MPP Decision Guide 15-06

Case Studies with MPP-Dairy Financial Stress-test Calculator: Dealing with Declining Milk Price Basis in Michigan

Chris Wolf and Marin Bozic
Michigan State University and University of Minnesota

A financial stress-test tool has been created to help dairy farm managers in determining how MPP-Dairy might assist in farm financial risk management. This case study illustrates the use of the stress-test tool by a diversified dairy farm in Michigan.

The National Program on Dairy Markets and Policy released Advanced MPP-Dairy Calculator in July 2015 to support risk management decision making by U.S. dairy producers. The advanced tool enables dairy producers to create their own stress-test scenario with low milk prices, high feed costs or a combination of both. The tool evaluates the impact of low IOFC margins on a dairy farm profitability, liquidity and solvency. In this case study we illustrate the use of tool by a dairy in Michigan who is trying to understand the consequence of declining local milk price basis on their risk management strategy.

Case Study: Spartan Acres

Spartan Acres is a diversified dairy and field crop farm in mid-Michigan. Spartan Acres milks 320 cows and farms 1200 acres. They own 500 acres and rent the other 700 acres. The operation generally produces forage needs, most grains, and often have enough crop production to result in significant crop sales.

Herd size has been static at 320 milking cows in recent years and the operation has no current plan to expand. The milking herd is expected to average 24,300 pounds per cow in 2016 resulting in an expected milk sales of 7,776,000 pounds. The highest milk production sold in 2011, 2012, or 2013 occurred in 2013, was 23,100 pounds per cow for a herd actual production history in 2014 of 7,392,000 pounds.

The operation participated in MPP-Dairy in 2015 at $4/cwt coverage level by paying the $100 administrative fee. This participation meant that they realized a growth of 0.87 percent plus the 2.61 percent growth so that the actual production history in 2016 is 7,650,920 pounds. This represents more than 98 percent of their expected milk production and they can cover up to 90 percent of that level under MPP-Dairy.

Considering financial and accounting records from recent years reveals that both milk price and crop revenue—measured in $/cwt of milk sold—were down in 2015 (Table 1). Feed expenses were also slightly lower. Values for 2015 are projection using the first 10 months of the year and expected values for November and December.

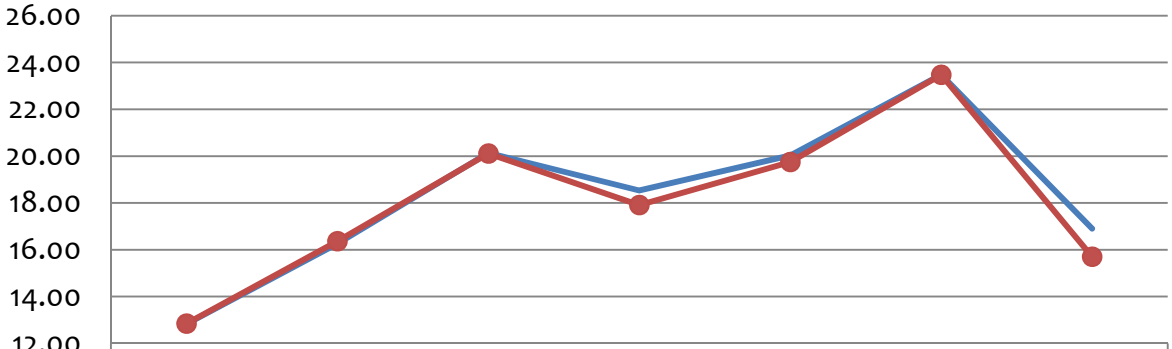
Spartan Acres Milk Prices and Feed Expense Per Hundredweight, 2009-2015

Year	2009	2010	2011	2012	2013	2014	2015
Milk Price	12.84	16.36	20.11	17.91	19.75	23.47	15.70
Crop Revenue	3.67	2.46	4.27	4.27	3.93	1.87	1.42
Feed Expense	8.15	8.14	10.56	11.02	11.43	10.45	9.32

Balance Sheet at Market Values			Spartan Farms 2015		
	Beginning	Ending		Beginning	Ending
	($)			($)	
Current Assets	600,851	426,850	**Current Liabilities**	242,711	322,869
Intermediate Assets	1,446,966	1,465,611	**Intermediate Liabilities**	252,550	245,010
Long Term Assets	2,667,573	2,782,991	**Long Term Liabilities**	835,588	828,346
Total Farm Assets	4,715,390	4,675,452	**Total Farm Liabilities**	1,330,849	1,396,225
			Farm Net Worth	3,384,541	3,279,227
Assets/cow ($)	14,736	14,611	**Debt-to-Asset (%)**	28.2	29.9
			Working capital/cow ($)	1,119	325

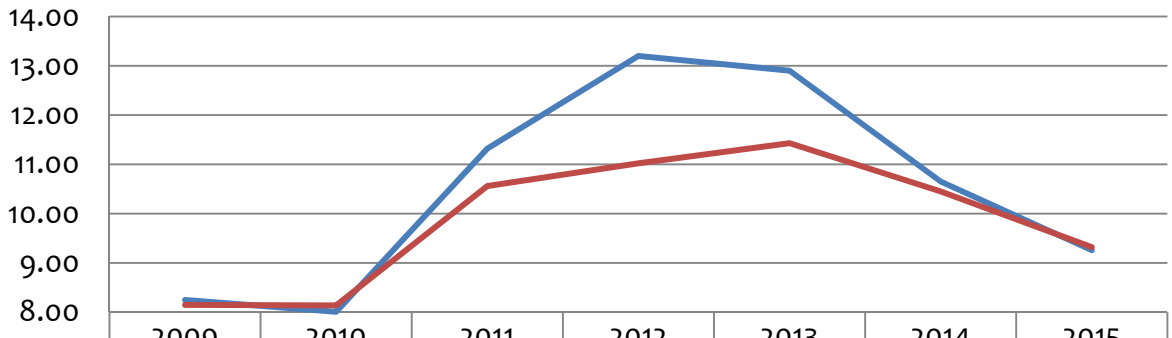
Spartan Acres' Balance Sheet for 2015 is displayed above. The table actually displays two balance sheets—beginning and ending for 2015 where the ending balance sheet is the beginning balance sheet for 2016. Also, notice that the balance sheets are at market values as opposed to cost values. While the difference is not important for liabilities, market values for assets such as land that was purchased years ago can be significantly different than cost basis. The balance sheets reveal an operation with a great deal of assets. Between the cattle and 500 acres valued rather conservatively at $3,300/acre, Spartan acres has a healthy solvency position. Entering 2016, the Debt-to-Asset ratio was about 30 percent meaning that creditors had claims on only 30 percent of the farm asset value. Spartan Acres' liquidity position is a bit more tenuous at end of 2015. Because of a very profitable 2014, the operation entered 2015 with a large amount of prepaid expenses—particularly feed. However, they are leaving 2015 with much less in prepaid expenses resulting in fewer current assets. Further, the corn and soybean enterprises that had been so profitable in 2011-2013 were much closer to break-even in 2015 and appear to be that way for 2016. The result is that the operation starts 2016 with $325/cow in working capital. Working capital is defined as current assets less current liabilities. Spartan Acres managers enter farm financial information into the Stress-Test input screen of the MPP-Dairy advanced tool. Because this is a risk management exercise, the managers aim to be relatively conservative with their estimates. Expenses other than Feed are projected to be $9/cwt for 2016. Between cull cows, steers and heifers and crop sales, the managers are confident in achieving $3/cwt in other revenue in 2016. The "Worst Case" basis required more thought and analysis for 2016. By gathering information on the annual average milk and feed prices for the US that are utilized by MPP-Dairy and the operation's mailbox milk price and feed expenses, Spartan Acres managers can get a more accurate picture of where they should set the worst case basis. The milk prices, feed expenses and margin relationships are displayed on the next page. Historically, the operation would have expected a positive income over feed cost basis based on milk prices that were very similar to the US All Milk price and lower feed expenses. 2015 was different primarily because the mailbox milk price in Michigan eroded relative to the US All Milk price to be $1.20/cwt lower in the case of Spartan Acres. This was not operation specific as the growth in Michigan milk production meant that there were increased expenses in finding processing capacity market-wide. This issue is expected to continue to plague the Michigan market in 2016 and the managers of Spartan Acres decide that their "Worst Case" basis is -$1.50/cwt.

US All Milk and Spartan Mailbox Price Per Hundredweight



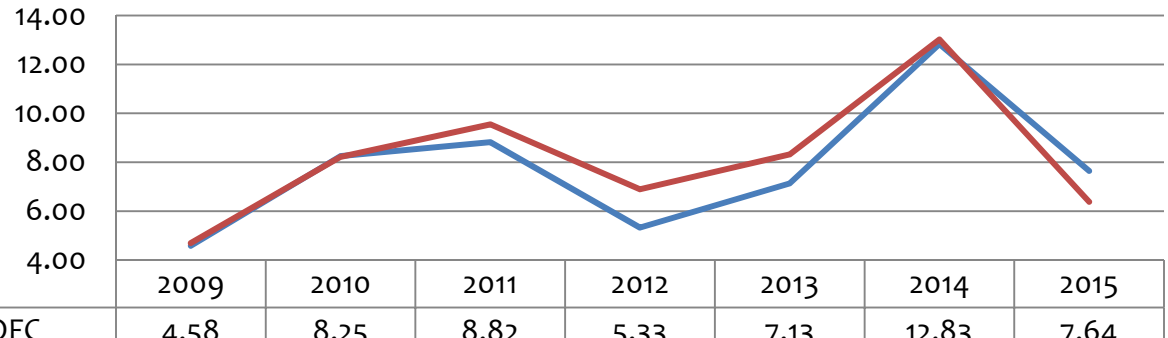
	2009	2010	2011	2012	2013	2014	2015
US All milk	12.83	16.26	20.14	18.53	20.03	23.48	16.90
Spartan mailbox	12.84	16.36	20.11	17.91	19.75	23.47	15.70

MPP-Dairy vs. Spartan Acres Feed Cost Per Hundredweight



	2009	2010	2011	2012	2013	2014	2015
US Feed	8.25	8.01	11.32	13.20	12.90	10.65	9.26
Spartan Feed	8.15	8.14	10.56	11.02	11.43	10.45	9.32

MPP-Dairy vs. Spartan Acres IOFC Margin



	2009	2010	2011	2012	2013	2014	2015
US IOFC	4.58	8.25	8.82	5.33	7.13	12.83	7.64
Spartan IOFC	4.69	8.22	9.55	6.89	8.32	13.02	6.38

Spartan Acres MPP-Dairy Advanced Tool Profile

Production & Prices	
Cows	320
Milk Per Cow (lbs/yr)	24,300
Expenses, Other than Feed ($/cwt)	$9.00
Worst-Case IOFC Basis over MPP ($/cwt)	-$1.50
Other Revenue (beef, crops, etc.) ($/cwt)	$3.00

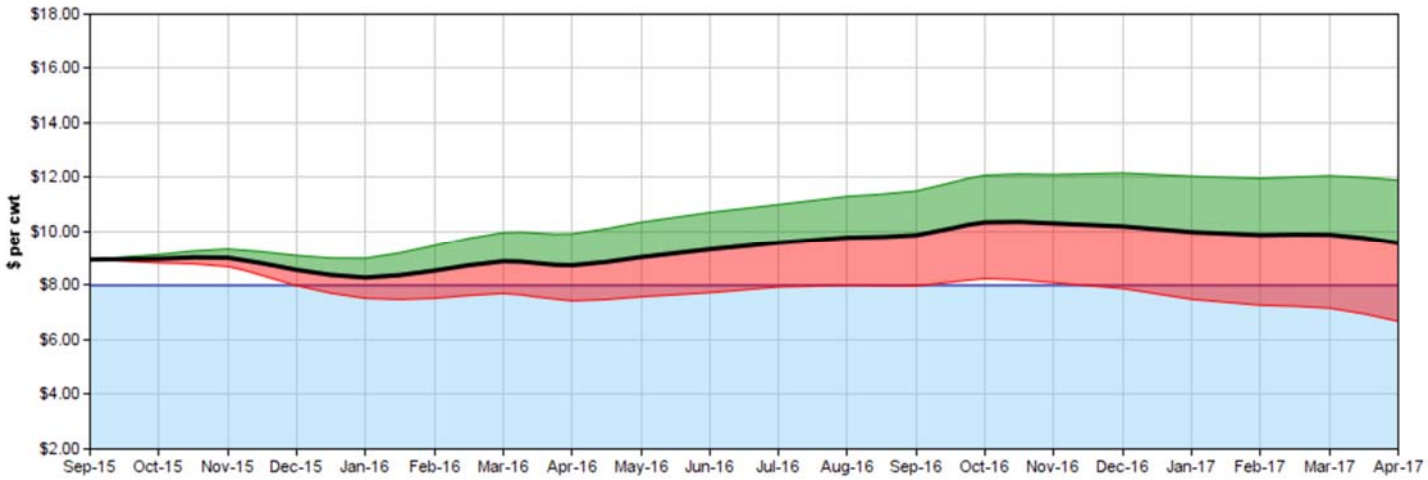
Risk Management	
MPP-Dairy: Production History	7,650,920
MPP-Dairy: Coverage Percentage	90%
CME & Other: % of 2015 Milk and Feed Hedged	0%
CME & Other: Average Hedged IOFC	$1.00

Financials	
Working Capital Per Cow	$325
Assets Per Cow	$14,000
Debt-to-Asset Ratio (At Market Value)	30%
Effect of Crisis on Assets Value	-5%

Scenario: Average MPP-Dairy Margin in 2015	$8.15

Diagnostics	
Expected 2015 Milk Production	7,776,000
Cash-Flow Breakeven MPP-Dairy Margin	$7.50

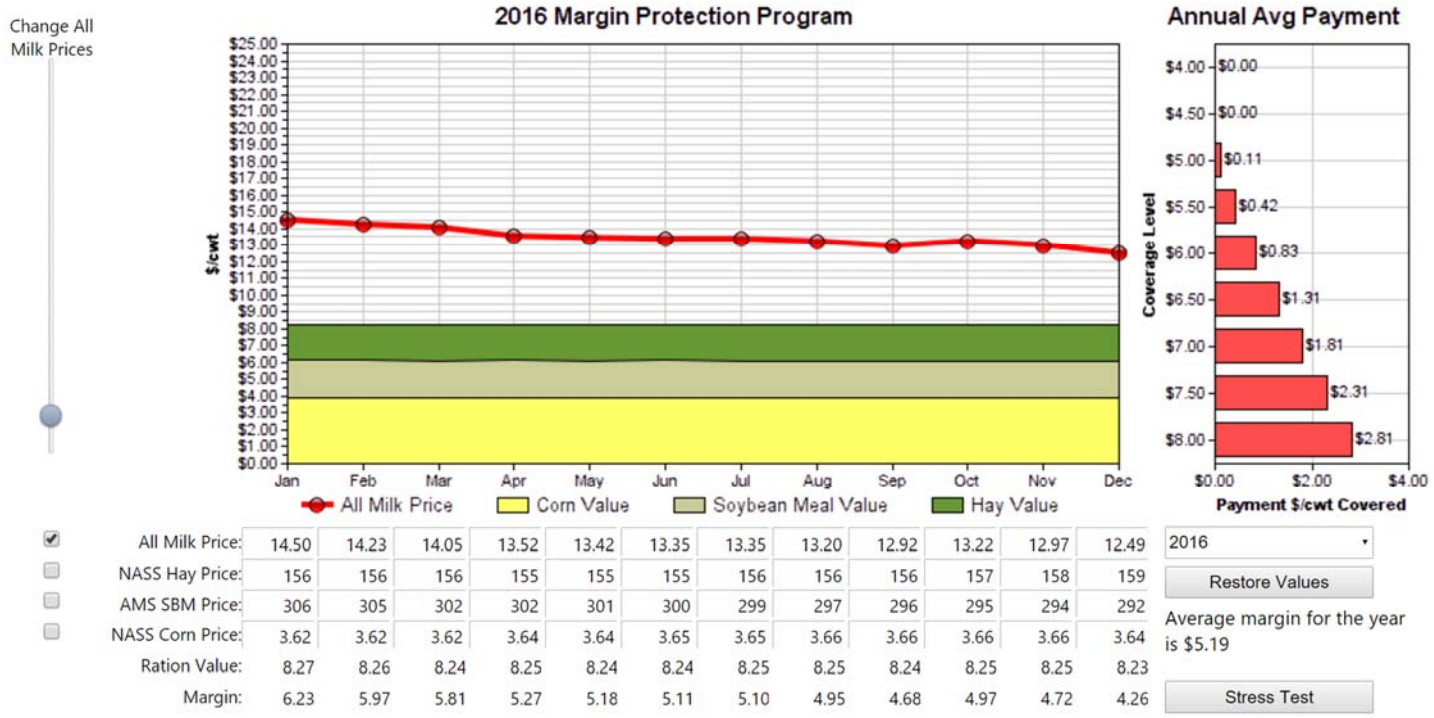
Stress-Test Scenario 1: Expected 2016 MPP-Dairy Margin



Margin Level	Sep-Oct 2015	Nov-Dec 2015	Jan-Feb 2016	Mar-Apr 2016	May-Jun 2016	Jul-Aug 2016	Sep-Oct 2016	Nov-Dec 2016	Jan-Feb 2017	Mar-Apr 2017
Expected	$8.96	$8.79	$8.41	$8.81	$9.18	$9.68	$10.11	$10.25	$9.93	$9.73
< $8.00	-	7%	38%	34%	31%	25%	23%	25%	32%	36%
< $7.50	-	1%	23%	23%	22%	18%	17%	19%	26%	31%
< $7.00	-	-	12%	14%	15%	12%	12%	14%	21%	25%
< $6.50	-	-	5%	8%	9%	7%	8%	10%	16%	21%
< $6.00	-	-	2%	4%	5%	4%	5%	6%	11%	17%
< $5.50	-	-	-	2%	3%	3%	3%	4%	8%	13%
< $5.00	-	-	-	1%	1%	1%	1%	2%	5%	9%
< $4.50	-	-	-	-	1%	-	1%	1%	3%	6%
< $4.00	-	-	-	-	-	-	-	-	2%	4%

To start analyzing this decision, Spartan Acres managers went to www.dairymarkets.org/MPP to look at the forecasted margins for 2016. The operation was analyzing MPP-Dairy expected margins on November 4, 2015. At that time, milk and feed futures and options markets expected the Actual Dairy Production Margin to average $9.22/cwt which is above the break-even margin of $7.50/cwt for Spartan Acres. This scenario would allow Spartan Acres to rebuild liquidity in the form of working capital per cow. At the time of sign-up in November 2015, US All Milk prices for 2016 were projected to range from about $16.50 early in the year to more than $18/cwt at the peak in autumn months. However, given the large domestic stock of milk powders, the surplus of dairy products in Europe and New Zealand, the strong US dollar, and discount that world dairy products were priced at relative to domestic prices, Spartan Acres' managers felt that there was a higher likelihood of lower milk prices in 2016 than the market currently forecasted. They used MPP-Dairy Advanced Tool to stress-test their dairy's ability to deal with unexpected market shocks.

Stress-Test Scenario 2: 2016 MPP-Dairy Margins Unexpectedly Decline to $5.19/cwt



Spartan Acres managers examine a lower milk price scenario resulting in an APDM of $5.19/cwt for 2016. While the solvency position is not a risk from a year with this level of losses, these figures make it clear that in a poor margin situation, the profitability and liquidity position of Spartan Acres would suffer. MPP-Dairy could assist in off-setting these losses but would require purchasing at least at the $6.50/cwt coverage level. To protect 90% of their milk production history given the two-tiered premium structure will cost Spartan Acres $0.16/cwt for 2016. Ultimately, the farm managers decide it is worth that price to put a floor on profits and help ensure positive liquidity levels.

	MPP-Dairy		Profitability	Liquidity	Solvency
	Premium Costs		Net Income	Working Capital/Cow	Debt/Asset Ratio
	Total $	$/cwt	$/cwt	$/cow	%
No MPP			-$2.31	-$236	32.5%
$4.00	$100	$0.00	-$2.31	-$236	32.5%
$4.50	$1,077	$0.01	-$2.32	-$238	32.5%
$5.00	$2,254	$0.03	-$2.24	-$219	32.5%
$5.50	$4,586	$0.06	-$2.00	-$161	32.3%
$6.00	$6,773	$0.09	-$1.67	-$80	32.1%
$6.50	$12,069	$0.16	-$1.31	$7	31.9%
$7.00	$32,732	$0.42	-$1.12	$52	31.8%
$7.50	$42,689	$0.55	-$0.81	$128	31.6%
$8.00	$58,347	$0.75	-$0.57	$187	31.5%

Conclusions

Due to strong milk production growth that was not matched by the increase in the processing capacity, Michigan dairy farms have seen substantial milk price basis decline in 2015 relative to US All-Milk price used by USDA to determine MPP-Dairy margins. While that is one of the considerations when making the risk management decision for 2016, it is not by any means the only item of relevance. To make a well informed decision regarding the MPP-Dairy coverage level, producers should start by identifying their cash-flow break-even MPP-Dairy margin. That margin level is equal to the sum of non-feed expenses and IOFC margin basis less revenue from beef, crops, and other sources other than milk check. Once the break-even MPP-Dairy margin is identified, farmers can establish their loss tolerance by looking at the implications of unexpected margin shocks on their profitability, working capital and solvency.

The DMaP Team includes Marin Bozic, University of Minnesota, Brian Gould, University of Wisconsin, Charles Nicholson, The Pennsylvania State University, Andrew Novakovic, Cornell University, Mark Stephenson, University of Wisconsin, Cameron Thraen, The Ohio State University, and Christopher Wolf, Michigan State University. With respect to any opinions, findings, conclusions, or recommendations, neither the United States Government, the University of Illinois, nor the National Program on Dairy Markets and Policy makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Users bear the sole responsibility for decisions affecting program participation and may want to consult other resources. The National Program on Dairy Markets and Policy is working with the University of Illinois led consortium National Coalition for Producer Education, which is supported by the U.S. Department of Agriculture, Farm Service Agency, under Agreement No. 58-0210-4-002 N. This material is based upon work supported by USDA/NIFA under Award Number 2012-49200-20032.