

Hedging Milk with BFP Futures and Options

Curriculum Guide

I. Goals and Objectives

- A. Gain an understanding of milk price seasonality.
- B. Learn about basis and how to track it over time.
- C. Learn how to hedge future milk sales with BFP futures and options contracts.

II. Descriptions/Highlights

- A. Milk prices fluctuate throughout the year due to seasonal demand patterns, as well as weather and management related supply fluctuations. Over longer time periods a broader mix of economic factors drive changes in milk supplies and milk demand, resulting in milk price movements. Review Figure 1.
- B. Review some of the basic terms related to futures and options. A futures contract is a contract traded on a futures exchange for the delivery of a specified commodity at a future point in time. The contract specifies acceptable delivery methods and locations, and clearly defines the standards of the commodity such as weight, quantity, quality, and form. Depending on the exchange used, BFP futures contracts are available for delivery of 50,000, 100,000, or 200,000 lbs. of milk. If a BFP contract is held open until maturity, it is settled by the cash difference between the contract price, and the actual index of basic formula price milk at the time of contract expiration.
- C. A hedger is someone *taking a position* in the futures market that is equal and opposite to the position he either has or expects to take in the cash market, thus providing protection against adverse price movements.
- D. The milk producer considering hedging must decide: 1) do I lock in my milk selling price? If so, for what month? 2) do I lock in prices of feed ingredients? If so, what commodity prices do I lock in and for what month do I lock in these prices? and 3) if I decide to lock in these prices, at what levels do I lock them in?
- E. Basis is the difference between the local cash price and the futures price at the time the milk is sold or the feed grain purchased. Basis accounts for transportation costs, quality differences, and local market conditions. Review Table 1 - the historical basis for the Federal Order 126 Uniform Blend milk price at Dallas compared to the BFP. Since the BFP is cash settled, the basis is the local Uniform Blend price minus the BFP.
- F. Three important aspects about calculating the basis must be kept in mind: 1) several years of historical price data should be used to calculate the basis 2) basis data used should correspond to the time the hedge is lifted or completed, and 3) basis can be seasonal and cyclical.

- G. The term “cash settlement” means that at expiration of the contract, the difference between the futures contract price and the actual price on the expiration date can be settled by a cash transaction rather than actual delivery of the product. The BFP contract is cash settled so that milk does not have to be delivered to settle the contract terms
- H. When a producer opens an account and begins trading, he or she is required to put a certain percent of the value of the contract into a margin account to guarantee financial security on the part of the contract holder. If the futures market moves against the producer, additional margin money will be required. If a profit accrues (the futures market moves in favor of the producer), money may be withdrawn from the margin account. When the futures position is liquidated, the margin account is used to settle the account.
- I. **Hedging Example** - Outline the assumptions used in the hedging example:
- The dairyman wants assurance that milk revenue will cover expected cash costs during the month of December.
 - December BFP is forecasted to be \$11.04.
 - Considering the average basis of +\$1.96, cash price would be \$13.00.
 - December BFP futures contract closed today at \$12.54 (it is now July).
 - The breakeven price to cover cash costs is \$13.89.
 - An at-the-money (\$12.50 strike price) put option costs \$.35/cwt.

Review the outcomes associated with:

Example 1 - Short hedge with decreasing prices

Sells futures at \$12.54. The futures price falls to \$11.04 resulting in a gain of \$1.50. The net price received is \$14.50 (\$1.50 futures gain + \$11.04 cash BFP price + \$1.96 basis)

Example 2 - Short hedge with rising prices

Sells futures at \$12.54. The futures rises to \$13.00 resulting in a loss of \$0.46. The BFP has risen to \$13.00 also. Net price received is \$14.50 (- \$0.46 + \$13.00 cash BFP + \$1.96 basis).

Example 3 - Purchase a put option with decreasing prices

Purchases an at-the-money put option, \$12.50 strike price, for \$.35. The futures price falls to \$11.04. He executes the option (sells futures at the strike) and buys back futures at \$11.04. This results in a net price received of \$14.11 (\$1.46 futures gain - \$.35 premium + \$11.04 cash BFP + \$1.96 basis). The same results could have been achieved by selling the option rather than executing it.

Example 4 - Purchase a put option with rising prices

Purchases an at-the-money put option, \$12.50 strike price, for \$.35. The futures price and cash BFP price rise to \$13.00. Since the futures price is above the strike price, he lets the option expire having no value. This results in a net price received of \$14.61 (-\$.35 premium lost + \$13.00 cash BFP + \$1.96 basis).

III. Potential Speakers

- A. Extension Economists
- B. Marketing Adviser
- C. Commodity Broker

IV. Review Questions

- A. If a BFP contract is held open until maturity, how is it settled?

Answer: The contract is settled by the cash difference between the contract price, and the actual index of basic formula price milk at the time of contract expiration.

- B. How many pounds of milk are specified in a BFP futures contract?

Answer: BFP futures contracts are available in three different quantities - 50,000, 100,000 and 200,000 pounds - depending the futures exchange, Coffee, Sugar and Cocoa Exchange, or the Chicago Mercantile Exchange.

- C. When a BFP put option is purchased (to protect from downside price risk), and the BFP futures price is higher than your strike price on the day you lift the hedge, what action is usually taken?

Answer: In this case, the option holder (hedger) allows the option to expire, having no value since the BFP futures price is higher than the strike price. The milk is sold and the net price received is reduced by the amount of the option premium, which is a loss in this case.

V. For More Details

James Mintert, Mark Waller and Rob Borchardt. Introduction to Futures Markets, RM2-1.0. Risk Management Curriculum Guide. Texas Agricultural Extension Service. December, 1998.

Craig Fincham, James Mintert, Mark Waller and William Tierney. Introduction to Options, RM2-2.0. Risk Management Curriculum Guide. Texas Agricultural Extension Service. September, 1998.

Carl Anderson, Jackie Smith, Kevin Dhuyvetter, and Mark Waller. Hedging With a Put Option, RM2-12.0. Risk Management Curriculum Guide. Texas Agricultural Extension Service. June, 1998.

James D. Sartwelle, III, Edward Smith, Terry Kastens, and Daniel O'Brien. Selling Hedge with Futures, RM2-14.0. Risk Management Curriculum Guide. Texas Agricultural Extension Service. April, 1998.

James D. Sartwelle, III, Edward Smith, Terry Kastens, and Daniel O'Brien. Buying Hedge with Futures, RM2-15.0. Risk Management Curriculum Guide. Texas Agricultural Extension Service. April, 1998.

Jason Johnson, Jackie Smith, Kevin Dhuyvetter, and Mark Waller. Factors Affecting Option Premium Values, RM2-29.0. Risk Management Curriculum Guide. Texas Agricultural Extension Service. September, 1998.

Options on Agriculture Futures. Chicago Board of Trade, Publication Department, 141 W. Jackson Blvd., Suite 2210, Chicago, IL 60604-2994. Phone 312-435-3558.

Hedging Milk with BFP Futures and Options



! Milk Price Volatility

- ☞ 1996 Farm Bill
- ☞ Federal Order reforms
- ☞ Price volatility has increased

! Seasonality of Milk Prices

- ☞ Seasonal Demand Patterns
- ☞ Weather
- ☞ Supply
- ☞ Low in late spring and early summer
- ☞ Then rising to high in late fall
- ☞ This pattern follows the spring flush and the increased demand for milk and dairy products during the school year and end of year holiday season

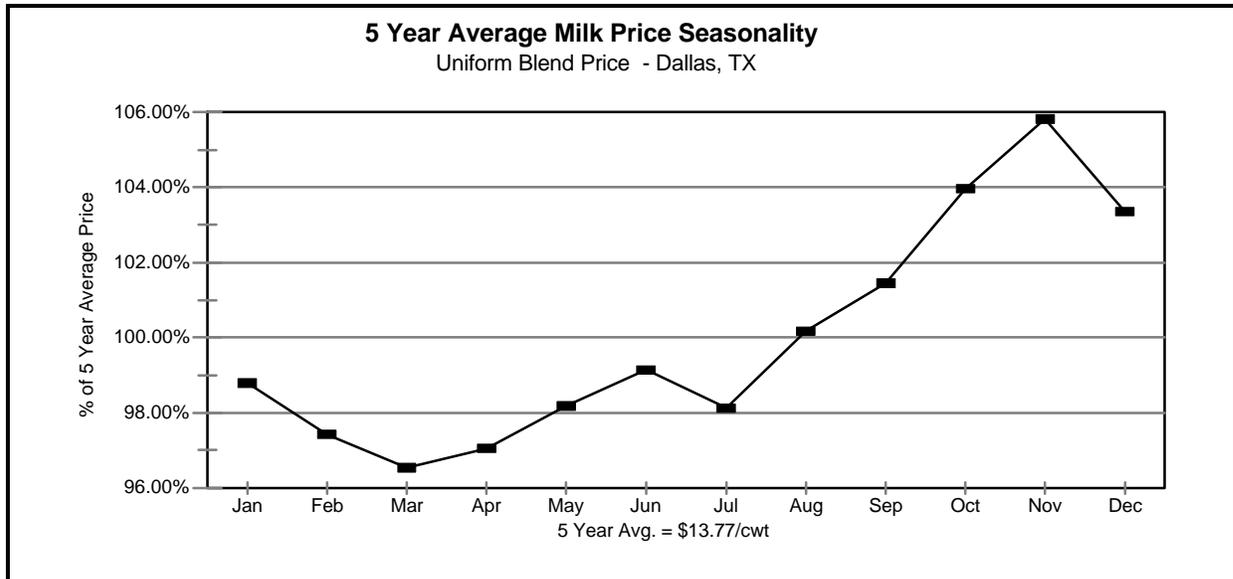
! The Futures Market

! Using BFP Futures to Hedge

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Figure 1



! Milk Basis

- ☞ Basis is the difference between the local cash price and the futures price.
- ☞ Basis accounts for transportation costs, quality differences, and local market conditions.
- ☞ Since the BFP is cash settled, the basis is the local Uniform Blend price minus the BFP.
- ☞ Several years of historical price data should be used to calculate the basis.
- ☞ Basis data used should correspond to the time the hedge is lifted or completed.
- ☞ Basis can be seasonal and cyclical.

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**Table 1: Federal Order 126 Uniform Blend minus
BFP Basis at Dallas, 1992-1997**

	1992	1993	1994	1995	1996	1997	Avg. ‘92-‘97
Jan.	\$2.27	\$2.25	\$1.60	\$1.68	\$1.59	\$1.56	\$1.83
Feb.	2.28	2.03	1.39	1.13	1.56	0.96	1.56
Mar.	1.95	1.45	0.87	1.04	1.05	1.17	1.26
Apr.	1.44	0.60	0.69	1.54	0.97	2.17	1.23
May	1.07	0.75	2.08	1.85	0.66	2.62	1.51
June	1.31	1.91	2.42	1.29	1.11	2.15	1.70
July	1.51	2.42	1.19	1.36	1.29	1.87	1.61
Aug.	1.87	2.26	1.42	1.67	1.18	0.96	1.56
Sept.	2.32	1.37	1.43	1.18	1.28	0.39	1.33
Oct.	2.22	1.01	1.18	1.01	2.66	1.38	1.58
Nov.	2.01	1.35	1.74	1.20	4.76	1.74	2.13
Dec.	2.06	1.36	2.02	1.27	3.55	1.51	1.96



! Margin Account Requirements

- ☞ Trading futures contracts requires that a margin account be established.
- ☞ Does not apply to buying options.
- ☞ Does apply to selling options.
- ☞ Margin accounts ensure financial obligation of contract holder.
- ☞ Adverse move in prices require additional margin money.
- ☞ Advantageous price move allows contract holder to withdraw margin money.
- ☞ Upon contract liquidation, margin money is used to settle account.



! Example Hedge Using BFP Futures and Options

☞ Assumptions

- ✓ A dairy producer wants assurance that milk revenue will cover expected cash costs during the month of December.
- ✓ December BFP is forecasted to be \$11.04.
- ✓ Considering the average basis of +\$1.96, cash price would be \$13.00.
- ✓ December BFP futures contract closed today at \$12.54 (it is now July).
- ✓ The breakeven price to cover cash cost is \$13.89.
- ✓ An at-the-money (\$12.50 strike price) put option costs \$.35/cwt.

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Table 2 - Hedging with the BFP Futures and Options Contracts

Assumptions	Per cwt.
Producer's Total Cash Costs	\$13.89
Projected December BFP	\$11.04
Average December Basis	\$1.96
Projected Uniform Blend cash price	\$13.00
December BFP Contract on July 1	\$12.54
December put option strike price on July 1	\$12.50
Cost of December put option July 1	\$0.35

Hedging with the BFP Futures Contract

	Example 1	Example 2
BFP Futures Contract Sold (July 1)	\$12.54	\$12.54
Cash Settled BFP Futures Price (January 5)	\$11.04	\$13.00
Net on Hedge	\$1.50	-\$.46
December BFP cash	\$11.04	\$13.00
	\$12.54	\$12.54
Basis	+\$1.96	+\$1.96
Net Price Received (1)	\$14.50/cwt.	\$14.50
Returns over cash costs w/hedge (1) (14.50-13.89)	\$0.61/cwt.	\$0.61
Returns over cash costs without hedge	-\$0.89/cwt.	\$1.07

Hedging with BFP Put Option

	Example 3	Example 4
Strike price (July 1)	\$12.50	\$12.50
Premium (July 1)	\$0.35	\$0.35
Cash Settled BFP Futures Price (January 5)	\$11.04	\$13.00
Net on Hedge	\$1.11	-\$.35
December BFP cash	\$11.04	\$13.00
	\$12.15	\$12.65
Basis	+\$1.96	+\$1.96
Net Price Received (1)	\$14.11/cwt.	\$14.61
Returns over cash costs w/hedge (1)	\$0.22/cwt.	\$0.72
Returns over cash costs without hedge	-\$0.89/cwt.	\$1.07

(1) Excludes commissions costs