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The Basic Formula Price Futures Contract: A New Dairy Industry risk Management Tool

By

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The Basic Formula Price Futures Contract: A New Dairy Industry Risk Management Tool

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On April 8, 1997, the Coffee, Sugar & Cocoa Exchange began trading a new futures contract for the Basic Formula Price (BFP). The contract is unusual in several respects:

- It is a cash settlement contract. A physical commodity is not "delivered." Rather, contracts outstanding at expiration are settled by payments and receipts representing the difference between the contract price and the reported BFP value.

- The contract does not represent an actual commodity. The BFP is a reference price for raw milk, not a price actually experienced in a cash marketplace.

- The BFP is not a constantly evolving price. It is announced after the fact once a month and becomes the basis for paying for milk already delivered.

- The BFP is used in establishing minimum milk prices throughout the country. Most futures commodity prices are specific to a particular location, and cash prices in other locations differ by varying amounts depending on local market conditions. In contrast, the BFP expressly sets minimum prices in all federal milk marketing order markets, regardless of location.

This unique new contract offers excellent hedging opportunities for buyers and sellers of raw milk. Since federal milk marketing order pricing formulas directly incorporate the BFP, cash market participants can accurately relate their prices to the BFP contract price. Minimal basis risk should encourage broad hedging interest in the new contract.

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In what follows, we describe in more detail what the BFP measures, how it is calculated, and how it is used in milk pricing. Then, we discuss the characteristics of the new BFP contract, comparing it to the CSCE Grade A milk contract. Finally, we illustrate several hedging examples using the BFP contract.

HOW THE BFP IS CALCULATED AND USED

The BFP measures the value of Grade B milk marketed to plants in Minnesota and Wisconsin. Grade B milk is produced under less stringent farm-level sanitary requirements than applicable to Grade A milk.[2] Grade B milk can only be used to produce specified manufactured products; it cannot be used for packaged fluid milk products. In 1995, only 5 percent of U.S. milk was Grade B, and 37 percent of that total was produced in the states of Minnesota and Wisconsin.

Grade B milk trades in an unregulated marketplace. Consequently, Grade B milk prices are viewed in the dairy industry as representing the market value of milk for manufacturing uses.

The BFP is a synthetic price reported monthly by the National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture. It is composed of two parts: The Base Month Minnesota-Wisconsin (M-W) Price, representing a survey estimate of Grade B pay prices for the previous month, plus a price adjuster based on changes in manufactured product prices between the previous month and the current month.

The Base Month M-W Price is estimated from a survey of approximately 170 manufacturing milk plants located in Minnesota and Wisconsin. These plants procure about 80 percent of all Grade B milk marketed in the two states. The Base Month M-W Price is reported by NASS by the fifth of the month two months after the month to which it applies. For example, the Base Month M-W Price for December 1996 was reported on February 5, 1997, and became part of the January 1997 BFP.

The price adjuster is used to update the Base Month M-W Price to the current month. The adjustment formula is complex. Essentially, it calculates the monthly change in gross value per hundredweight of milk used to produce butter, nonfat dry milk, and cheddar cheese weighted by the proportion of milk in the two states used to produce these products. Cheese typically represents more than 95 percent of the weight in the update formula.

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[2]The designations, Grade A and Grade B, stem from harmonized municipal standards, enforced by inspection, pertaining to characteristics of milk production facilities. In addition, Grade A milk has higher minimum milk quality standards.

The BFP, reported on or before the fifth of the following month[3], is the sum of the Base Month M-W Price and the change in gross value adjuster. In effect, it measures what Grade B plants *actually paid* one month earlier adjusted for their *ability to pay* based on changes in product prices between the previous and current months.

An illustration of the BFP calculation may be useful. The December 1996 BFP was reported at $11.34 per hundredweight. This was the November 1996 base month M-W price of $12.19 per hundredweight plus the change in product value during December of *minus* $0.85 per hundredweight. The change in product value was calculated by weighting the changes in butter/nonfat dry milk gross value per hundredweight (minus $0.5708) and cheese gross value per hundredweight (minus $0.8570) by the relative proportions of Minnesota and Wisconsin milk used for butter/nonfat dry milk (0.8 percent) and cheese (99.2 percent) in Minnesota and Wisconsin in October 1996.

While the BFP represents a general indicator of the value of milk used in manufacturing, its importance is magnified because of its use in Federal Milk Marketing Orders as a price base. Federal orders establish minimum prices for Grade A milk in 32 designated marketing areas of the U.S.[4] About 75 percent of Grade A milk and 70 percent of all milk produced in the U.S. is subject to federal order regulation. The primary unregulated area is the state of California, which maintains its own system for setting minimum milk prices.

Federal orders establish three milk use classes with different minimum prices. Class I, which commands the highest value, refers to milk used for packaged fluid milk products. Class II is milk used to make perishable, or "soft" manufactured products like yogurt, cottage cheese, and ice cream. Class III milk is used for semi-perishable, "hard" manufactured products, primarily butter, nonfat dry milk, and hard cheeses.[5]

Minimum class prices, announced monthly, are tied directly to the Basic Formula Price. The current month Class III price is the BFP for the current month, and is the same in all orders. The Class II price, also common across orders, is the BFP from two months' earlier plus 30 cents per hundredweight. Class I prices are set by adding a Class I differential to the BFP from two months' earlier. Class I differentials are different across orders, but are the same from month-to-month within orders.

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[3]The BFP is announced on the fifth of the month if the fifth falls on a normal business day. Otherwise, it is announced on the last business day preceding the fifth. For example, the December 1996 BFP was announced on Friday, January 3, 1997, since January 5 fell on a Sunday.

[4]The 1996 Federal Agricultural Improvement and Reform Act (Farm Bill) mandates consolidation of orders to no more than 14 and no less than 10 by early 1999.

[5]Class IIIa, a subcategory of Class III, represents milk used to produce nonfat dry milk. Class IIIa prices are set using a formula based on nonfat dry milk prices and yields; they are NOT tied to the BFP.

The direct link between federal order class prices and the BFP means that *minimum* processor pay prices are known with certainty when the BFP is announced. *Actual* pay prices are negotiated and are generally higher than the announced minimum prices. In particular, most Class I milk is sold by dairy cooperatives to proprietary fluid milk processors. Cooperatives typically negotiate a premium over the federal order minimum price. But since over-order premiums tend to be fairly constant over time, Class I prices are correspondingly predictable once the BFP is announced. Similarly, the amounts by which actual Class II and Class III prices differ from order-mandated minimum prices do not vary much from month-to-month. Buyers can accurately link their milk cost to the BFP.

Federal orders also specify minimum producer pay prices, or blend prices. These are weighted average values based on the proportion of producer milk used in the various classes. Actual producer pay prices differ significantly from the order blend prices for several reasons. The announced blend price is for "standardized" milk composition at a specific location; differences in milk composition and location among producers lead to different minimum prices. Many plants have extra-order payment schedules for milk quality, volume, or other milk characteristics. Hence, actual pay prices will deviate from minimum blend prices. Dairy cooperatives are exempt from paying minimum order pay prices, and sometimes "reblend" total receipts across markets and uses, resulting in further variations in producer pay prices from order blend prices.

Despite these differences between actual and announced minimum blend prices, factors underlying the differences are predictable. For example, dairy farmers know their milk composition and their buyer's premium schedules, and they can use historical data to accurately predict milk utilization in their federal order market. Hence, they can reliably link their expected pay price to the BFP.

Table 1 illustrates the close relationship of various milk price measures with the BFP over the period 1984-1995. The four comparison monthly series (all adjusted to 3.5 percent butterfat content) are:

(1) Wisconsin Grade A manufacturing price. This is an estimate of the fob plant cost of Grade A milk used for manufacturing purposes in Wisconsin. It is reported by the Upper Midwest Federal Milk Marketing Order Administrator's office and is derived by adjusting actual pay prices for revenues associated with federal order Class I and Class II sales.

(2) Wisconsin Grade A price. This is a USDA estimate of the state-wide average fob plant pay price for Grade A milk in Wisconsin.

(3) California Class 4b. This is the minimum price for Grade A milk used for making cheese announced under the California milk pricing program.

(4) 10 X Block Cheese. This series is derived by multiplying the monthly average block cheddar cheese price from the National Cheese Exchange by 10.0. It approximates the gross value of cheese from 100 pounds of milk at 3.5 percent butterfat test.

Table 1 indicates that, compared to the actual prices, the variation in basis (difference between the price and the BFP) is only 1/4 to 1/3 as large. In other words, while the prices that plants pay and farmers receive for milk are different from the BFP, the pay prices move very closely with the BFP, i.e., the price differences are quite predictable. This has important implications for hedging.

Basis is even more predictable than indicated by the raw price differences. While the BFP is adjusted to a standard butterfat test (3.5 percent), it is not adjusted to a common protein test. Protein content, which positively affects cheese yields, varies seasonally. When protein tests are relatively high, cheesemakers can achieve higher yields per hundredweight of milk, meaning that the BFP at 3.5 percent butterfat will be relatively high compared to when protein tests are lower. Factoring in the predictable nature of milk protein content can reduce basis risk.

The price series with the largest variance relative to the BFP is the California 4b price. This price is not directly linked to the BFP. Rather, it is related through a formula to the National Cheese Exchange price "opinion" for block cheddar cheese. Nevertheless, variation in the 4b price basis is substantially less than the actual price variation.

Table 1: Milk Prices and Price Differences Relative to BFP, 1984-95

Price Measure	Mean	Standard Deviation	Coef. of Variation	Min.	Max.
Actual Prices, Dollars per Hundredweight					
M-W/BFP*	11.70	.87	.07	10.02	14.93
Wis. Grade A Mfg.	12.38	1.00	.08	10.58	15.97
Wis. Grade A - All	12.57	.96	.08	10.77	15.99
California 4b	10.95	.85	.08	9.29	13.30
10 X NCE Block Cheese	12.76	.94	.07	10.87	15.45

Price Measure	Mean	Standard Deviation	Coef. of Variation	Min.	Max.
Actual Prices Minus BFP, Dollars per Hundredweight					
Wis. Grade A Mfg.	.67	.22	.32	.31	1.16
Wis. Grade A - All	.87	.23	.26	.46	1.48
California 4b	-.76	.36	.48	-2.06	-.05
10 X NCE Block Cheese	1.05	.30	.29	.41	1.96

*Basic Formula Price (BFP) beginning May 1995.

CHARACTERISTICS OF THE NEW BFP FUTURES CONTRACT

The new Coffee, Sugar & Cocoa Exchange BFP futures contract calls for cash settlement of a value equal to 1,000 times the announced BFP. The trading unit is not a physical volume of a commodity. Rather, the holders of long and short positions at the date of "delivery" agree to settle their account at the announced BFP value. Other characteristics of the new BFP contract are similar to the Exchange's Grade A milk contract. Specifics of both contracts are shown in Table 2.

Table 2. Contract Specifications: CSCE Milk Futures Contracts

Contract Specification	BFP	Grade A Milk
Commodity	Basic Formula Price at 3.5 percent butterfat content as reported by USDA	FOB delivery of Grade A milk with 3.5 percent butterfat content from an approved plant
Trading unit	1,000 times the BFP	One tanker load
Delivery Unit	Equivalent to 100,000 pounds of milk (1,000 hundredweight)	One tanker load; allowable variation 48,000 to 50,000 pounds
Trading hours	9:15 AM to 2:00 PM NY time	Same
Delivery Months	Feb., Apr., Jun., Aug., Oct., Dec. Intervening months may be offered	Same
Price Quotation	Dollars and cents per hundredweight	Same

Contract Specification	BFP	Grade A Milk
Minimum Fluctuation	$.01 per cwt., equivalent to $10.00 per contract	$.01 per cwt., equivalent to $5.00 per contract
Daily Price limits	From previous day's settlement price, $.50 per cwt. with variable limits effective under certain conditions; no price limits on 2 nearby months	Same
Position Limits	1,000 contracts (futures plus options); 250 contracts in last trading month	Same
Standards	Not Applicable	Grade A raw milk with 3.5% butterfat content
Delivery points	Not Applicable	From Interstate Milk Shippers (IMS) certified plants, receiving stations or transfer stations located in the Madison district of Chicago federal order
Delivery	Cash Settlement	Pick up by the buyer from the seller's plant
Last trading day	Exchange business day prior to USDA announcement of the BFP (usually the fifth of the following month)	Six Exchange business days prior to the last Exchange business day of the delivery month
Notice of delivery	Not Applicable	First exchange business day following last trading day
First and last delivery day	Settlement on day USDA announces the BFP	First Exchange day following notice day up to the last Exchange business day of the delivery month

Cash settlement, rather than physical delivery, is the major difference between the two milk contracts. Cash settlement works as follows: The BFP announced by USDA on the fifth of the month is the final settlement price. Traders who hold BFP contracts at the close of the last trading day will make or receive a total payment equal to the difference between the price they purchased or sold the contract for and the announced BFP. For example, suppose that in January 1997, a trader sold an April 1997 BFP contract at $13.50 and holds the contract until the settlement date. The April BFP is announced on May 5 at $12.50. The short trader's account is credited a total of $1,000, the price difference ($1.00 per hundredweight) times the contract volume (1,000). The account of the trader on the long side of the contract in this case would be debited a total of $1,000.[6]

Cash settlement avoids the complications associated with physical delivery; money changes hands rather than milk. Traders do not need to be concerned about liquidating their positions prior to delivery, since their positions will be reconciled against the announced BFP.

For many dairy industry risk managers, the BFP contract is superior to the Grade A milk contract as a hedging tool. The Grade A milk contract was fashioned to price the Basic Formula Price. However, the terms of delivery have resulted in the contract price reflecting an unpredictable basis relative to the BFP and other milk prices. Specifically, the Grade A milk contract calls for delivery of Grade A milk from specified plants regulated under the Chicago Regional Federal Milk Order, most of which are cheese manufacturing plants. During certain times of the year, these plants supply milk for fluid purposes to handlers in deficit milk production regions. When that occurs, the plants typically assess buyers a "give-up" charge, in addition to the federal order minimum price. Give-up charges represent the costs of lost manufacturing margins and the cost of operating at reduced capacity due to the plant diverting milk from manufacturing.

Settlement of the BFP contract will be at the announced BFP for the month. Hence, some hedgers can more confidently predict basis. They can localize prices against the reference price that is used in setting minimum purchase prices and farm pay prices. However, hedgers whose source of milk is Chicago order plants may still find the Grade A contract a superior hedging tool.

POTENTIAL HEDGERS AND HEDGING EXAMPLES

The BFP contract offers risk management opportunities to dairy producers, cooperatives, and processors through direct hedging or through forward price contracting. In combination with the CSCE cheese, butter, and nonfat dry milk futures contracts, the BFP contract can also be used to protect manufacturing margins.

[6] Actually, trading account debits and credits occur daily, as futures positions are "marked to market" each trading day. Accordingly, the total credit (debit) would accrue over time between the initial sale (purchase) and the settlement date.

In what follows, we illustrate possible uses of the BFP contract as a risk management tool. In each example, we assume that the hedged position is held until expiration of the contract (the settlement date, i.e., the day the BFP is announced). Consequently, the futures market gain or loss is based on the contract price at the time the hedge is placed compared to the actual BFP. This assumption eliminates any basis risk from non-convergence. Of course, there are circumstances when it would be economically advantageous to liquidate a futures position prior to expiration.

DAIRY FARMER HEDGE

Dairy farmers can hedge milk sales using the cheddar cheese or the nonfat dry milk contracts. But hedges based on these contracts are cross-hedges, requiring the conversion of cheese or nonfat dry milk prices to equivalent milk prices. Hedging Grade A milk at the farm against the BFP futures contract is a direct hedge, which makes it simpler to calculate basis, particularly if payment is made on a volume basis. The Grade A milk contract would also be a direct hedge for a Grade A producer. But for reasons noted above, the BFP contract would usually involve smaller basis risk.

A simplified dairy farmer hedge is illustrated below, in which a dairy farmer sells an April BFP contract to hedge expected April Grade A milk production of 100,000 pounds. Given specific on-farm conditions with respect to milk composition, size of herd, milk quality, etc.; buyer conditions with respect to the buyer's premium structure (plant volume, quality, protein, etc.); and milk utilization by class in the federal order market; the farmer has determined that a $13.00 BFP correlates to a Grade A milk price of $14.00. That price looks favorable compared to production costs, so the farmer attempts to lock the price in through a short hedge. In Case I, with a constant basis, the lower cash market price from a lower BFP is offset by futures market gains. In cases II and III, offsets are not exact because the basis at the time the hedge was lifted was different from what was expected at the time the hedge was placed. Net gains are experienced with a strengthened basis and losses are incurred when the basis weakens.

The farm-level Grade A price associated with a particular BFP was merely specified in this example. In reality, considerable analysis would be necessary to derive the basis and there would be several sources of basis risk. The minimum federal order blend price varies with utilization by class as well as with the BFP; hence the blend price relative to the BFP is not constant. A plant's base pay price relative to the federal order blend price varies with product mix, extent of competition, and premium structure. Farmers' butterfat and protein tests, somatic cell count and other quality variables, herd size, and a host of other factors cause actual pay prices to deviate from base pay prices.

Another complicating factor in calculating basis for dairy farmer hedges is Multiple Component Pricing (MCP), which is used in many milk marketing orders. Under MCP, manufacturing plants are obligated to pay for the pounds of milk components they purchase rather than the hundredweights of milk containing the components. Typically, priced components are butterfat, protein and other solids.

With MCP, dairy farmers would need to convert the expected value of milk components to an equivalent per hundredweight price. Similarly, plants paying on an MCP basis would need to relate component prices to an aggregate per hundredweight basis in calculating basis. Since the BFP is used to derive component prices, this conversion is reasonably straightforward.

Dairy Farmer Hedge

Date	Cash Market	Futures Market	Basis
Jan. '97	Dairy farmer expects to sell 100,000 pounds of Grade A milk in April. Price expectation based on April futures price is $14.00	SELL Apr. BFP contract @ $13.00	$1.00
Case I: Futures price decline/No basis change			
Apr. '97	Sell 100,000 pounds of milk @ $13.00.	Apr. BFP announced @ $12.00. Cash settle at announced price	$1.00
Gain/(Loss) Net Gain	($1.00) $0.00	$1.00	
Case II: Futures price decline/Basis weakens			
Apr. '97	Sell 100,000 pounds of milk @ $13.00.	Apr.BFP announced @ $12.50. Cash settle at announced price	$.50
Gain/(Loss) Net Gain	($1.00) ($0.50)	$.50	
Case III: Futures price increase/Basis strengthens			
Apr. '97	Sell 100,000 pounds of milk @ $15.00.	Apr. BFP announced @ $13.50. Cash settle at announced price	$1.50
Gain/(Loss) Net Gain	$1.00 $.50	($.50)	

CASH FORWARD PRICING

Milk futures can be used by dairy plants to offer fixed price contracts to their dairy farmer suppliers. The cheddar cheese contract on the CSCE has been used for this purpose by cooperatives heavily involved in manufacturing cheese. The new BFP futures may provide superior hedging opportunities for plants making other dairy products. Some cheese plants might also choose to use the new BFP futures rather than the cheese futures for hedging cash forward contracts.

A simple example of cash forward contracting by a cheese plant using BFP futures is illustrated below. The example is simple because it implies a very rudimentary basis calculation. Cash market gains and losses are calculated relative to "opportunity cost," i.e., in relation to what competitors paid for milk.

Cheese plant offers cash forward price contract to dairy farmers

Date	Cash Market	Futures Market	Basis
Jan. '97	Plant offers fixed price contract to Grade A patrons. Will pay $14.00 base price (3.5% butterfat) for April milk. Contract price is derived as follows: $13.00 BFP + .75 Normal Apr. "pool draw" + .25 Plant premium $14.00	SELL Apr. BFP contracts @ $13.00.	$1.00
Case I: Futures price decline/No basis change			
Apr. '97	Plant pays producers the contract price of $14.00. Competitors pay $13.00.	Apr. BFP announced @ $12.00. Cash settles at announced price	$1.00
Gain/(Loss)	($1.00)	$1.00	
Net Gain	$0.00		

Date	Cash Market	Futures Market	Basis
Case II: Futures price increase/No basis change			
Apr. '96	Plant pays producers the contract price of $14.00. Competitors pay $15.00.	Apr. BFP announced @ $14.00. Cash settles at announced price	$1.00
Gain/(Loss)	$1.00	($1.00)	
Net Gain	$0.00		

The plant offering the forward pricing arrangement establishes its future pay price according to the futures market price for milk. In this case, the April price offer is set in January by adding the manufacturing plant's expected "pool draw" and its plant premium to the futures market prediction of the BFP. The pool draw is the difference between the reported federal order blend price for the month and the Class III, or Basic Formula Price. Pooled manufacturing plants receive this draw to make up the difference between the blend price (which all regulated handlers are obligated to pay their producers) and the Class III price (the order-specified value of milk used to make cheese). As described earlier, the plant premium is over the blend price, and reflects competition among plants for milk.

The pool draw and the plant premium comprise the basis, which is added to the futures price to derive the Grade A price offer. The plant is committed to paying $14.00 per hundredweight. To protect itself against adverse price movements, which would prevent the plant from paying the fixed price, the plant hedges by selling April BFP futures contracts equivalent in volume to the volume of milk contracted at the fixed price.

If there is no change in the basis from what was predicted when the hedge was placed, then futures market gains will offset cash market losses if futures market prices fall. Cash market losses, in this case, are relative to what competitors paid for milk. In case I of the example, the plant offering the forward contract would be at a serious competitive disadvantage if it were obligated to pay $14.00 while its competitors making the same product could acquire milk at $13.00.

In case II, the plant loses $1.00 per hundredweight from its futures market transaction because the announced BFP was $1.00 higher than the BFP contract at the time the hedge was placed. However, this loss is offset by the lower price the plant pays for contracted milk relative to competitors. Obviously, those dairy farmers holding fixed price contracts would not be very pleased by this turn of events. But they received the price they agreed to contract for in January.

FLUID MILK PROCESSOR HEDGING

Possibly the most direct hedging opportunity with the BFP contract is for a fluid milk bottling plant that purchases its entire raw milk supply from a cooperative under an open price contract. This is because all MCP plans in effect under federal milk marketing orders exempt fluid handlers (bottlers) from MCP payments. In all orders, fluid handlers' pool obligation is the order Class I price plus or minus an adjustment for butterfat content above or below 3.5 percent. The minimum Class I price is the basic formula price from two months earlier plus a fixed Class I differential. Hence, a handler can lock in its minimum federal order price two months beyond the contract month for the BFP futures contract.[7]

Fluid handlers acquiring milk from cooperatives typically pay more than the order minimum Class I price in the form of an "over-order" or "superpool" premium added to the announced Class I price. These premiums are a source of basis risk, but they are usually announced at least two months in advance, and usually do not change substantially from month-to-month.

An example of a potential hedge by a fluid milk bottler is illustrated in the table below. The example assumes that the bottler forward contracts for delivery of half-pints of milk to a school district on a fixed price basis. The bottler's largest cost is raw milk, so it wants to protect its contracted price by locking in its raw milk cost, which is tied directly to the BFP.

Fluid Milk Processor Hedge to protect a contracted sale.

Date	Cash Market	Futures Market	Basis
Jan. '97	Bottler needs 500,000 pounds of milk to supply April school milk contract. Class I Differential = $2.50. Coop premium = $1.00. Price objective is $15.00.	BUY 5 Feb. BFP contracts @ $11.50	$3.50

[7]A fluid milk processor could also employ the Grade A milk contract to hedge its raw milk purchase. But unless the processor was acquiring milk from supply plants designated as delivery sources in the Grade A contract, basis risk would likely be less using the BFP contract.

Date	Cash Market	Futures Market	Basis
Case I: Futures price increase/No basis change			
Mar. 5, '97		Feb. BFP announced @ $12.50. Cash settles at announced price	
Apr. '97	Bottler purchases 500,000 pounds of milk from coop @ $16.00 (Feb. BFP + Class I Differential [$2.50] + Coop premium [$1.00])		$3.50
Gain/(Loss)	($1.00)	$1.00	
Net Gain	$0.00		
Case II: Futures price increase/Basis strengthens			
Mar. 5, '97		Feb. BFP announced @ $13.00. Cash settles at announced price	
Apr. '96	Bottler purchases 500,000 pounds of milk from coop @ $17.00 (Feb. BFP + Class I Differential [$2.50] + Coop premium [$1.50]).		$4.00
Gain/(Loss)	($2.00)	$1.50	
Net Gain	($0.50)		
Case III: Futures price decrease/Basis weakens			
Mar. 5, '97		Feb. BFP announced @ $11.00. Cash settles at announced price	
Apr. '96	Bottler purchases 500,000 pounds of milk from coop @ $14.25 (Feb. BFP + Class I Differential [$2.50] + Coop premium [$.75]).		$3.25
Gain/(Loss)	$.75	($.50)	
Net Gain	$.25		

In this example, the bottler would have established its contract price to the school district by converting the February 1997 futures price into a related raw product price that would have permitted a normal profit. With no change in the basis (the difference between the bottler's expected procurement price and the futures contract price), any potential loss from a price increase in the cash market would be offset by a gain from futures market transactions.

Because of the lag in Class I pricing under federal orders, the bottler would place its hedge in the futures contract delivery month two months before the milk was to be purchased. Since cooperatives price milk to their buyers according to federal order pricing rules, the lagged BFP, not the current month BFP, establishes the processors fluid milk price.

Since the futures contract is held until the delivery date and settled in cash at the announced BFP, there is only one source of basis risk in this example: The coop overorder premium may be different from what the plant expected when it placed its hedge. The other component of basis, the federal order Class I differential, is known at the time the hedge is placed.

In this example, when the basis strengthened (the co-op premium increased) there was a net loss because the loss on the cash market exceeded the gain on the futures market. When the basis weakened (the co-op premium decreased), there was a net gain because the gain on the cash market exceeded the loss on the futures market.[8]

FLUID MILK SUPPLIER HEDGING

Another fluid milk hedging opportunity involves a cooperative supplying milk to a fluid bottler. The hedge would be different depending on whether the supply contract was an open price or fixed price contract. With an open price contract, the cooperative would be interested in locking in a price that represented a profitable fluid milk price for its members. It would place a short hedge to protect against a price decline. Under a fixed price contract, the cooperative would need to protect its procurement cost, and would place a long hedge.

Looking first at the open price supply contract hedge, assume that in January 1997, a cooperative agrees to supply one million pounds of milk to a fluid bottler in June. The price when the milk is delivered will be the BFP for April plus $3.75 per hundredweight. Assume that the Class I differential applying in this market is $2.50 per hundredweight, and that the cooperative is a member of a over-order bargaining federation that has announced a $1.25 per hundredweight Class I premium on all June fluid milk sales in the marketing area. Under these assumptions, the basis for the hedging transaction is $3.75, the sum of the order Class I differential and the overorder premium.

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[6]The basis is said to strengthen when the cash price increases relative the futures price. The basis "weakens" when the cash price decreases relative to the futures price. Longs have a net loss when the basis strengthens and a net gain when the basis weakens. The opposite occurs for shorts.

The cooperative feels that the $13.00 BFP futures price for April 1997 represents an optimistic price level, and decides to lock in the related fluid milk price of $16.75. To do so, it sells BFP contracts equal in volume to its contracted cash market sale, or 10 contracts. Because of the lag in pricing Federal order Class I milk, the cooperative will place its hedge in the BFP futures contract month that is two months prior to the month it will make its milk delivery; it is hedging in the month when the sale is priced.

In this example, futures market gains exactly offset cash market losses (relative to the price expectation) if the April 1997 BFP (announced on May 5) is less than the BFP futures price at the time the hedge is placed. Likewise, cash market gains (relative to expectations) offset futures market losses if the actual BFP ends up higher than the April BFP contract price in January. This is an unusual, risk-free hedge. There is no basis risk because the cooperative has locked its sales price to the BFP through the known Class I differential and the known overorder premium.

Cooperative contracts to supply milk to a fluid bottler at future date

Date	Cash Market	Futures Market	Basis
Jan. '97	Cooperative signs an *open price* contract to supply a fluid bottler with 1 million pounds of milk during June 1996. Price at delivery will be BFP from two months earlier plus $3.75 (Class I differential of $2.50 and Overorder premium of $1.25). Coop wants to lock in an attractive fluid milk sales price as reflected by current futures quote for April. Price objective is $16.75.	SELL 10 Apr. BFP contracts @ $13.00.	$3.75
Case I: Futures price decline/No basis change			
May 5, '97		Apr. BFP announced @ $12.75. Cash settles at announced price	
Jun. '97	Cooperative delivers milk to bottler. Gross pay price is $16.50		$3.75
Gain/(Loss) Net Gain	($0.25) $0.00	$0.25	
Case II: Futures price increase/No basis change			

Date	Cash Market	Futures Market	Basis
May 5, '97		Apr. BFP announced @ $14.00. Cash settles at announced price	
Jun. '97	Cooperative delivers milk to bottler. Gross pay price is $17.75.		$3.75
	$1.00		
Gain/(Loss)	$0.00	($1.00)	
Net Gain			

This example ignores one complexity that should be recognized. Note that nothing is said about what the cooperative pays its members in the month of June. The June BFP could be much lower or higher than the April BFP. But because of federal order pricing and pooling rules, the cooperative accounts to the federal order pool for its Class I disposition at the federal order Class I price, which, for June Class I sales, is set in April. Consequently, even if the BFP is different between April and June, the Class I price obligation is fixed in April. The cost of the milk in terms of the cooperative pay price may be different from expectations because producer premiums may be higher or lower than predicted. But this risk applies whether or not the cooperative hedges; hence, it is not a part of basis risk in this example.

A second example illustrates a *fixed price* contractual arrangement. In January 1997, a cooperative agrees to supply milk to a bottler in June 1997 at $16.00 per hundredweight. To protect itself against adverse price movements that would cause a loss, the cooperative wants to lock in the cost of the milk it will supply at the fixed price through a long hedge.

In this example, the basis is calculated as the cost of milk to the cooperative less the BFP. In practice, the cooperative would set its sales price by adding its expected basis to the futures market prediction of the BFP for the pricing month. The cost of milk is largely fixed by federal order pricing and pooling rules. However, there is an element of basis risk associated with "plant premiums" (premiums over the federal order blend price). In building its basis, the cooperative assumes it will pay a Grade A plant premium of $1.00 per hundredweight. In Case II, the actual premium paid was only $.75, leading to a hedging "profit" equal to the amount by which the basis weakened ($.25). Had the basis strengthened, the hedge would have yielded a loss equal to the change.

Cooperative contracts to supply milk to a fluid bottler at a specified price in the future

Date	Cash Market	Futures Market	Basis
Jan. '97	Cooperative commits to provide 1 million pounds of milk to a fluid bottler during June 1996 at a fixed price of $16.00. Class I Differential = $1.50. Grade A premium to patrons is $1.00 over the order blend price. Projected cost of milk is $14.50. (BFP plus $2.50)	BUY 10 Apr. BFP contracts @ $12.00.	$2.50
Case I: Futures price decline/No basis change			
May 5, '97		Apr. BFP announced @ $11.75. Cash settles at announced price	
Jun. '97	Cooperative procures milk to meet contract. Accounts to federal order pool at $13.25 Class I price ($11.75 BFP plus $1.50 Class I differential). Pays producers a June '96 plant premium of $1.00 (over the order blend price). Cost of milk is $14.25.		$2.50
Gain/(Loss) Net Gain	$0.25 $0.00	($0.25)	

Date	Cash Market	Futures Market	Basis
Case II: Futures price increase/Basis Weakens			
May 5, '97		Apr. BFP announced @ $13.00. Cash settles at announced price	
Jun. '97	Cooperative procures milk to meet contract. Accounts to federal order pool at $14.50 Class I price ($13.00 BFP plus $1.50 Class I differential). Pays producers a June '96 plant premium of $.75 (over the order blend price). Cost of milk is $15.25.		$2.25
Gain/(Loss)	($.75)	$1.00	
Net Gain	$.25		

CHEESE PLANT HEDGES OPERATING MARGIN

A cheese plant could use the BFP contract to protect plant operating margins. Assume a cheese plant in January 1997 contracts to deliver 50,000 pounds of cheddar cheese to a cheese buyer during April at a fixed price. The risk to the cheese plants is an increase in the cost of milk to make cheese.

The cheese plant sees that April BFP contracts are trading at $12.00. The basis has been $1.25. The estimated procurement cost of milk for April is $13.25 ($12.00 BFP + $1.25 premiums). The plant has an operating margin of $1.30. Thus, the total cost to make cheese per hundredweight of milk is estimated at $14.55. With a yield of 10 pounds of cheese per hundredweight of milk, the cheese plant contracts in January to deliver 50,000 pounds of cheddar cheese to a cheese buyer during April at a fixed price of $1.455 per pound. The cheese plant protects its $1.30 plant margin by buying 5 April BFP contracts at $12.00.

In Case I, the April cost of milk increases from the estimated cost of $13.25 to $14.25, reducing the plant margin by $1.00 to just $0.30. But, the April BFP settles at the $13.00 announced April BFP and a $1.00 gain on the futures market is realized. Adding this $1.00 gain to $0.30 nets the $1.30 plant margin desired. In Case II, the cost of April milk is $1.00 lower than what was estimated, but the realized plant margin is still just $1.30 because the $1.00 lower milk cost is offset by a $1.00 loss on the futures.

Without the ability to protect plant margins a cheese plant would be exposed to major financial risk by entering into a fixed price contract for future delivery of cheese. In this example, only a $0.30 realized plant margin could pose real financial problems for the cheese plant. But by hedging the cost of milk through the use of the BFP contracts, the $1.30 plant margin objective is protected.

Cheese Plant Contracts To Supply Cheese To A Buyer At A Specified Price

Date	Cash Market	Futures Market	Basis
Jan. 97	Cheese plant commits to providing 50,000 pounds of cheese during April 1997 at a fixed price of $1.455 per pound based on a milk cost of $13.25 ($12.00 BFP + $1.25 premiums) and a plant margin of $1.30 per hundredweight of milk.	Buys 5 Apr. BFP contracts @ $12.00	$1.25
Case I:	Futures price increases/No basis change		
Apr. 97	Cheese plant procures milk at $14.25 ($13.00 BFP + $1.25 premiums) and makes and delivers cheese to buyer at $1.455 per pound	Apr. BFP announced @ $13.00. Cash settles at announced BFP price	$1.25
Gain/(loss)	($1.00)	$1.00	
Net Gain	$0.00		
Case II:	Futures price decreases/No basis change		
Apr. 97	Cheese plant procures milk at $12.75 ($11.50 BFP + $1.25 premiums) and makes and delivers cheese to buyer at $1.455 per pound	Apr. BFP announced @ $11.50. Cash settles at announced price	$1.25
Gain/(loss)	$0.50	($0.50)	
Net Gain	$0.00		

SUMMARY[9]

The BFP milk futures contract is a cash settlement contract. Unlike the Grade A milk and the cheddar cheese futures contracts, no milk or cheese is ever delivered on the futures market. Rather, contracts outstanding at expiration are settled by payment and receipts representing the difference between the contract and the reported BFP value. This BFP cash settlement contract may be preferred by some buyers and sellers to either the Grade A milk contract or the cheddar cheese contract. Dairy producers, for one, do not make cheese for delivery and it is difficult for them to deliver raw Grade A milk under the futures market delivery requirements. Fluid milk bottlers do not have cheese to deliver. But besides the delivery issue, because the BFP contract settles at the announced BFP it may be superior to the Grade A milk futures contract. There has been some difficulty in determining exactly what the Grade A milk futures is reflecting, the BFP, a Grade A price for milk used for manufacturing or the value of spot shipments of Grade A milk from Wisconsin. This has made it difficult to determine the appropriate basis to use in hedging strategies.

Since the BFP futures contract is settled at the announced BFP, it will be reflecting the BFP. Basis determination should be improved over that of the Grade A milk futures. Therefore, this new BFP contract offers excellent hedging opportunities for buyers and sellers of raw milk whether they are dairy producers, cheese manufacturers, or bottlers of package milk. Since federal milk marketing order pricing formulas directly incorporate the BFP, cash market participants can accurately relate their prices to the BFP contract price. Minimal basis risk should encourage broad hedging interest in the new contract.

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[9]Further information on the CSCE BFP contract is available by writing the Exchange at 4 World Trade Center, New York, NY 10048, or call toll-free 1-800-HEDGE IT. Information is also available on the Exchange's web page at http://www.csce.com.