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FUTURES CONTRACTS FOR MILK: HOW WILL THEY WORK?

By

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INTRODUCTION

In June 1993, the Coffee, Sugar and Cocoa Exchange (CSCE) introduced futures and options contracts for cheddar cheese and nonfat dry milk[2]. These new contracts provided the opportunity for dairy industry participants -- dairy farmers, manufacturers, distributors, and others -- to manage price risk in an era of increasingly volatile dairy markets.

Now, expanded risk management opportunities exist via futures and options contracts for Grade A milk. On October 10, 1995, the Commodity Futures Trading Commission approved Grade A milk futures and options contracts for both the CSCE and the Chicago Mercantile Exchange (CME). The CSCE began trading these contracts on December 12, 1995. The CME announced a starting date of January 11, 1996.

In this paper we discuss these new milk futures contracts, focusing on their potential uses for hedging. We explain the differences between the CSCE and the CME contracts and implications for hedgers. Several hedging examples are provided. In this paper, we deal exclusively with the futures contracts. In a later paper, to be issued after some trading experience with the new contracts, we will look at related options contracts offered by both exchanges and their potential use in a risk management strategy.

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[2] For more on the cheddar cheese contract, see *Futures and Options Trading in Cheese: Basic Principles for Hedgers*, Bulletin No. A3593, University of Wisconsin-Extension, Cooperative Extension, October 1993. This bulletin also provides a detailed discussion of hedging and basis calculation.

WHAT IS THE PURPOSE OF FUTURES CONTRACTS?

Futures contracts are marketing tools for managing price risk. Using futures to manage price risks is not new. Futures contracts for grains have been traded for about 130 years. Today, more than one hundred different commodities are traded on U.S. futures markets.

There had been only limited experience with dairy futures prior to introduction of the cheese, nonfat dry milk, and milk contracts. From the early 1950s until 1976, the CME traded butter futures. However, the contract was lightly traded, mainly because, there was little need for dairy futures markets to manage price risk for producers and there was little interest on the part of speculators in trading a commodities with an effective price floor.

The federal dairy price support program provided a relatively high floor (safety net) under manufacturing milk prices directly and under Grade A milk prices indirectly. The federal dairy price support program requires USDA's Commodity Credit Corporation to purchase unlimited quantities of surplus butter, cheddar cheese and nonfat dry milk at specified prices that enable manufacturers of these products to pay the support price. This federal price support program provided price protection for milk and dairy products. For many years, there was little price risk and therefore, there was no interest in dairy futures as a risk management tool.

But all that has changed. The federal price support level for milk has been cut from $13.10 per hundredweight in 1981 to $10.10 per hundredweight in 1990, where it remains today.[3] At this low level of price support, market forces -- not the federal support program -- determine cheddar cheese and nonfat dry milk prices most of the time. And for the past two years, even butter prices have usually been above support. Indeed, manufacturing milk prices (as measured by the M-W price and the more recent Basic Formula Price) have not been at support since 1988.

Market-driven milk prices have created uncertain and volatile dairy product prices and milk prices. For example, for the past five years the ranges in the Minnesota-Wisconsin Price (M-W) per hundredweight from high to low were: 1990, $3.75; 1991, $2.48; 1992, $1.61; 1993, $2.01; and 1994, $1.74. Dairy producers, milk processors and marketers, and buyers of fluid milk and dairy products now are exposed to major price risks. As a result, there is increased interest in dairy futures and options contracts as a tool to manage this price risk.

The risk of price change is reduced through the *hedging* on the futures market. Hedging is taking opposite transactions in the cash and futures markets. By taking opposite transactions losses (gains) on the cash market can be offset by gains (losses) on the futures market. With these offsetting losses and gains, hedging enables the users of futures markets for price protection to realize close to their price objectives. We illustrate how this works in the paper.

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[3] The support price was raised to $10.35 per hundredweight on January 1, 1996, under provisions of the 1990 Food, Agriculture, Conservation and Trade Act. New dairy legislation is being debated that will likely change the support price.

WHY GRADE A MILK FUTURES AND OPTIONS CONTRACTS?

Cheddar cheese and nonfat dry milk futures and options have been used since their inception in June, 1993 as risk management tools by dairy farmers, milk processors and marketers and buyers of cheese and milk powder. But the interest has been limited and trade volume has been disappointing. Both cheese and nonfat dry milk contract markets lack the broad liquidity enjoyed by most commodity futures.

Cheddar cheese and nonfat dry milk futures and options may be used by both buyers and sellers to protect themselves against changes in the prices of these manufactured dairy products. But these same contracts can be used to reduce the risk of a change in farm level milk prices. This is because the *base price* and *mover* of Grade A milk prices under all federal milk marketing orders is the Basic Formula Price (BFP).[4]

The BFP is the grade B price paid to producers by butter, milk powder and cheese plants located in Minnesota and Wisconsin adjusted by a product price formula for the same three products. Since about 85 percent of the grade B milk in Wisconsin and 65 percent in Minnesota is used to make cheese, cheese is the major determinant of the BFP. About 90 percent of the change in the BFP may be explained by changes in cheddar cheese prices. With such a strong relationship, dairy producers and buyers of farm level milk can use cheese futures and options contracts to reduce the risks from changing milk prices. Dairy cooperatives have successfully used cheese futures contracts to offer cash forward price contracts to their producer members[5].

About 80 percent of all grade A milk is priced under federal milk marketing orders. But prices for grade A milk not priced under a federal order and prices for Grade B milk have similarly strong relationships to cheese prices. In California, for example, a state order is used to price grade A milk. But prices for cheese, nonfat dry milk and butter are used in a formula to calculate the minimum pay prices to the state's dairy producers.

Protecting milk prices via cheddar cheese futures contracts is a "*cross hedge*" (cheese prices against milk prices) and not a "*direct hedge*" (milk prices against milk prices). Although the price relationship between cheddar cheese futures and milk is high, the price relationship between milk futures contracts and milk prices should be even higher. This is because other factors besides cheese prices influence milk prices.

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[4] The Basic Formula Price has been used since May 1995 as the federal order Class III price and Class II and Class I price mover. From 1961 until May 1995, the M-W price served that role. Both price series are based on pay prices by (unregulated) Grade B plants in Minnesota and Wisconsin.

[5] Alto Dairy Cooperative has been offering their producers cash forward contracts hedged through the CSCE cheddar cheese futures since August, 1994. Since then, Swiss Valley Farms and Dairylea Cooperative have made cash forward contracts available to producers and there may be others.

Further, dairy producers and fluid milk bottlers may have more interest in a direct hedge. Dairy producers don't normally manufacture cheese. Therefore, dairy producers may better relate to milk prices than cheese prices. And, since futures contracts are deliverable, dairy producers are in a position to deliver milk but not cheese. The same is true with fluid milk bottlers. Bottlers are interested in purchasing grade A milk for bottling. Bottlers do not sell or purchase cheese.

Dairy cooperatives and other dairy companies who wish to offer cash forward price contracts to dairy producers may find the grade A milk futures preferable to cheese futures. Even if the milk purchased by the cooperative is used to make cheese, the grade A milk futures provides for a direct hedge, producer milk prices protected with grade A milk futures. Cheese prices would not need to be converted to milk prices, which is necessary when using cheese futures to offer cash forward contracts to producers.

WHO WILL USE THE MILK FUTURES CONTRACTS?

Dairy producers, firms that buy producer milk for bottling, and dairy product manufacturers will likely be interested in using the new milk contracts.

Dairy producers may use these contracts to lock in milk prices for future production. For example, in February a dairy producer might be concerned that milk prices will weaken towards spring. The producer sees that June milk futures contracts are trading at a reasonable level and in February *sells* one or more June milk futures to protect future milk production against declining milk prices. Prior to the delivery date of the June contract the producer would offset this position by *purchasing* June milk futures contracts.

The producer would deliver milk to a dairy cooperative or other milk buyer in June. If the price of milk had declined from February, the June milk futures price would have also fallen and a profit would be made on the futures market from buying June milk futures at a lower price than what they were sold for in February. The profit from the milk futures is used to offset the lower price received for June milk delivered to the cooperative. By adding the futures market profit to the lower June milk price received from the cooperative the producer receives a net June milk price close to what was a price objective back in February.

But what if milk prices had increased instead of declining? June milk futures would be purchased at a higher price than what they were sold for back in February and a loss would be experienced on the futures market. Nevertheless, after subtracting the futures loss, the producer still nets a June milk price close to what was believed back in February to be a fair price for milk delivered in June. The objective of using dairy futures is not to receive the highest possible price, but rather to protect a price objective. This price objective is a reasonable price from the perspective of the producer; a price that will return an acceptable profit. Dairy producers should not lock in an unacceptable price.

Dairy cooperatives or other milk buyers could provide a service by offering cash forward contracts to dairy producers for milk delivered in the future to the plant. The cooperative would use the grade A milk futures contract to offer a cash forward contract at a specified price. For example, in February the cooperative quotes a price for milk to be delivered in June. If a dairy producer accepts this price offer, the cooperative protects itself by *selling* June milk futures. When June rolls around and the producer delivers his/her milk, the cooperative offsets its futures position by *purchasing* June milk futures. If June milk prices have declined from when the hedge was placed, then the cooperative can still pay the producer the contract price with the profit generated from the future market transactions. If June milk prices were higher, the cooperative can still only pay the producer the contract price because the loss experienced on the futures market would need to be deducted from the higher milk price.

Cheese makers or other manufacturers of dairy products and bottlers of fluid milk may use grade A milk futures to reduce their plant operation risks stemming from rising milk costs. For example, a cheese manufacturer could negotiate with a cheese buyer a price for cheese manufactured and delivered at some future date. The risk to the cheese maker is that the price of milk to make the cheese may be higher than anticipated. This would result in reduced plant margins or even a loss from making the cheese and delivering it to the buyer at the prior negotiated price.

But this milk cost risk could be reduced by using the Grade A milk futures for hedging. For example, assume that a cheese maker negotiates in May with a cheese buyer to deliver 50,000 pounds of cheddar cheese in October at a specified price. In determining its selling price the cheese maker would consider the estimated cost of milk and manufacturing costs. In May, the cheese maker could use the trading price for October milk futures as its estimated milk cost to make this cheese in October.

In May, the cheese maker would *purchase* October milk futures. Then, in October when it is time to procure milk and make the cheese, the cheese maker would offset the long position by *selling* October milk futures. If the cost of milk had increased, the cheese maker would experience a profit on the futures market by selling October milk futures in October at a higher price than what October milk futures were purchased for back in May. The futures profit can be subtracted from the higher cost milk procured and thereby protecting the margins of the cheese plant from delivering cheddar cheese to the buyer in October at prices established in May. If the cost of milk had declined, then the cheese maker would have suffered a loss on the futures market. Nevertheless, by adding the loss to the lower cost of milk procured in October the cheese makers still experiences the plant margin that it expected when it placed its hedge.

The concept would be similar for a bottler attempting to negotiate the future sale of packaged milk at a specified price to a large retail food chain. A future selling price could be negotiated. The bottler could reduce the risk from higher than anticipated milk costs by *purchasing* milk futures at the time the price for packaged milk to be delivered at a future date was negotiated. Then, when the milk was later procured, packaged and delivered to the retail chain the bottler would *sell* milk futures.

As with the cheese maker, the bottler, through the use of milk futures, would have reduced its plant margin risk associated with changing milk costs.

A buyer of packaged milk could itself use milk futures to negotiate with a bottler a supply of packaged milk to be delivered at some date in the future at a specified price. The danger to the buyer is that farm level milk prices decline, lowering the price for, packaged milk. The buyer would be at competitive disadvantage in attempting to selling packaged milk to its customers at the previously negotiated higher price. The buyer would either have to risk loss of customers or sell its packaged milk at a loss.

But this problem could be reduced by hedging in milk futures. When negotiating the purchase price for packaged milk to be delivered at a future date, the buyer would protect itself from a subsequent fall in price by *selling* a milk futures. For example, let's say a buyer in October wishes to lock in a price for packaged milk purchased and delivered in December. The buyer would use the December milk futures to negotiate its fixed price and protects itself by *selling* December milk futures.

Then, when December rolls around and the packaged milk is delivered, the buyer *purchases* December milk futures. If the price of packaged milk had actually declined, the buyer would experience a profit from the futures by purchasing December milk futures at a lower price than what December milk futures sold for back in October. The buyer can meet the competition in selling packaged milk in December. The profits from the futures market can be added to the lower selling price for packaged milk. If packaged milk prices had instead gone up, the buyer would experience losses on the futures market. Nevertheless, after subtracting these losses from the higher selling price for packaged milk in December, the buyer still nets out a margin close to what was anticipated back in October.

THE BASIS

Success in reducing price risks through hedging hinges on the *predictability of the relationship between the cash price and the futures price.* In this case, we are taking about the relationship between the cash market price for Grade A milk and the grade A milk futures price. The relationship between the cash price and the futures price is referred to as the *basis.*

Successful hedges are possible only if the basis relationship is known and predictable. That's because the net outcome of a hedge is equal to the change in the basis. The likelihood of the basis being different at the time the hedge is placed and when it is removed or offset is referred to as *basis risk*. If the basis is exactly the same at placement and offset, then the net outcome will be equal to what was anticipated when the hedge was set. If the basis changes, the net outcome will be either better or worse, depending on which direction it changed, from what was anticipated earlier when the hedge was set.

The level of basis is immaterial; i.e., it makes no difference whether the cash price for milk is, for example, $1.00 per hundredweight higher or $1.00 per hundredweight lower than the milk futures price. What does matter is that this relationship is predictable and stable. If it is, then losses (gains) on the cash market will be closely offset by gains (losses) on the futures market.

The good news is that the basis is normally more predictable than cash prices. Therefore the risk exposure from a change in the basis is less than the risk of changing cash prices.

CONTRACT SPECIFICATIONS OF MILK FUTURES

The contract specifications for grade A milk futures contracts for the NY CSCE and the CME are given in the table below. There are some significant differences between the two contracts.

Contract Specifications: Milk Futures Contracts, CSCE & CME

Contract Specification	CSCE	CME
Commodity	FOB delivery of Grade A milk with 3.5 percent butterfat content from an approved plant	FOB delivery of Grade A milk with 3.5 percent butterfat content to an approved plant
Trading unit	One tanker load	One tanker load
Delivery Unit	One tanker load; allowable variation 48,000 to 50,000 pounds	One tanker load; allowable variation 3%
Trading hours	9:15 AM to 2:00 PM NY time	8:00 Am to 1:00 PM
Delivery Months	Feb., Apr., Jun.,Aug., Oct., Dec.	Feb., Apr.,Jun., Jul., Sept., Nov.
Price Quotation	Dollars and cents per hundredweight	Same
Minimum Fluctuation	$.01 per cwt., equivalent to $5.00 per contract	$.025 per cwt., equivalent to $12.50 per contract

Contract Specification	CSCE	CME
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, with no limits on 3rd. nearby month from first day of a delivery month until the last trading day of the delivery month	From previous day's settlement price no trading at a price more than $1.50 per cwt.
Standards	Grade A raw milk with 3.5% butterfat content	Same
Delivery points	From Interstate Milk Shippers (IMS) certified plants, receiving stations or transfer stations located in the Madison district of Chicago federal order	To CME approved facilities within borders of Wisconsin and Minnesota or that portion of surrounding states included in the Chicago or Upper Midwest federal orders.
Delivery	Pick up by the buyer from the seller's plant	Seller to buyers facility
Last trading day	Six Exchange business days prior to the last Exchange business day of the delivery month	Seven Exchange business days prior to the last Exchange business day of the delivery month
Notice of delivery	First exchange business day following last trading day	Same

Contract Specification	CSCE	CME
First and last delivery day	First Exchange day following notice day up to the last Exchange business day of the delivery month	Buyer and seller shall select a day so that delivery can be made by the last calendar day of the delivery month. If no agreement is conveyed to the Clearing House, the Exchange will chose a delivery date from calendar days beginning four days after notice of no agreement and ending on the last calendar day of the delivery month

The biggest distinction between the CSCE and the CME grade A milk contracts is the delivery point. The CSCE contract requires delivery ***from*** an approved plant or facility in the Madison, Wisconsin district of the Chicago Regional federal milk marketing order. The buyer is responsible for picking up the shipment and assuming all transportation costs from that point. The CME requires delivery ***to*** a CME approved facility within the borders of Wisconsin and Minnesota or located in that portion of surrounding states included in the Chicago Regional or Upper Midwest Federal Milk Marketing orders. The seller assumes all transportation costs to the buyer's facility except that the buyer will be assessed a standard freight rate per mile for each additional mile the milk is hauled over and above the distance between the seller's facility and either Eau Claire or Fond du Lac, Wisconsin. The excess hauling cost will paid to the seller.

There are other differences in delivery conditions. For the CSCE contract, the seller is required to give notice of intentions to deliver by the first Exchange business day following the last trading day and delivery can be made from the first Exchange day following notice day to the last Exchange business day of the delivery month. For example, if October milk futures had been available in 1995, the Notice of delivery would have been required by Tuesday, October 24 (the first business day following the last trading day which would have been Monday, October 23). Delivery could be made as soon as Wednesday, October 25, but would have to be delivered by Tuesday, October 31.

The notice procedure is similar for the CME, but there are differences in delivery procedures. After notice of intentions to deliver by the seller, the seller and the buyer are to select a mutually agreeable day and time for arrival so that the shipment can be received by the last calendar day of the delivery month. Again using October, 1995, that would have been October 31st. The last day could fall on a weekend or holiday. If no agreement is reached by 12:00 noon on the day after the buyer submits routing instructions, the seller shall notify the Clearing House and an arrival date will be chosen by the CME from those calendar days beginning four days after assignment by the Clearing House and ending on the last calendar day of the month.

Another difference between contract provisions are delivery months. Although both Exchanges have six delivery months, the months are different. Both Exchanges have February, April, and June as delivery months. Additional delivery months for the CSCE are August, October, and December. But for the CME the additional delivery months are July, September, and November. While the CSCE uses every other month beginning with February as delivery months, the CME starts the same but then has two back-to-back months, June and July and then returns every other month, but has no delivery months for two months, December and January.

There are also differences in the minimum price fluctuations. Price changes are $.01 per hundredweight, $5.00 per contract for the CSCE. The CME allows minimum price changes of $.025 per hundredweight or $12.50 per contract. Daily price limits also differ. These are limits on how much a contract price may change from the previous day's settlement price. The CME specifies a limit of no more than $1.50 per hundredweight. The CSCE sets this limit at no more than $.50 per hundredweight. However, there are no price limits on the two nearby months for the CSCE contract and no limit on the third nearby month from the first day of a delivery month until the last trading day of the delivery month.

There is a slight difference between the two contracts in allowable variations in quantity delivered. The CSCE will allow a cash settlement in lieu of delivery, but only if the seller fails to satisfy the grade specifications in an intitial attempt to deliver. In that case, the seller is obligated to deliver a substitute load within 72 hours and be responsible for all costs associated with the substitution. Alternatively, the buyer may request a cash settlement in lieu of the substitute delivery, but with some penalty imposed upon the seller.

Under the CME milk futures contract, if the seller fails to present "deliverable milk" at the time and place specified, the seller will be penalized $.50 per hundredweight each day until the requirements are met. If the seller fails to deliver a load of milk, the seller will be penalized $1.50 per hundredweight on each day until the requirements are met. Further, if a buyer fails to unload "deliverable milk", the buyer will be penalized $.50 per hundredweight and if it is not unloaded within 12 hours, the penalty is increased to $1.50 per hundredweight.

Both the CSCE and the CME specify that grade A milk deliveries be from or to, respectively, a facility regulated under a federal milk marketing order. Federal milk marketing orders use classified pricing, setting minimum pay prices for milk according to use class. Class III-A is skim milk used for nonfat dry milk. The minimum price is established via a nonfat dry milk product price formula. Class III is grade A milk used to make cheese. The minimum price for class III is the current month's Basic Formula Price (BFP). Class II is grade A milk used for soft manufacture dairy products (yogurt, cottage cheese, ice cream, etc.) and is based on the BFP two months previous plus $.30 per hundredweight. Class I is grade A milk used for beverage purposes and is also priced using the BFP two months previous plus a class I differential that varies with distance from Eau Claire, Wisconsin.

Deliveries of milk under both contracts will be subject to federal order pricing rules. The federal order class specification for both contracts is Class III. Class III-a, Class II, and Class I price differentials will apply to the delivery settlement price. In other words, those taking delivery will be responsible for any additional costs associated with higher uses (Classes I and II) or any reduced cost if the milk is used for Class III-A and the federal order Class III-A is less than the Class III price.

WHAT WILL THE NEW MILK FUTURES CONTRACTS PRICE?

Since the new milk futures contracts price Class III milk and since the minimum Class III price in all federal orders is the Basic Formula Price (BFP), it would seem logical to assume that the contracts will "price" the BFP; that is, that futures prices will represent the expected value of the BFP for the delivery month.

However, the actual value of Grade A milk used for Class III purposes seldom matches the BFP. In Wisconsin and other Midwestern states, intensive competition for milk elevates Grade A milk prices well above minimum blend prices, implying plant costs for Grade A milk used for manufacturing higher than the BFP.

Figure 1 shows the relationship between the Grade A manufacturing milk price in Wisconsin and the M-W price (the predecessor of the BFP) for 1984-94.[6] During that period, Grade A manufacturing milk prices increased steadily above the M-W price. In recent years, Grade A plants paid \$.70-\$1.00 per hundredweight more than the BFP for milk used to make Class III products.

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[6] This chart is derived from data supplied periodically by the Market Administrator's Office, Upper Midwest Milk Marketing Order. The Grade A manufacturing milk price is calculated by subtracting federal order pool draws (revenues associated with market-wide sales of Class I and Class II sales) from reported pay prices of plants engaged exclusively or predominantly in manufacturing Class III products.

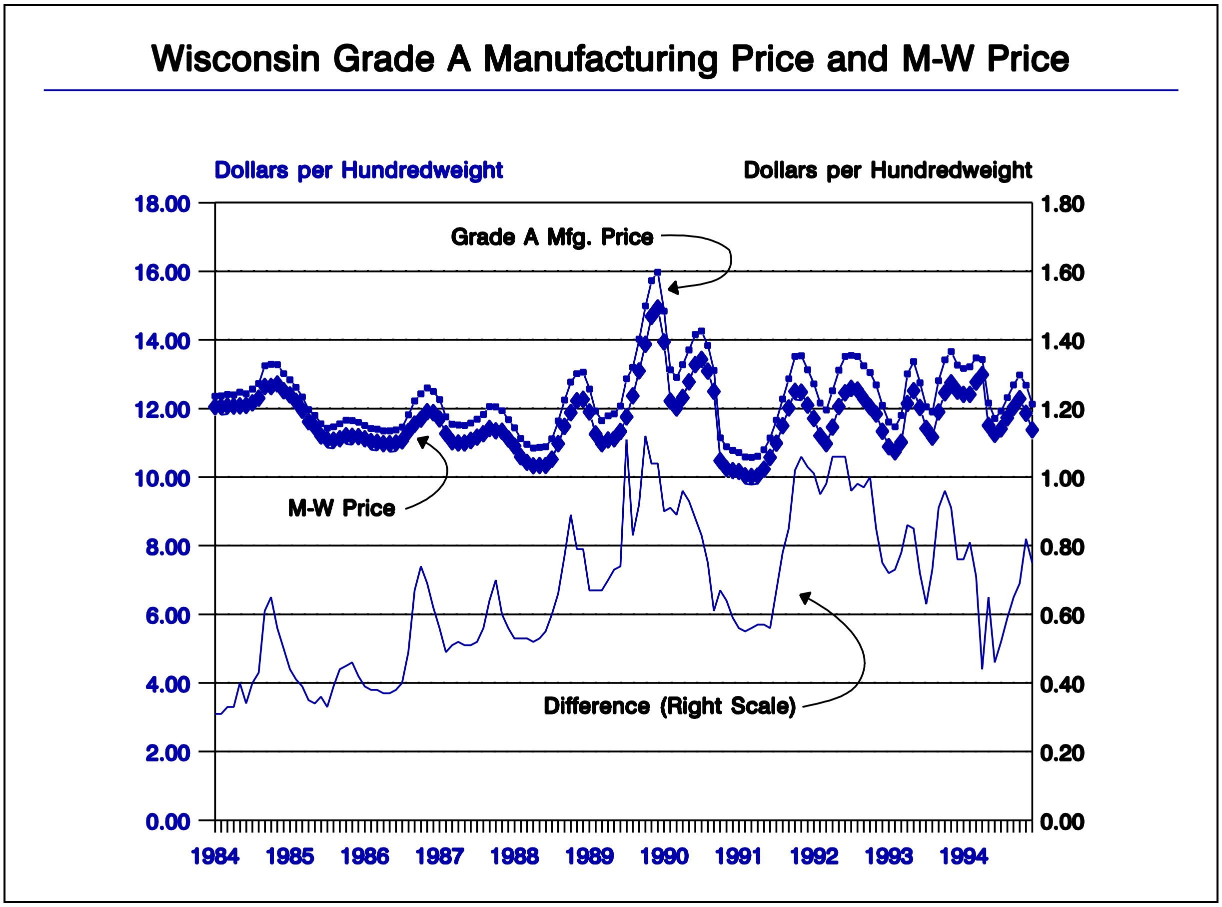

Figure 1

Under the CSCE milk contract, with delivery points in the vicinity of Madison, eligible plants would not likely be willing to supply milk for delivery at the Basic Formula Price if they were obligated to pay producers more. The cost to acquire milk for delivery would be at least the Grade A cost to the plant for Class III milk. Plants may demand even more, since the unanticipated reduction in supply would disrupt manufacturing schedules and cause the plant to operate at reduced input levels.[7] If these added costs are reflected in the futures price, then the CSCE milk futures price would be expected to exceed the BFP by the amount necessary to induce delivery from Grade A plants. Of course, this assumes that delivery, rather than offset, is viewed as a viable option for hedgers.

If the CSCE contract prices the Madison, Wisconsin, district Grade A price rather than the BFP, establishing a basis for hedging purposes will be more difficult than if the contract prices the

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[7] Grade A manufacturing plants typically negotiate substantial "give-up" charges for spot sales of milk for diversion to fluid use.

BFP. There is no routinely-reported Grade A manufacturing price. Consequently, hedgers will need to predict the Grade A premium for Class III milk in the Madison district and use that value in relation to the BFP in their calculation of basis. This does not pose a serious problem as long as the relationship between the Grade A price and the BFP is reasonably predictable and the contract does not "switch" from pricing the BFP to pricing the Grade A price.

The CME contract price could be affected in a different way. The CME contract specifies plants regulated under the Chicago and Upper Midwest orders as destinations for delivery. Contract sellers bear all or most of the cost of delivery to the destination. The milk may originate from eligible Grade A milk plants anywhere in the U.S.

This raises the possibility that the CME milk contract will price "distressed" milk; i.e., milk volume that temporarily exceeds plant capacity in some region. Distressed milk moving to Wisconsin for manufacturing typically sells at a discount to the BFP.[8] Suppliers are willing to incur large hauling costs in order to find a home for the milk.

Moreover, the location of distressed milk and the related cost of delivery to a Chicago or Upper Midwest order-regulated plant could vary from month-to-month. And, at times, the delivered cost of distressed milk to Midwestern plants could exceed the cost of local supplies. Because of their different delivery terms, the CME contract price would be expected to be at or below the CSCE price. The CME price would equal the CSCE price if the delivered cost of Grade A milk from the lowest price area equalled or exceeded the Grade A price in the delivery region. If the CME contract prices distressed milk that suppliers are willing to ship to the Midwest at delivered price less than the Grade A price in the delivery region, then the CME contract would be expected to trade at a discount to the CSCE contract.

The possibility that the CME contract will price distressed milk poses a potential problem for hedgers because the basis would be unpredictable. For example, at the time a hedge is placed, the CME contract price might reflect a temporary surplus of milk in New Mexico and the related willingness of a cooperative to incur a substantial loss to ship the excess milk to Wisconsin for manufacturing. That price might be lower than the BFP. At the time the hedge is lifted, the CME contract price might represent a normal supply situation, pricing the Grade A manufacturing milk price in Minnesota and Wisconsin. That price would be above the BFP. In other words, the price expectation when the hedge was placed would be different from the price expectation when the hedge was lifted because the underlying futures price was, in effect, pricing different commodities.

These concerns may be immaterial if delivery occurs only very infrequently. In that case, both contracts would likely price the BFP. That is because the BFP is the only consistently reported, verifiable, nationally applicable milk price. That, in itself, may ensure that the contracts price the

[8] Distressed Grade A milk from regulated plants is subject to federal order minimum pricing rules. But dairy cooperatives, which are exempt from paying minimum producer blend prices, account for most interorder shipments of milk in excess of local manufacturing capacity.

BFP, and that parties choosing to make or take delivery bear any additional costs or risks. Since delivery is (intentionally) very difficult under both contracts, we suspect that it will be a rare event.

In the hedging examples below, we assume that the CSCE and CME milk contracts price the BFP. If that is not the case, then hedgers will need to account for deviations in establishing basis.

HEDGING WITH THE MILK FUTURES CONTRACTS - SOME EXAMPLES

A stated reason for introducing the new milk futures contracts is to provide more straightforward hedging opportunities for dairy farmers and dairy plants buying raw milk. The cheddar cheese futures contract, which has traded on the Coffee, Sugar and Cocoa Exchange since June 1993 can and has been used for hedging milk. This involves a cross-hedge; protecting a price for one commodity by trading futures contracts for another commodity. Since cheese and milk prices move together very closely, hedging milk using the cheese futures is not a particularly risky cross-hedge. Nonetheless, the exchanges felt that a direct hedge (trading raw milk futures contracts to protect raw milk prices) would be easier for many hedgers to understand and use.

Assuming that the new milk futures contracts "price" the Basic Formula Price, hedging is straightforward for some potential users. But it is not for others. Fluid milk processors should find it easy to derive accurate price expectations based on milk futures prices (i.e, basis risk will likely be small). Dairy plants who buy milk on a volume basis and dairy farmers who sell milk by the hundred-weight will also find the new contracts reasonably simple to use for hedging. However, plants paying for milk components rather than milk volume can only use the futures contracts to cross hedge component prices against the futures milk price. Likewise, dairy farmers paid under multiple component pricing arrangements will need to convert milk futures prices to related component prices or convert component prices to equivalent expected milk prices if they engage in hedging.

Several hedging examples are shown below. We caution the reader that these are simplified examples to illustrate the concept of hedging with the milk futures contracts and the types of hedges that might be placed.

FLUID MILK PROCESSOR HEDGING

Possibly the most direct hedging opportunity with the milk contracts is for fluid milk bottling plants that purchase their entire raw milk supply from cooperatives. This is because all multiple component pricing (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 an order price two months beyond the contract month for the milk futures contract.

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 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.

Fluid Milk Processor Hedge to protect contracted sale

Date	Cash Market	Futures Market	Basis
Jan. '96	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 10 Feb. contracts @ $11.50	$3.50
Case I: Futures price increase/No basis change			
Feb. '96		SELL 10 Feb. contracts @ $12.50.	
Apr. '96	Bottler purchases 500,000 pounds of milk from coop @ $16.00.		$3.50
Gain/(Loss) Net Gain	($1.00) $0.00	$1.00	
Case II: Futures price increase/Basis strengthens			

Feb. '96		SELL 10 Feb. contracts @ $13.00	
Apr. '96	Bottler purchases 500,000 pounds of milk from coop @ $17.00. (Coop premium increased to $1.50)		$4.00
Gain/(Loss) Net Gain	($2.00) ($0.50)	$1.50	
Case III: Futures price decrease/Basis weakens			
Feb. '96		SELL 10 Feb. contracts @ $11.00	
Apr. '96	Bottler purchases 500,000 pounds of milk from coop @ $14.25. (Coop premium decreased to $.75)		$3.25
Gain/(Loss) Net Gain	$.75 $.25	($.50)	

In this example, the bottler would have established its contract price to the school district by converting the February 1996 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. It would then offset its long futures market position two months before procuring milk in the cash market. 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.

There are only two sources of basis risk in this example: (1) The coop overorder premium may be different from what the plant expected when it placed its hedge; or (2) the futures market price may not converge with the basic formula price in the delivery month.

In case II of the example, the coop supplying the bottler negotiated a premium higher than what the bottler expected. This resulted in a basis higher than expected (strengthened basis), leading to a net loss from the hedge. In Case III, the coop premium was less than expected (basis weakened), and the hedge showed a net gain. Note that the Class I differential is fixed and cannot affect the basis.

Convergence of cash and underlying futures prices during the month of delivery is usually assured because of arbitrage -- gains from "buying low" and "selling high" cause the cash and futures prices to come together at the time of delivery. In actively-traded futures markets, there is essentially no risk that prices will not converge. However, as noted earlier, there is some question about what cash market price the futures price will converge with in the case of the milk futures.

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 (short futures market position with subsequent offsetting purchase) 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 (long futures market position with subsequent offsetting sale).

Let's look at a simple open price supply contract hedge first. Assume that in January 1996, 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. This pricing formula conforms with federal order pricing rules: The minimum Class I price is the Basic Formula Price from two months earlier plus a Class I differential that is constant from month-to-month. Assume that the Class I differential applying in this market is $2.50 per hundredweight. Further, assume that the cooperative is a member of a over-order bargaining federation that has negotiated a $1.25 per hundredweight Class I premium with all fluid handlers 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.

The cooperative feels that the $12.00 futures price for April 1996 represents an optimistic price level, and decides to lock in the related fluid milk price of $15.75. To do so, it sells milk contracts equal in volume to its contracted cash market sale, or 20 50,000-pound contracts. Because of the formula lag in pricing, the cooperative will place its hedge in the futures contract delivery 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, not when it occurs.

In this example, futures market gains from offsetting the hedge cancel cash market losses (relative to the price expectation) if the futures price falls between the time the hedge is placed and when it is lifted. Likewise, cash market gains (relative to expectations) cancel futures market losses if the futures price increases. With no change in basis, gains and losses exactly match, meaning that the cooperative exactly achieves its locked-in price.

This is an unusually risk-free hedge. As long as the milk futures contracts price the BFP and there is convergence in the futures market delivery month, there is no basis risk in this hedging example. That is because the cooperative has locked its sales price to the BFP.

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

Date	Cash Market	Futures Market	Basis
Jan. '96	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 $15.75.	SELL 20 Apr. contracts @ $12.00.	$3.75
Case I: Futures price decline/No basis change			
Apr. '96		BUY 20 Apr. contracts @ $11.75.	
Jun. '96	Cooperative delivers milk to bottler. Gross pay price is $15.50		$3.75
Gain/(Loss)	($0.25)	$0.25	
Net Gain	$0.00		
Case II: Futures price increase/No basis change			
Apr. '96		BUY 20 Apr. contracts @ $13.00	
Jun. '96	Cooperative delivers milk to bottler. Gross pay price is $16.75.		$3.75
Gain/(Loss)	$1.00	($1.00)	
Net Gain	$0.00		

There is one other complexity that should be discussed. Note that nothing is said in this example 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. How can this be a risk-free hedge if the cooperative price is unknown when the hedge is lifted.

The answer is in 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. (But see the next example!)

A second example illustrates a fixed price contractual arrangement. In January 1996, a cooperative agrees to supply milk to a bottler in June 1996 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. This calls for a long hedge.

In this example, the basis is calculated as the cost of milk to the cooperative less the futures price (assumed to price 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 assumed it would 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. '96	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 20 Apr. contracts @ $12.00.	$2.50
Case I: Futures price decline/No basis change			

Apr. '96		SELL 20 Apr. contracts @ $11.75.	
Jun. '96	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)	
Case II: Futures price increase/Basis Weakens			
Apr. '96		SELL 20 Apr. contracts @ $13.00	
Jun. '96	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.		$2.25
Gain/(Loss) Net Gain	($.75) $.25	$1.00	

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 milk futures may provide superior hedging opportunities for plants making other dairy products whose prices are tied as closely as cheese to the BFP. Some cheese plants might also choose to use milk futures rather than the cheese futures for hedging cash forward contracts.

A simple example of cash forward contracting by a cheese plant using milk 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; hedges obligation in milk futures

Date	Cash Market	Futures Market	Basis
Jan. '96	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. milk contracts @ $13.00.	$1.00
Case I: Futures price decline/No basis change			
Apr. '96	Plant pays producers the contract price of $14.00. Competitors pay $13.00.	BUY Apr. milk contracts @ $12.00.	$1.00
Gain/(Loss) Net Gain	($1.00) $0.00	$1.00	
Case II: Futures price increase/No basis change			
Apr. '96	Plant pays producers the contract price of $14.00. Competitors pay $15.00.	BUY Apr. milk contracts @ $14.00	$1.50
Gain/(Loss) Net Gain	$1.00 $0.00	($1.00)	

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 milk 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 futures price (and the BFP) rose by $1.00 between the time the hedge was placed and when it was removed. 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.

It is instructive to compare this cash forward pricing arrangement with one involving a hedge in cheese futures. The following example shows an identical Grade A cash forward price quote derived from the CSCE cheddar cheese futures. Basis is derived in a different fashion. First, the cheese futures price is converted to gross revenue per hundredweight by multiplying by expected yield of cheese per hundredweight of milk (assumed to be 10 pounds in the example). Then, the gross value is adjusted by added revenue associated with the plant pool draw and plant costs, yielding a net value to milk. The net value, representing what the plant can profitably afford to pay for milk, is the cash forward price offer. The basis is the difference between the net value of milk and the futures price for cheese times expected cheese yield.

Both the pool draw and plant costs are sources of basis risk in this hedging example. In Case II, the pool draw is $.25 less than expected and net make cost is $.10 more than expected. This weakens the basis by $.35, resulting in a hedging loss. Other sources of basis risk include cheese yield variations and local cheese prices varying from the futures price at the time of offset.

Cheese plant offers cash forward price contract to dairy farmers; hedges obligation in cheese futures

Date	Cash Market	Futures Market	Basis

Jan. '96	Plant offers fixed price contract to Grade A patrons. Will pay $14.00 base price (3.5% butterfat) for May milk. Contract price is derived as follows: $14.00 Cheddar cheese price X 10 + .75 Normal Apr. "pool draw" - .75 Net make cost $14.00	SELL May cheese contracts @ $1.40	$0.00
Case I: Futures price decline/No basis change			
May '96 Gain/(Loss) Net Gain	Plant pays producers the contract price of $14.00. Cheese revenue is $1.00/Cwt. less than expected. Pool draw and net make cost are both $.75. Net milk value is $13.00. ($1.00) $0.00	BUY May cheese contracts @ $1.30 $1.00	$0.00
Case II: Futures price increase/Basis weakens			
May '96 Gain/(Loss) Net Gain	Plant pays producers the contract price of $14.00. Cheese revenue is $.50/Cwt. more than expected. Pool draw is $.50 and net make cost is $.85. Net milk value is $14.15. $.15 ($.35)	BUY May cheese contracts @ $1.45 ($.50)	($.35)

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 milk futures contract is a direct hedge, which makes it simpler to calculate basis if payment is made on a volume basis. Moreover, the milk contracts are for 50,000 pounds of milk, which is smaller than the equivalent volume of milk associated with the product contracts. Consequently, smaller farmers should be better-able to utilize the milk contracts for hedging.

A simplified dairy farmer hedge is illustrated below, in which a dairy farmer sells 2 April milk contracts 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.

Dairy Farmer Hedge

Date	Cash Market	Futures Market	Basis
Jan. '96	Dairy farmers expects to sell 100,000 pounds of Grade A milk in April. Price expectation based on April futures price is $14.00	SELL 2 Apr. milk contracts @ $13.00	$1.00
Case I: Futures price decline/No basis change			
Apr. '96	Sell 100,000 pounds of milk @ $13.00.	BUY 2 Apr. milk contracts @ $12.00.	$1.00
Gain/(Loss)	($1.00)	$1.00	
Net Gain	$0.00		
Case II: Futures price decline/Basis weakens			

Apr. '96	Sell 100,000 pounds of milk @ $13.00.	BUY 2 Apr. milk contracts @ $12.50	$.50
Gain/(Loss) Net Gain	($1.00) ($0.50)	$.50	
Case III: Futures price increase/Basis strengthens			
Apr. '96	Sell 100,000 pounds of milk @ $15.00.	BUY 2 Apr. milk contracts @ $13.50	$1.50
Gain/(Loss) Net Gain	$1.00 $.50	($.50)	

But regardless of the complexities associated with calculating basis, ***basis risk*** for hedgers is usually much smaller than ***price risk*** for those who choose not to hedge. The relationship between Grade A prices and the BFP is very strong. Note from Figure 2 the large swings in the Wisconsin average Grade A price and the M-W price (predecessor to the BFP) over the last 10 years.[9] Two-dollar price changes within a year have become the norm. Note in contrast the small within-year differences between the Grade A price and the M-W price. The difference in prices is quite predictable relative to the absolute prices. Moreover, the price differences exhibit a pronounced seasonal pattern, suggesting even more predictability.

This seasonality is detailed in Figure 3, which shows the 10-year average difference between the Wisconsin Grade A price and the M-W price by month. The monthly difference peaks in the late fall and troughs in mid-summer. The upper and lower ranges shown in the chart represent the 90 percent confidence intervals for the price differences. For example, if the same relationship between the two price series continues, one can be 90 percent confident that the Wisconsin Grade A price will exceed the M-W (BFP) by between $.50 and $1.25 in June.

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[9] The Wisconsin Grade A price shown in Figure 2 is at average butterfat test, while the M-W price is adjusted to a 3.5 percent butterfat basis. The seasonal pattern of price differences is related primarily to milk composition, especially butterfat. Butterfat tests tend to be lowest in the summer and highest in the late fall. Note that this price series represents the value of all Grade A milk (regardless of use) and is different from the Grade A manufacturing milk price series discussed earlier.

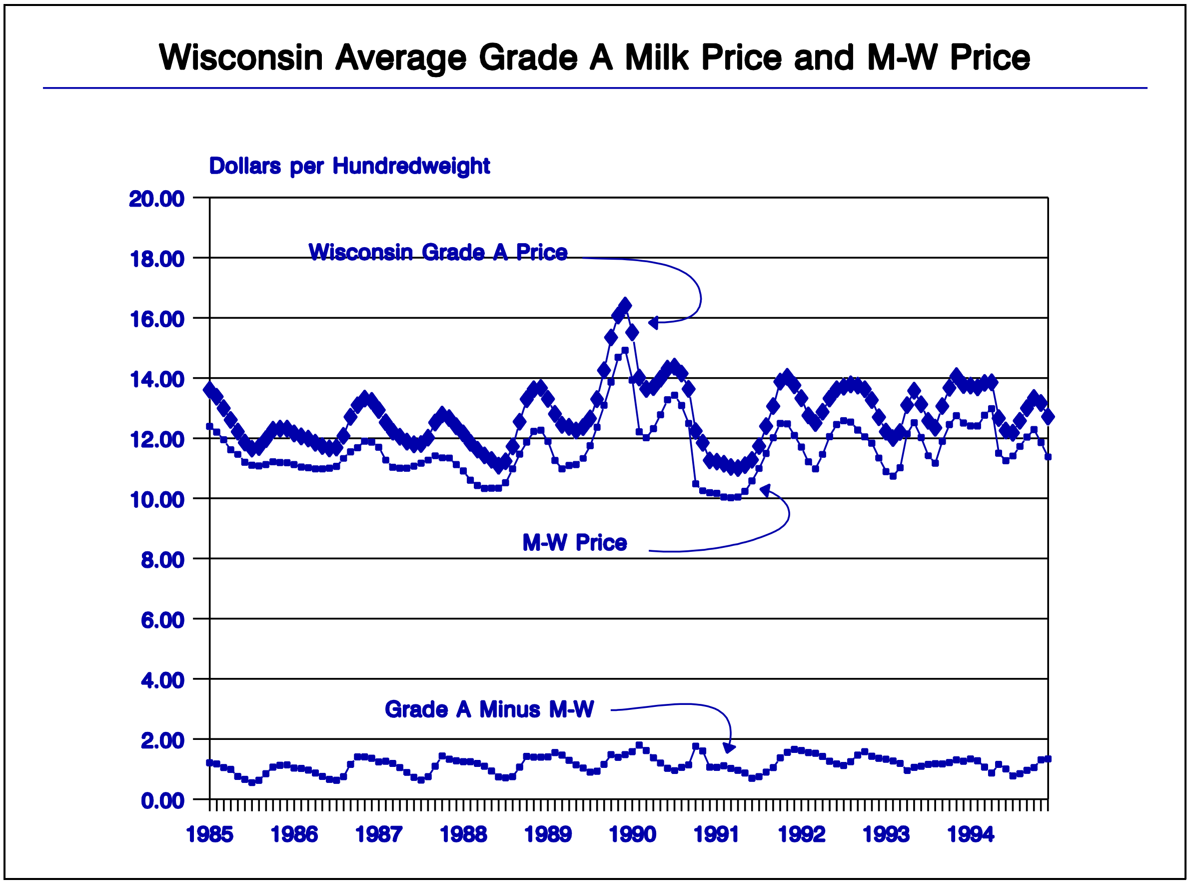

Figure 2

MULTIPLE COMPONENT PRICING AND HEDGING

Beginning with milk checks written for January marketings, most Grade A milk producers in the Upper Midwest will have their milk priced according to its component values. Five federal orders in the Upper Midwest have been amended to require Multiple Component Pricing (MCP). Under MCP, producers will be paid for pounds of protein, butterfat, and other solids in milk. This is in contrast to current federal order pricing in the region, under which producers are paid for milk volume plus or minus a butterfat differential.[10]

[10] See Marketing and Policy Briefing Papers No. 49 (*USDA's Recommended Decision on Multiple Component Pricing for Midwestern Federal Milk Marketing Orders*) and No. 53 (*USDA's Final Decision on Multiple Component Pricing for Midwest Federal Milk Marketing Orders*) for a detailed explanation of the MCP plan and how it will affect payment for milk.

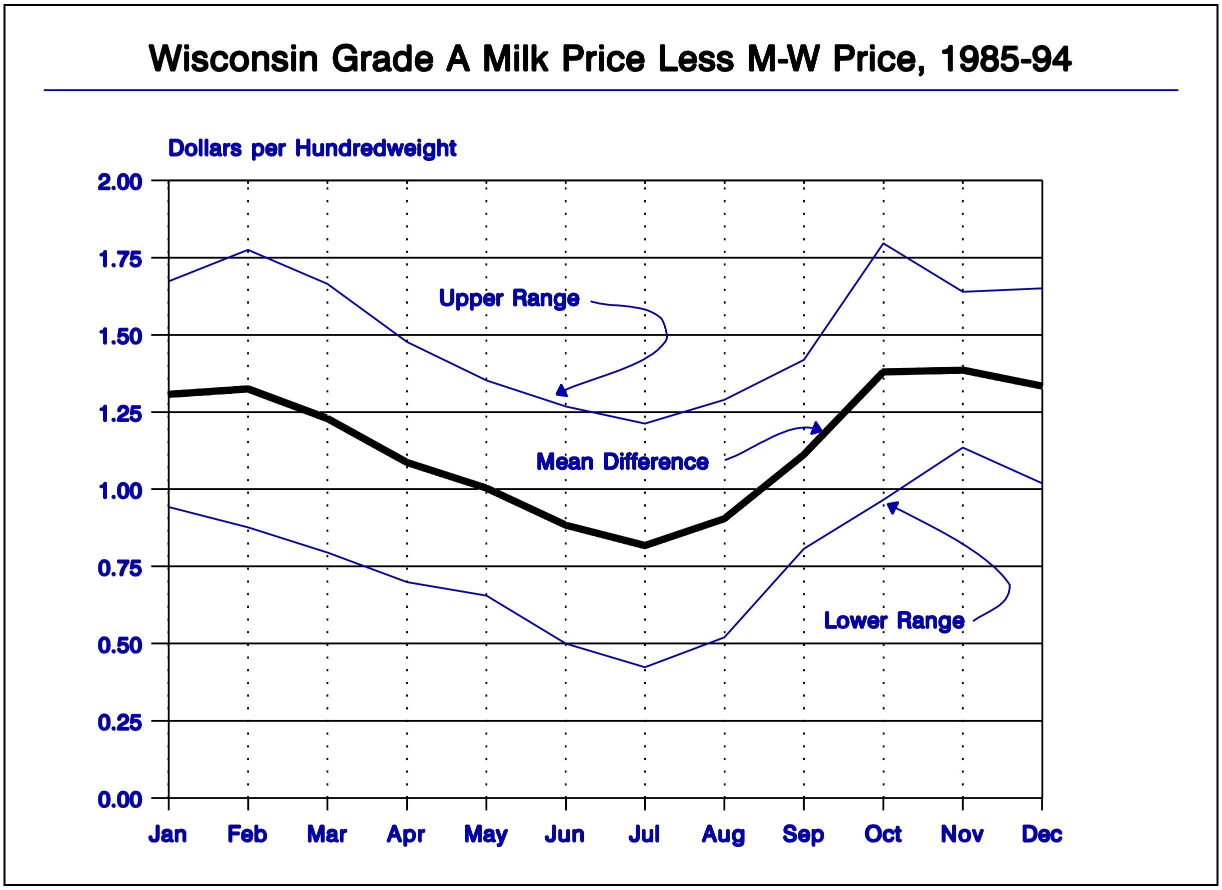

Figure 3

The switch to MCP in Upper Midwest federal orders affects hedging. Producers are no longer paid for milk; they are paid for milk components. Consequently, producers cannot directly hedge expected milk component marketings against the CSCE and CME milk contracts, which are written in terms of milk volume. Likewise, handlers who use milk for Class III and Class II purposes must pay for milk components, not for milk volume.

This does not mean that producers and handlers cannot use the new milk contracts for hedging. It does mean that hedges will be cross hedges -- hedging milk component prices against a per hundredweight milk value -- instead of direct hedges. In placing hedges, producers and handlers will need to convert futures milk prices to milk component prices or convert component prices to an equivalent milk price.

An example will illustrate how a producer might perform these conversions in establishing a basis prediction. At the same time, the example will reiterate how MCP values will be determined. Suppose that in January 1996, the CME July 1996 contract is trading at $12.50, and that this reflects the expected BFP for that month. A producer wants to know what the $12.50 price means in terms of his or her expected Grade A price for July.

The first step is to calculate component values per pound associated with the futures price. Priced components are butterfat, protein, and other solids. The milk contract prices are expressed in terms of 3.5 percent butterfat. However, the amounts of protein and other nonfat solids embodied in the futures price are unknown.

Under MCP, butterfat is priced in relation to butter prices as reflected by the monthly average CME cash market for Grade A butter. This price is widely quoted in dairy publications. The formula to convert butter prices to butterfat prices is complex, but a good rule of thumb is to multiply the CME butter price by 1.1 to derive the related butterfat price per pound. Suppose the producer thinks that the butter price in July will be $1.00 per pound. Using the rule of thumb, that means a butterfat price of $1.10 per pound.

The MCP protein price is 1.32 times the monthly average National Cheese Exchange (Green Bay) opinion for 40-pound block cheddar cheese. Since the specifications match closely, a reasonable estimate of the NCE block cheese price in July is the CSCE futures price for block cheddar cheese for the delivery month closest to the milk contract delivery month. Suppose the July 1996 CSCE cheese contract is trading at $1.35 per pound. That would predict a July protein price of (1.32 X 1.35) = $1.782 per pound.

The price for other solids under MCP is calculated as a residual to the BFP. Specifically, the other solids price per pound is the BFP *minus* the value of 3.5 pounds of butterfat *minus* the average protein test associated with the BFP times the protein price per pound all *divided by* the average other solids test associated with the BFP. The BFP protein and other solids tests vary seasonally, but are relatively constant from year-to-year. Suppose the average BFP protein and other solids test for July average 3.2 and 5.5 percent respectively. Then, the estimated other solids price per pound would be:

[$12.50 - (3.5 X $1.10) - (3.2 X $1.782)]/5.5 = $.536

With these expected component values associated with the July futures price for milk, the producer can then estimate his or her farm level Grade A milk price consistent with the futures quote. The producer's component levels will likely be different from those used to calculate the MCP component prices. Suppose the producer expects July herd milk to test 3.8 percent butterfat, 3.4 percent protein, and 5.6 percent other solids. Given the milk component values calculated above, milk value consistent with the $12.50 futures price would be:

	3.8 X $1.100	=	$4.18	= butterfat value per hundredweight
+	3.4 X $1.782	=	6.06	= protein value per hundredweight
+	5.6 X $0.536	=	3.00	= other solids value per hundredweight
			$13.24	= total milk component value per hundredweight

The producer's milk is expected to be worth 74 cents per hundredweight more than the July 1996 futures market BFP prediction because of higher component values. Since the milk is Grade A and purchased by a plant regulated under a federal order, the producer will receive an additional *producer price differential* reflecting market-wide utilization and prices of classes of milk other than Class III. Let's say that, based on historical records, the producer price differential is expected to be $.35 per hundredweight in our example.

The producer will also receive a premium or a penalty to the extent herd somatic cell count (SCC) for the month differs from 350,000. The premium/penalty per 100,000 SCC below/above 350,000 will be between 6 and 7 cents, depending on the cheese price for the month. Let's assume the producer expects to have a herd SCC of 150,000 in July, and that this would qualify for a premium of 13 cents per hundredweight.

Finally, the producer would probably be eligible to receive other premiums on top of the federal order minimum price. These might include plant premiums, volume premiums, and, possibly, quality premiums over and above the federal order SCC premium. Assume the producer expects these other premiums to total $.25 per hundredweight in July based on previous experience.

The producer's expected total milk value per hundredweight with these assumptions would be:

	$13.24	=	Milk component value
+	.35	=	Producer price differential
+	.13	=	Somatic Cell Count Premium
+	.25	=	Non-order producer price enhancements
	$13.97	=	Expected Grade A price

Stated differently, the producer's basis prediction is $1.47 per hundredweight after converting MCP component values to milk equivalent and accounting for other distinctions between the futures market price quotation and the manner in which farm-level Grade A prices are established. There are many elements making up the basis and, consequently, many sources of basis risk. But experience with relating actual pay prices with the BFP should serve to minimize basis risk.

SUMMARY

The two new milk futures contracts offer dairy farmers and other buyers and sellers of milk and dairy products additional opportunities to manage price risk in an increasingly volatile milk price environment. The availability of these risk management tools is especially important given the market-oriented direction of federal dairy policy.

The CSCE and CME contracts differ somewhat in their specifications. Potential hedgers will need to evaluate which offers the best opportunity to lock in prices. Hedgers should also look at the cheese and nonfat dry milk contracts in determining the most appropriate risk management strategy. Strategies may involve using more than one futures market.

Key in any hedging decision is the basis, especially the predictability of the relationship between cash and futures prices. Hedgers should compare the alternative contracts in terms of which yields the most predictable basis given the type of hedge and the specific market conditions affecting their business.