MPP Decision Guide 16-02

How Accurate are MPP-Dairy Margin Forecasts and What are The Implications of Forecast Inaccuracy?

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How accurate are futures markets forecasts of the MPP-Dairy margin and what are the implications of an inaccurate forecast for MPP-Dairy program outcomes?

The MPP-Dairy program can be used for alternative objectives, and the MPP-Decision Tool available at http://dairymarkets.org/MPP/Tool/ can provide insights about appropriate decision strategies. If a farm intends to use MPP-Dairy primarily as risk management, the "Advanced" mode of the decision tool can be used to "stress test" a farm to determine what single strategy is appropriate to mitigate the risks of insolvency. When used for that objective, forecasts of margins are not particularly important, because expectations of future margin values shouldn't affect decisions. However, MPP-Dairy can also be used with the objective of trying to maximize net revenues from the program. [DG 16-01 discusses what the year-by-year revenue-maximizing strategies would have been during 2007-2016.] For use as a revenue-maximizing strategy, expectations of future margins are important determinants of the coverage levels chosen by a farm. Thus, it is relevant to consider the accuracy of forecasts of margin based on futures markets, which are used by the MPP-Dairy Decision Tool.

Forecast accuracy is often assessed using statistical measures. The ***Mean Forecast Error (MFE)*** is the average amount that a number of forecasts were above or below the actual value. The ***Mean Absolute Percentage Error (MAPE)*** is uses the absolute value[1] of a forecast error compared as a percentage of the actual value. We calculated these two measures for the margin values predicted by futures markets as of September 30 in each of the years 2008-2016 (through May), averaging the monthly values from September of the year in which a decision would be made through December of the year when coverage would have applied. Thus, we are considering the average accuracy of forecasts over a 15-month time horizon.

The annual average MFE for futures markets forecasts of MPP-Dairy margin varied from negative $3.00/cwt in 2014 (futures markets predicted much lower margin values than actually occurred) to more than $2.00/cwt in 2009 and 2015 (futures markets predicted much higher margins than actually occurred). In all years except for 2010 and 2013, the MFE was larger than about $1.00/cwt. The MAPE values also varied (from less than 10% in 2010 to more than 60% in 2009). The average value for MAPE is about 25%, which would be considered a reasonable value of forecast accuracy by forecasters in many industries. It is not unusual to have forecast errors of this magnitude in predicting prices 15-months in advance. However, forecasts for individual months (not shown) are less accurate.

It is also relevant to consider the degree to which inaccurate futures market forecasts would have suggested decision other than the revenue-maximizing one. We determined the revenue-maximizing strategy for each year for a 180-cow dairy with a 21,000-lb herd average (production history of 3.8 million lbs, under the 4 million-lb cap for the lower-tier payments under MPP-Dairy). In 6 of the 9 years from 2008 to 2016, the decision tool correctly predicted the strategy that maximized net revenues (Table 1). For 2010 and 2011 (prior to program implementation) the tool suggested buying coverage to $8/cwt on 90% of milk when the best strategy would have been catastrophic coverage. This would have reduced payments net of premiums by $0.28/cwt and $0.41/cwt in those two years. For 2016, $8.00/cwt coverage would have been best, but the impact of forecast inaccuracy on the return from the program is less than $0.01/cwt. ***Thus, forecast accuracy can affect MPP-Dairy decisions and outcomes when the program is used to maximize revenues.***

1 *The use of the absolute value means that the MAPE considers how far away from the actual value a forecast was, regardless of whether it was too high or too low.*

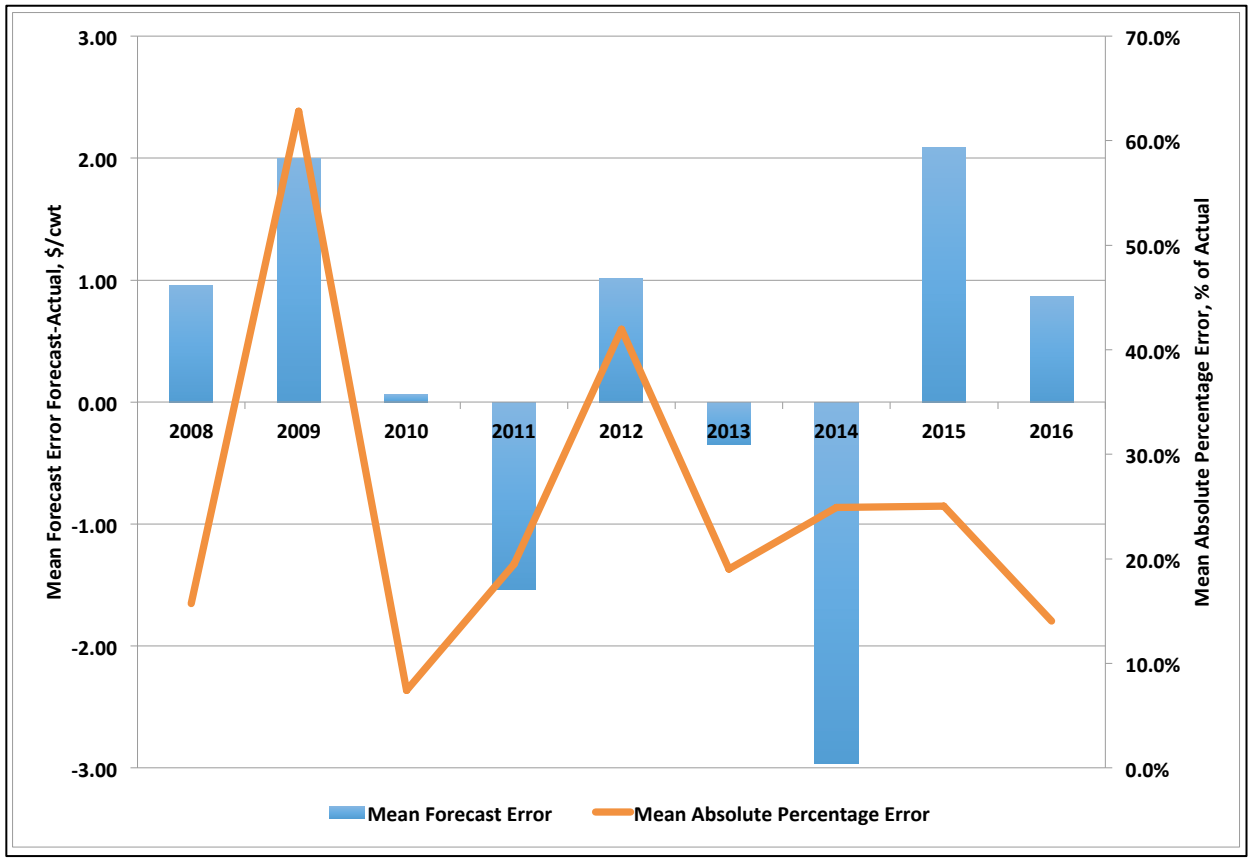

Figure 1. Statistical Forecast Accuracy Measures for Futures-Market Based Forecasts, Annual Averages 2008-2016 through May

Table 1. Comparison of Revenue-Maximizing Strategies Suggested by the MPP-Dairy Decision Tool and Actual Strategies

Year	Forecast Tool Expected Revenue Maximizing Strategy	Revenue-Maximizing Strategy	Forecast Correctly Predicted Revenue Maximizing Strategy?	Impact of Model-Predicted Revenue Maximizing Strategy Relative to Actual Revenue-Maximizing Strategy, $/cwt
2008	4.00/90	4.00/90	YES	--
2009	8.00/90	8.00/90	YES	--
2010	8.00/90	4.00/90	NO	-0.28
2011	8.00/90	4.00/90	NO	-0.41
2012	8.00/90	8.00/90	YES	--
2013	8.00/90	8.00/90	YES	--
2014	4.00/90	4.00/90	YES	--
2015	4.00/90	4.00/90	YES	--
2016[a]	4.00/90	8.00/90	NO	-0.003

[a]*Based on projected margins from June to December.*

The MPP-Dairy Decision Tool correctly predicted revenue-maximizing strategies in 6 of 9 years during 2008-2016, and the impact of a forecast error in 2016 was small.

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