If the analysis incorporates correlation that is too high, it will understate the level of program operation while if the analysis incorporates correlation that is too low, it will overstate the level of program operation. Although this analysis takes a stochastic approach to provide a more robust outcome, if the average outcomes are too high or too low it will cause the analysis to understate/overstate the program effects.

Appendix

Table A1. Effect of the MDSA2011 on Dairy Markets

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Dairy Cows					(Thousand Head)						
Baseline	9,240	9,237	9,259	9,276	9,287	9,298	9,306	9,315	9,329	9,344	9,361
MDSA2011	9,240	9,236	9,256	9,272	9,283	9,292	9,300	9,308	9,322	9,336	9,353
Change	(0)	(1)	(3)	(4)	(5)	(6)	(6)	(7)	(7)	(8)	(8)
Percent Change	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Milk Production					(Million Pounds)						
Baseline	199,125	202,316	205,492	208,329	211,050	213,719	216,215	218,832	221,380	224,089	226,659
MDSA2011	199,113	202,249	205,376	208,189	210,889	213,538	216,026	218,634	221,170	223,876	226,436
Change	(12)	(67)	(117)	(140)	(162)	(181)	(189)	(198)	(210)	(213)	(223)
Percent Change	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Cheese Production											
Baseline	10,779	11,034	11,263	11,474	11,687	11,889	12,088	12,293	12,494	12,710	12,917
MDSA2011	10,779	11,030	11,257	11,467	11,679	11,879	12,079	12,283	12,483	12,699	12,906
Change	(1)	(4)	(6)	(7)	(8)	(9)	(10)	(10)	(11)	(11)	(12)
Percent Change	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Butter Production											
Baseline	1,891	1,932	1,966	1,987	2,006	2,026	2,043	2,062	2,079	2,096	2,116
MDSA2011	1,891	1,930	1,964	1,984	2,004	2,023	2,040	2,058	2,076	2,092	2,112
Change	(0)	(1)	(2)	(2)	(3)	(3)	(3)	(3)	(3)	(3)	(4)
Percent Change	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
Nonfat Dry Milk Production											
Baseline	1,868	1,963	2,076	2,169	2,240	2,311	2,372	2,436	2,502	2,566	2,638
MDSA2011	1,868	1,962	2,073	2,165	2,236	2,307	2,367	2,431	2,496	2,561	2,632
Change	(0)	(2)	(3)	(4)	(4)	(5)	(5)	(5)	(5)	(5)	(6)
Percent Change	0.0%	-0.1%	-0.1%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
Cheese Exports											
Baseline	340	360	379	392	404	414	425	434	444	454	475
MDSA2011	339	359	378	391	402	413	423	432	443	452	473
Change	(0)	(1)	(1)	(1)	(1)	(2)	(2)	(2)	(2)	(2)	(2)
Percent Change	0.0%	-0.2%	-0.3%	-0.3%	-0.3%	-0.4%	-0.4%	-0.4%	-0.4%	-0.4%	-0.4%
Butter Exports											
Baseline	108	116	123	123	119	121	120	120	119	121	121
MDSA2011	108	116	123	122	118	119	119	119	118	120	120
Change	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Percent Change	-0.1%	-0.3%	-0.6%	-0.7%	-0.8%	-0.9%	-0.9%	-0.9%	-0.9%	-1.0%	-1.0%
Nonfat Dry Milk Exports											
Baseline	1,005	1,088	1,182	1,249	1,295	1,331	1,369	1,404	1,435	1,468	1,506
MDSA2011	1,005	1,087	1,179	1,246	1,291	1,327	1,365	1,400	1,430	1,463	1,501
Change	(0)	(1)	(3)	(3)	(4)	(4)	(4)	(4)	(5)	(5)	(5)
Percent Change	0.0%	-0.1%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%

Table A2. Effect of the MDSA2011 on Dairy Prices

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
U.S. All Milk Price					(Dollars per Cwt)						
Baseline	18.91	19.10	18.97	18.92	19.07	19.07	19.19	19.24	19.32	19.32	19.57
MDSA2011	18.92	19.13	19.01	18.97	19.13	19.13	19.25	19.31	19.39	19.40	19.64
Change	0.01	0.02	0.04	0.05	0.06	0.06	0.07	0.07	0.07	0.07	0.08
Percent Change	0.0%	0.1%	0.2%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%
Class III Milk Price											
Baseline	17.26	17.42	17.13	17.00	17.12	17.14	17.29	17.37	17.43	17.52	17.73
MDSA2011	17.27	17.44	17.17	17.05	17.18	17.21	17.36	17.44	17.51	17.60	17.82
Change	0.01	0.03	0.04	0.05	0.06	0.07	0.07	0.08	0.08	0.08	0.08
Percent Change	0.0%	0.1%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%
Class IV Milk Price											
Baseline	16.89	17.08	17.15	17.23	17.36	17.42	17.48	17.50	17.53	17.46	17.74
MDSA2011	16.90	17.10	17.19	17.27	17.41	17.47	17.53	17.56	17.59	17.52	17.80
Change	0.01	0.02	0.03	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.06
Percent Change	0.0%	0.1%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.4%
Wholesale Cheese Price					(Cents per Pound)						
Baseline	165.9	169.5	168.5	168.9	170.0	170.3	171.8	172.6	173.2	174.3	176.2
MDSA2011	166.0	169.7	168.9	169.4	170.6	170.9	172.5	173.3	173.9	175.1	177.0
Change	0.1	0.2	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.8
Percent Change	0.0%	0.1%	0.2%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Wholesale Butter Price											
Baseline	171.4	163.2	158.3	159.5	159.7	161.0	162.2	163.0	164.5	163.0	167.1
MDSA2011	171.5	163.5	158.8	160.2	160.5	161.9	163.1	163.9	165.5	164.0	168.1
Change	0.1	0.3	0.5	0.7	0.8	0.9	0.9	0.9	1.0	1.0	1.1
Percent Change	0.1%	0.2%	0.3%	0.4%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
Wholesale Nonfat Dry Milk Price											
Baseline	142.4	148.7	151.9	152.2	153.6	153.6	153.7	153.6	153.2	153.1	154.4
MDSA2011	142.4	148.7	152.0	152.3	153.7	153.8	153.9	153.8	153.4	153.3	154.6
Change	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Percent Change	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Agricultural and Food Policy Center
Texas A&M University

April 2012

FARM LEVEL IMPACTS OF EFFECTS OF A MODIFIED DAIRY SECURITY ACT OF 2011

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FARM LEVEL IMPACTS OF EFFECTS OF A MODIFIED DAIRY SECURITY ACT OF 2011

Executive Summary

The report analyzed the effect of the modified Dairy Security Act of 2011 (MDSA2011) provisions that was discussed in late 2011 on individual dairy farms using data on 22 actual representative dairy farms developed and maintained by AFPC. These representative dairy farms vary significantly in size and are distributed throughout the United States.

The following are the some of the key conclusions of the study:

1) The overwhelming majority (19 out of 22) of the representative farms would have higher net cash farm income over the study period under the MDSA2011 proposed policy relative to current policy. Eleven dairies would choose the $6.50 buy-up level and 8 would choose $5.00 buy-up level as their most preferred option. The remaining three would choose non-participation as their preferred option.

2) In general, the current policy alternative (option 1) was among the least preferred across the representative dairies.

3) Sector level analysis from Brown indicates that MDSA2011 will result in very minor changes in milk prices and milk production, compared with current dairy policy.

4) Although the analysis formally assumes that the milking herd sizes of the representative farms remains constant throughout the analysis period (2009-2016), it was determined that the results would not change under a more general assumption of herd size growth.

FARM LEVEL IMPACTS OF EFFECTS OF A MODIFIED DAIRY SECURITY ACT OF 2011

This report provides the results of farm level analyses of the modified Dairy Security Act of 2011 provisions that was discussed in late 2011. This analysis is a companion to the sector level analysis of these provisions developed by Brown. The sector level results were utilized in this analysis and imposed on the representative dairy farms maintained by the Agricultural and Food Policy Center at Texas A&M University. Detailed descriptions of the sector results are contained in the report, *The Effects of a Modified Dairy Security Act of 2011 on Dairy Markets.*

AFPC Panel Process

AFPC has developed and maintains data to simulate 22 representative dairy farms in the major production areas across the United States (Figure 1). Characteristics for each of the operations in terms of location, size, and crop mix are summarized in Appendix A. More detailed information on the farms are contained in Richardson, et al., 2012.

The locations of these farms are primarily the result of past discussions with staff members of the U.S. House and Senate Agriculture Committees. Information necessary to simulate the economic activity on these representative farms is developed from panels of producers using a consensus-building interview process. Often, two farms are developed in each region using separate panels of producers: one is representative of moderate size full-time farm operations, and the second panel usually represents farms two to three times larger.

The data collected from the panel farms are analyzed using the whole farm simulation model (FLIPSIM) developed by AFPC. The producer panels are provided pro-forma financial statements for their representative farm and are asked to verify the accuracy of simulated results for the past year and the reasonableness of a multi-

Figure 1. Location and Size of AFPC Representative Dairies.

year projection. Each panel must approve the model's ability to reasonably reflect the economic activity on their representative farm prior to using the farm for policy analyses.

Initial debt levels for dairy farms were set at 30 percent. The debt levels the farms have at the outset of 2009 are based on a stratified tabulation of the ERS-USDA Farm Cost and Returns Survey (using the survey data for moderate to large size farms in states where AFPC has representative farms) and panel member input.

Panel Member Input

AFPC often gets asked to analyze policy changes on our representative farms and the results often hinge on the assumptions made for the analysis. We often fact check our assumptions with our panel members or at least try to get a feel from them for how they might react to a policy change. The significance of the changes being analyzed in this report prompted us to seek our panel member input via an email survey. These email surveys are not meant to represent a scientific sample, but rather provide anecdotal information and raise issues for both policy makers and modelers to address. The dairy producers were asked whether they would participate in the potential program laid out under the Modified Dairy Security Act. In general, the responses were pretty evenly split between intending to participate and not participating. It was clear that many producers were not fully aware of the dairy provisions of the bill presented to the Supercommittee. There was a clear indication that producers needed more information about the details of the provision to make an informed decision. Some reasons listed for potential lack of participation in the program were: too complicated, potential to hurt export markets, and doubting the market stabilization portion of the program would work if not full participation. On the question of what information the producers need to make a decision on whether to buy-up coverage and at what level, the most mentioned responses included: futures prices for both milk and feed, their operations cost of production, and premium costs. The results of our ad hoc survey suggested that more analysis, such as this study were indeed needed to help producers more fully understand the economic implications of the modified Dairy Security Act.

Brief descriptions of assumptions that apply to all alternatives are as follows:

1) The study period runs from 2009 to 2016. Several years of history are included to ensure the results are tracking what actually occurred in the industry appropriately. Several common financial condition measures are reported for each representative dairy as of the end of 2016.

2) The milking herd size remains constant throughout the study period.[1]

3) Milk production is expected to increase at 1.5% annually.

Brief descriptions of alternatives analyzed in this report are as follows:

1. **Current Policy.** Assumes that a new farm bill reauthorizes MILC and other farm programs included in baseline projections by the Congressional Budget Office (CBO) without changing program provisions. This means that MILC payments are limited to 2.4 million pounds of milk, the feed cost adjustor is raised to $9.50, and payments are made on 34% of the difference between the $16.94 base price and the class 1 Boston price.

2. **Non-Participant.** Assumes that a new farm bill puts in place the provisions of the Dairy Security Act, but that individual representative dairies choose not to participate in the margin protection and market stabilization.

3. **Participant Base Coverage.** Assumes that each representative dairy chooses to participate in margin protection, but only at the basic level (no buy-up). Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

[1] Several farms were analyzed to determine whether their preferences would change under a herd growth scenario. The preferred choice for these farms did not change from the constant herd size analysis.

Table 1. Premium Schedule for First 4 Million Pounds of Production.

Coverage Level	Premium per Cwt.
$4.50	$0.010
$5.00	$0.025
$5.50	$0.040
$6.00	$0.065
$6.50	$0.100
$7.00	$0.434
$7.50	$0.590
$8.00	$0.922

Table 2. Premium Schedule for Production in Excess of 4 Million Pounds.

Coverage Level	Premium per Cwt.
$4.50	$0.015
$5.00	$0.036
$5.50	$0.081
$6.00	$0.155
$6.50	$0.230
$7.00	$0.434
$7.50	$0.590
$8.00	$0.922

4. **Participant Buy-up $4.50 Coverage.** Individual representative dairies are simulated at the $4.50 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

5. **Participant Buy-up $5.00 Coverage.** Individual representative dairies are simulated at the $5.00 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

6. **Participant Buy-up $5.50 Coverage.** Individual representative dairies are simulated at the $5.50 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

7. **Participant Buy-up $6.00 Coverage.** Individual representative dairies are simulated at the $6.00 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

8. **Participant Buy-up $6.50 Coverage.** Individual representative dairies are simulated at the $6.50 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

9. **Participant Buy-up $7.00 Coverage.** Individual representative dairies are simulated at the $7.00 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

10. **Participant Buy-up $7.50 Coverage.** Individual representative dairies are simulated at the $7.50 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in

Table 3. Ranking of the 11 Alternatives for Each Representative Farm Using the Highest Net Cash Farm Income Criteria.

	Current Policy	Non-Participant	Participant								
			Base Coverage	4.5	5	5.5	6	6.5	7	7.5	8
CAD1710	8	7	4	3	1	2	6	5	9	10	11
WAD250	7	8	6	5	4	3	2	1	9	10	11
WAD850	8	7	4	3	1	2	6	5	9	10	11
IDD3000	8	7	3	2	1	4	5	6	9	10	11
NVD500	8	7	6	5	3	2	4	1	9	10	11
TXCD550	8	2	7	6	5	3	4	1	9	10	11
TXCD1300	8	5	4	3	1	2	7	6	9	10	11
TXED400	8	7	6	5	4	3	2	1	9	10	11
TXED1000	8	7	5	3	1	2	6	4	9	10	11
TXND3000	8	5	4	2	1	3	6	7	9	10	11
WID145	8	7	6	5	4	3	2	1	9	10	11
WID1000	8	7	4	3	1	2	6	5	9	10	11
NYWD600	8	7	6	5	3	2	4	1	9	10	11
NYWD1200	8	7	4	3	1	2	6	5	9	10	11
NYCD110	7	8	6	5	4	3	2	1	9	10	11
NYCD550	8	7	6	5	3	2	4	1	9	10	11
VTD140	5	8	7	6	4	3	2	1	9	10	11
VTD400	8	7	6	5	4	3	2	1	9	10	11
MOGD180	4	2	8	7	6	5	3	1	9	10	11
MOGD550	2	1	8	7	6	5	4	3	9	10	11
FLND550	8	1	7	6	5	3	4	2	9	10	11
FLND1500	8	1	5	4	2	3	7	6	9	10	11

Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

11. **Participant Buy-up $8.00 Coverage.** Individual representative dairies are simulated at the $8.00 margin buy-up covering 90% of their annual production history. Premium payments correspond to rates found in Tables 1 and 2. Applicable reductions in dairy payments occur when the margin has been $6.00/cwt or less for the immediately preceding two months or $4.00/cwt or less for the immediately preceding month.

Results

AFPC applied the sector level results developed in Brown's analysis for the set of 22 representative dairy farms located across the United States, using AFPC's farm level simulation model for this analysis.

The farm level results reflect actual dairy data developed in our representative farm process. The representative dairies are all analyzed under each of the alternative scenarios described above. The sector level results provided by Brown reflect sector level supply response analyzing current policy as the baseline alternatives based on analysis of the provisions of the DSA.

Table 3 contains the rankings of the 11 alternatives (defined above) for each of the representative dairies. The rankings are based on average Net Cash Farm Income (NCFI) from 2012 to 2016 for each alternative. The alternative with the highest NCFI was given the highest ranking of 1. The next highest NCFI was given a ranking of 2 and so forth, all the way to 11. Table 3 reveals that 11 of the 22 dairies have the highest average NCFI under the $6.50 buy-up alternative (option 8 described above) followed closely with 8 dairies having the highest average NCFI under the $5.00 buy-up alternative (option 5). The large Missouri grazing dairy (MOGD550) and both Florida dairies received the largest average NCFI under the Non-Participant alternative.

In order to convey the magnitude between alternatives, the difference between the highest NCFI option and the next best alternative is presented in Figure 2. The color code in Figure 2 relates to the next best option. The results indicate the average difference per year over the 2012 to 2016 study period. The large Florida dairy shows the largest difference between its highest NCFI alternative (Non-Participation) and its next best option ($6.50 buy-up) at $13,600/year. Conversely, there are 10 dairies that show less than a $1,000/year difference.

Figures 3 and 4 also show magnitude of differences between alternatives. Figure 3 shows the annual average difference in NCFI between the Preferred option and Non-Participation. Three dairies (the large MOGD and both Florida dairies) indicate $0 difference because their preferred option was Non-Participation. Idaho has the largest average annual NCFI difference at $53,500. In general, given the analysis of margin volatility and the ability of the policy options to provide a safety net for that volatility combined with the affects of market stabilization, the analysis suggests that the costs of non-participation for a dairy would be significant especially for the larger dairies.

Figure 4 shows the differences for each dairy between their Preferred option and Current Policy alternatives. These results are similar as those in Figure 3, as most dairies have Non-Participation and Current Policy ranked closely in their order of preference. For example, the large Wisconsin dairy has a $14,600 difference between the non-participation ($18,300) and the current policy baseline option ($32,900). The smaller Wisconsin dairy has a very small difference between these same options. Non-participation tends to have the smaller NCFI difference from either of the preferred buy-up options ($6.50 or $5.00) than does the current program. That implies that non-participants in the new program would experience higher NCFI's than otherwise achieved under the current program.

Table 4 contains the average annual premium, lost marketings, and indemnity payments during the 2012 to 2016 study period. This table is a complement to Table 3 as it gives detail to the representatives dairies highest NCFI

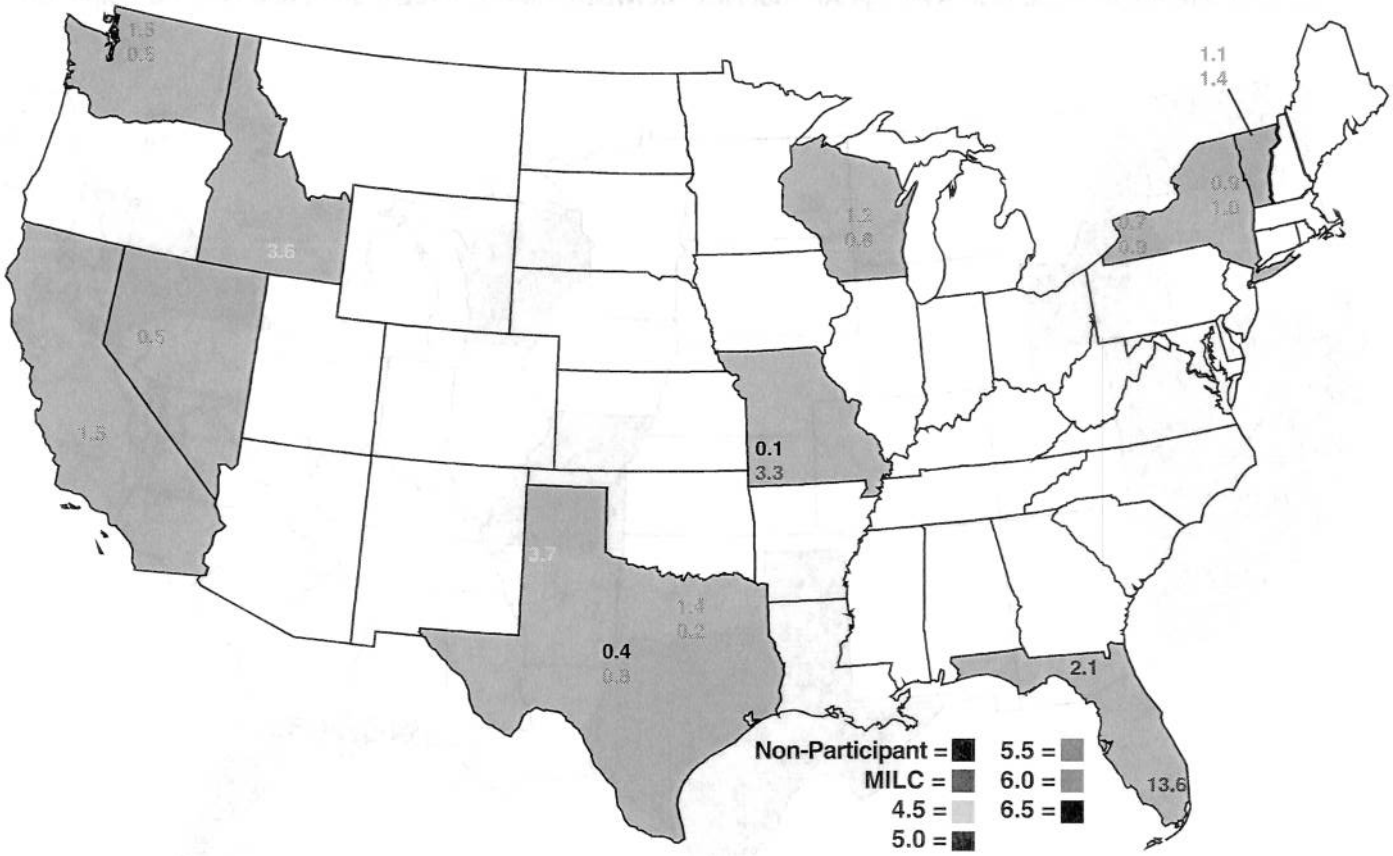

Figure 2. Differences in $1,000 in Average Annual NCFI between Preferred Option and Next Best Option.

Note: The numbers are the difference in $1,000 for each farm. Names were omitted due to space considerations. In states with more than one dairy, the moderate size farm is always listed first then the result for the large farm.

Figure 3. Difference in $1,000s in Average Annual NCFI between the Preferred Option and Non-Participation.

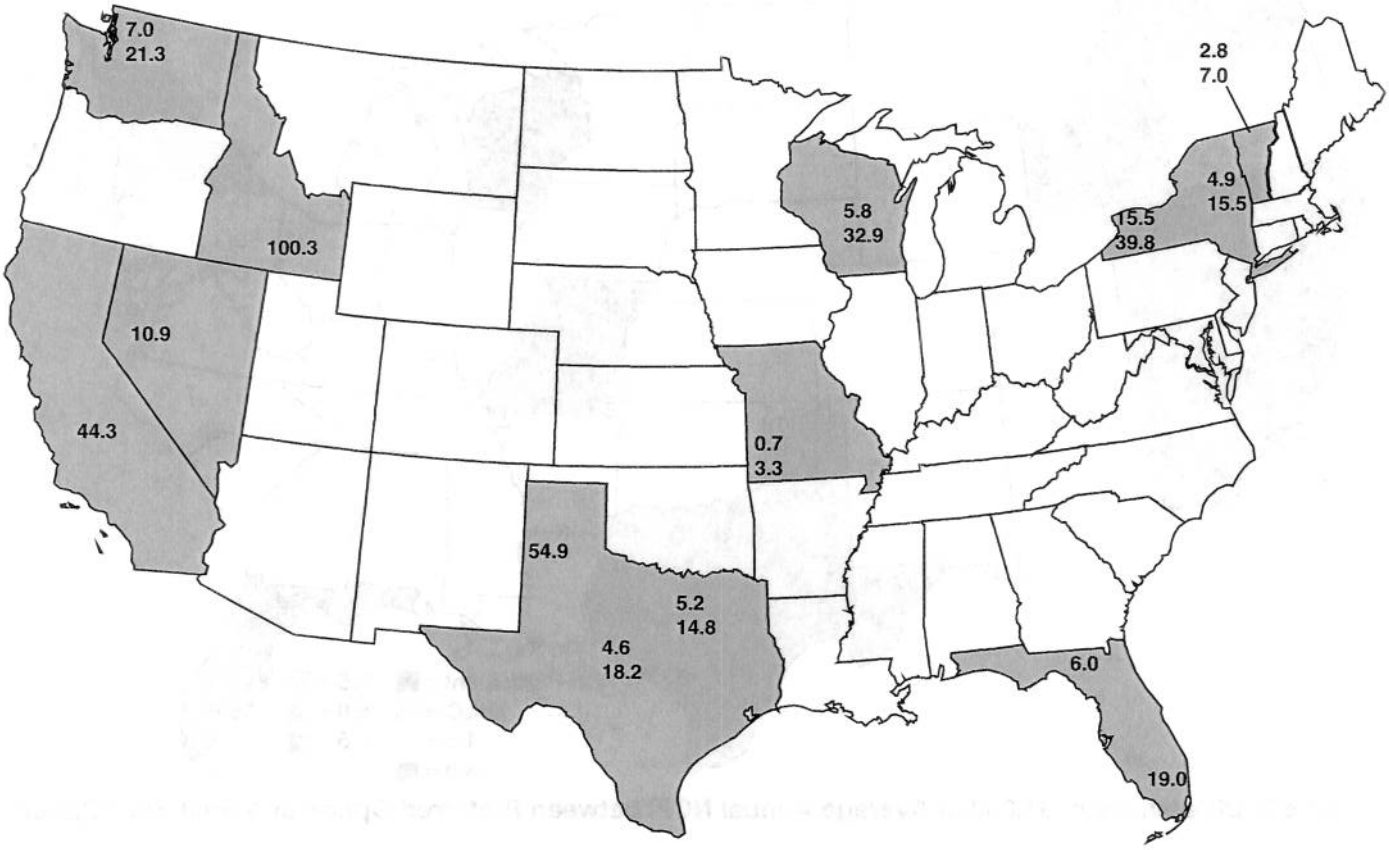

Figure 4. Difference in $1,000s in Average Annual NCFI between the Preferred Option and Current Policy.

Table 4. Average Premiums, Lost Revenues and Government Indemnities for DSA at the $6.50 Buy-Up Option (in $1,000).

	Premium	Income Lost	Indemnity
CA1710	85.2	21.5	88.4
WA250	8.4	3.8	13.0
WA850	42.9	13.4	46.0
ID3000	157.2	42.4	154.9
NV500	20.6	8.2	25.0
TXN3000	139.0	58.2	139.3
TXC550	18.6	9.8	23.0
TXC1300	51.7	24.0	55.0
TXE400	10.2	5.9	14.8
TXE1000	42.9	19.5	46.0
WI145	3.5	0.3	7.7
WI1000	52.2	0.5	71.3
NYW600	25.1	0.8	29.5
NYW1200	56.8	1.5	60.4
NYC110	2.5	0.2	10.2
NYC550	25.1	0.7	29.5
VT140	2.9	1.9	6.4
VT400	15.9	5.9	20.5
MOG180	2.1	2.8	4.7
MOG550	9.1	23.2	13.5
FLN550	17.9	12.5	22.3
FLS1500	59.1	39.0	61.8

for each alternative. For most dairies, the expected average annual indemnity payments outweigh, or exceed, the lost income triggered by the market stabilization and premium payments combined.

Table 5 contains the average annual milk prices for states where representative dairies are located assuming continuation of current policies. Table 6 contains the average annual milk prices for the same states assuming that the modified DSA is in effect for the 2012 to 2016 study period. The annual average milk prices in Tables 5 and 6 are averages from a risk-based analysis which simulated 500 different possible future paths for demand and production of crops, livestock, and milk; and thus 500 different paths of annual prices for feed and milk. The 500 sector level price paths were developed by Brown for the current farm program and DSA program both used the same risk so the only differences in prices is attributable to the policy change. The 500 possible price paths for dairy feed prices and milk prices simulated by Brown are appropriately correlated based on historical correlation among these variables. The farm level analyses used Brown's 500 price paths so the DSA premiums and indemnities were calculated using a wide range of possible projections for milk and feed prices, that were correlated based on historical relationships. By using the 500 draws of prices, the results of the farm level analysis are more robust than if the policies were simply analyzed using only the average prices.

Table 7 is related to the previous two tables as it shows the difference in prices between the DSA and current policy for each state (DSA prices minus Current policy). Current Policy (Baseline) milk prices and those projected under the DSA are projected by Brown.

Summary and Conclusions

AFPC analyzed the modified Dairy Security Act of 2011 provisions that was discussed in late 2011 utilizing our set of 22 representative dairy farms located in 10 states across the U.S. Each farm was simulated 500 times each year in AFPC's farm level simulation model (FLIPSIM) to incorporate risk in commodity prices and crop and milk yields into the analysis. Each farm was analyzed under 11 options from current policy (MILC) (option 1), to the modified DSA scenario as a non-participant (option 2), to participation at the base level of margin coverage (option 3), to 8 buy-up alternatives (options 4 – 11).

Table 5. Base Milk Price ($/cwt)

	2009	2010	2011	2012	2013	2014	2015	2016
California	11.49	14.69	18.47	16.83	17.08	17.04	17.06	17.21
Florida	16.90	20.70	24.24	23.22	23.40	23.32	23.25	23.49
Idaho	11.80	14.90	18.47	17.20	17.36	17.21	17.13	17.30
Missouri	13.00	16.60	20.71	19.57	19.74	19.62	19.55	19.75
New York	13.60	17.40	21.45	20.14	20.31	20.21	20.16	20.34
Texas	13.30	17.10	20.85	19.65	19.82	19.69	19.61	19.81
Vermont	13.80	17.70	21.63	20.31	20.47	20.38	20.33	20.52
Washington	12.30	16.10	20.68	19.32	19.48	19.36	19.30	19.46
Wisconsin	13.10	16.10	20.29	19.15	19.31	19.06	18.95	19.09
US	12.93	16.26	20.14	18.91	19.09	18.96	18.89	19.06

Table 6. DSA Milk Price ($/cwt)

	2009	2010	2011	2012	2013	2014	2015	2016
California	11.49	14.69	18.47	16.84	17.11	17.09	17.13	17.28
Florida	16.90	20.70	24.24	23.24	23.46	23.39	23.34	23.59
Idaho	11.80	14.90	18.47	17.21	17.41	17.27	17.22	17.39
Missouri	13.00	16.60	20.71	19.59	19.80	19.69	19.64	19.85
New York	13.60	17.40	21.45	20.15	20.36	20.28	20.24	20.43
Texas	13.30	17.10	20.85	19.67	19.87	19.76	19.70	19.90
Vermont	13.80	17.70	21.63	20.32	20.52	20.44	20.41	20.60
Washington	12.30	16.10	20.68	19.33	19.53	19.42	19.38	19.55
Wisconsin	13.10	16.10	20.29	19.18	19.36	19.13	19.03	19.17
US	12.93	16.26	20.14	18.93	19.14	19.02	18.98	19.14

Table 7. Difference between Current Policy and DSA Milk Price ($/cwt)

	2012	2013	2014	2015	2016
California	0.01	0.04	0.05	0.07	0.07
Florida	0.02	0.06	0.07	0.10	0.11
Idaho	0.02	0.05	0.06	0.08	0.09
Missouri	0.02	0.05	0.07	0.09	0.10
New York	0.01	0.05	0.06	0.09	0.09
Texas	0.02	0.05	0.07	0.09	0.09
Vermont	0.01	0.05	0.06	0.09	0.09
Washington	0.01	0.04	0.06	0.08	0.08
Wisconsin	0.03	0.05	0.07	0.08	0.08
US	0.02	0.05	0.06	0.08	0.08

The options were ranked for each farm based on average Net Cash Farm Income (NCFI) from 2012 to 2016 for each alternative. Eleven of the 22 dairies have the highest average NCFI under the $6.50 buy-up alternative (option 8) with 8 additional dairies having the highest NCFI under the $5.00 buy-up alternative (option 5). Only the large Missouri grazing dairy and both Florida dairies received the largest average NCFI under a different alternative (option 2 - Non-Participation). For most of the farms, the second best option was a slightly lower buy-up level. In general, the current policy alternative (option 1) was among the least preferred.

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Appendix A. 2011 Characteristics of Panel Farms Producing Milk.

CAD1710	A 1,710-cow, large-sized central California (Tulare County) dairy, the farm plants 1,200 acres of hay/silage for which it employs custom harvesting. Milk sales generated 94 percent of 2011 total receipts.
WAD250	A 250-cow, moderate-sized northern Washington (Whatcom County) dairy. This farm plants 200 acres of silage and generated 92 percent of its 2011 gross receipts from milk sales.
WAD850	An 850-cow, large-sized northern Washington (Whatcom County) dairy. This farm plants 605 acres for silage annually. During 2011, 95 percent of this farm's gross receipts came from milk.
IDD3000	A 3,000-cow, large-sized dairy located in the Magic Valley of Idaho (Twin Falls County). This farm plants 1,250 acres of corn silage annually. Milk sales account for 94 percent of 2011 gross receipts.
NVD500	A 500-cow, moderate-sized Nevada (Churchill County) dairy. This farm plants 150 acres of hay and 100 acres of corn silage annually. Milk sales accounted for 93 percent of NVD500's gross receipts for 2011.
TXND3000	A 3,000-cow, large-sized dairy located in the South Plains of Texas (Bailey County). This farm plants 1,440 acres of corn silage annually. Milk sales account for 93 percent of 2011 gross receipts.
TXCD550	A 550-cow, moderate-sized central Texas (Erath County) dairy, TXCD550 plants 1,100 acres of hay each year. Milk sales represented 93 percent of this farm's 2011 gross receipts.
TXCD1300	A 1,300-cow, large-sized central Texas (Erath County) dairy, TXCD1300 plants 680 acres of silage and 440 acres of hay annually. During 2011, milk sales accounted for 93 percent of receipts.
TXED400	A 400-cow, moderate-sized northeast Texas (Hopkins County) dairy. This farm has 400 acres of silage and 125 acres of hay. During 2011, milk sales represented 87 percent of annual receipts.
TXED1000	A 1,000-cow, large-sized northeast Texas (Hopkins County) dairy. This farm plants 1,025 acres of hay/silage. This farm generated 95 percent of 2011 receipts from milk sales.
WID145	A 145-cow, moderate-sized eastern Wisconsin (Winnebago County) dairy, the farm plants 180 acres of silage, 90 acres for hay, 150 acres of corn, and 130 acres of soybeans. Milk constituted 84 percent of this farm's 2011 receipts.
WID1000	A 1000-cow, large-sized eastern Wisconsin (Winnebago County) dairy, the farm plants 600 acres of hay, 600 acres of silage, 600 acres of corn and 100 acres of soybeans each year. Milk sales comprised 92 percent of the farm's 2011 receipts.

Appendix A. 2011 Characteristics of Panel Farms Producing Milk (continued)

NYWD600 A 600-cow, moderate-sized western New York (Wyoming County) dairy. This farm plants 600 acres of silage, 450 acres of haylage, 100 acres of corn, and 50 acres of hay annually. Milk sales accounted for 91 percent of the gross receipts for this farm in 2011.

NYWD1200 A 1,200-cow, large-sized western New York (Wyoming County) dairy. This farm plants 1,900 acres of silage and 200 acres of corn annually. Milk sales accounted for 93 percent of the gross receipts for this farm in 2011.

NYCD110 A 110-cow, moderate-sized central New York (Cayuga County) dairy, the farm plants 30 acres for hay, 90 acres for corn, and 185 acres for silage annually. Milk accounted for 92 percent of the gross receipts for 2011 on this dairy.

NYCD550 A 550-cow, large-sized central New York (Cayuga County) dairy, this farm plants 625 acres of hay and haylage and 475 acres of silage. Milk sales make up 93 percent of the 2011 total receipts for this dairy.

VTD140 A 140-cow, moderate-sized Vermont (Washington County) dairy. VTD140 plants 60 acres of hay and 160 acres of silage annually. Milk accounted for 91 percent of the 2011 receipts for this farm.

VTD400 A 400-cow, large-sized Vermont (Washington County) dairy. This farm plants 100 acres of hay and 850 acres of silage annually. Milk sales represent 93 percent of VTD400's gross receipts in 2011.

MOGD180 A 180-cow, grazing dairy in southwest Missouri (Dade County), the farm grazes cows on 265 acres of improved pasture. Milk accounted for 91 percent of gross farm receipts for 2011.

MOGD550 A 550-cow, grazing dairy in southwest Missouri (Dade County), the farm grazes cows on 520 acres of improved pasture. Milk accounted for 91 percent of gross farm receipts for 2011.

FLND550 A 550-cow, moderate-sized north Florida (Lafayette County) dairy. The dairy grows 130 acres of hay each year. All other feed requirements are purchased in a pre-mixed ration. Milk sales accounted for 93 percent of the farm receipts.

FLSD1500 A 1,500-cow, large-sized south central Florida (Okeechobee County) dairy, FLSD1500 plants 100 acres of hay and 400 acres of silage annually. Milk sales represent 94 percent of 2011 total receipts.

A policy research report presents the final results of a research project undertaken by AFPC faculty. At least a portion of the contents of this report may have been published previously as an AFPC issue paper or working paper. Since issue and working papers are preliminary reports, the final results contained in a research paper may differ - but, hopefully, in only marginal terms. Research reports are viewed by faculty of AFPC and the Department of Agricultural Economics, Texas A&M University. AFPC welcomes comments and discussions of these results and their implications. Address such comments to the author(s) at:

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Committee on Agriculture
U.S. House of Representatives
Information Required From Nongovernmental Witnesses

House rules require nongovernmental witnesses to provide their resume or biographical sketch prior to testifying. If you do not have a resume or biographical sketch available, please complete this form.

1. Name: Dr. Scott Brown

2. Organization you represent: University of Missouri

3. Please list any occupational, employment, or work-related experience you have which add to your qualification to provide testimony before the Committee: I have been providing quantitative analysis of dairy policy options for U.S. Congress for over two decades.

4. Please list any special training, education, or professional experience you have which add to your qualifications to provide testimony before the Committee: PhD, Agricultural Economics, University of Missouri

5. If you are appearing on behalf of an organization, please list the capacity in which you are representing that organization, including any offices or elected positions you hold: I am representing the University of Missouri as a faculty member in the Division of Applied Social Sciences within the College of Agriculture, Food and Natural Resources. I have a long-term affiliation with the Food and Agricultural Policy Research Institute.

PLEASE ATTACH THIS FORM OR YOUR BIOGRAPHY TO EACH COPY OF TESTIMONY.

Committee on Agriculture
U.S. House of Representatives
Required Witness Disclosure Form

House Rules* require nongovernmental witnesses to disclose the amount and source of Federal grants received since October 1, 2008.

Name: Dr. Scott Brown

Organization you represent (if any): University of Missouri

1. **Please list any federal grants or contracts (including subgrants and subcontracts) you have received since October 1, 2008, as well as the source and the amount of each grant or contract. House Rules do NOT require disclosure of federal payments to individuals, such as Social Security or Medicare benefits, farm program payments, or assistance to agricultural producers:**

Source: Food and Ag. Policy Research Inst. **Amount:** FY08 - $609,764
FY09 - $591,117
FY10 - $590,091

Source: Reg. Implications of Farm Programs **Amount:** FY08 - $236,313
FY09 - $221,884
FY10 - $221,499

2. **If you are appearing on behalf of an organization, please list any federal grants or contracts (including subgrants and subcontracts) the organization has received since October 1, 2008, as well as the source and the amount of each grant or contract:**

Source: _____ **Amount:** _____

Source: _____ **Amount:** _____

Please check here if this form is NOT applicable to you: _____

Signature: _____

* Rule XI, clause 2(g)(4) of the U.S. House of Representatives provides: *Each committee shall, to the greatest extent practicable, require witnesses who appear before it to submit in advance written statements of proposed testimony and to limit their initial presentations to the committee to brief summaries thereof. In the case of a witness appearing in a nongovernmental capacity, a written statement of proposed testimony shall include a curriculum vitae and a disclosure of the amount and source (by agency and program) of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) received during the current fiscal year or either of the two previous fiscal years by the witness or by any entity represented by the witness.*

PLEASE ATTACH DISCLOSURE FORM TO EACH COPY OF TESTIMONY.

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