

INTRODUCTION TO OPTIONS TRADING IN CHEESE AND NONFAT DRY MILK FUTURES CONTRACTS

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Trading in options for cheese and nonfat dry milk futures contracts commenced on June 22, 1993 on the New York Coffee, Sugar and Cocoa Exchange. Leaflet M-12 provides an introduction to the purpose and potential use of cheese and nonfat dry milk futures contracts. This leaflet defines options, their purpose, and the potential use of cheese and nonfat dry milk options. Options trading offers another risk management tool to cheese and nonfat dry milk manufacturers, buyers, and dairy producers; one that may be preferable to futures market hedging in some cases.

In many ways, options trading is similar to futures contract trading. The same regulatory procedures generally apply. Trading rules are similar. The same players are involved (hedgers, speculators, brokers, floor traders, locals, etc.). Placing trading orders is the same. Since these aspects were covered in leaflet M-12, they are not discussed here. But trading options is somewhat more complicated than trading futures. There are more alternatives, more confusing terminology, and more need to watch the markets. There is one big advantage to using options instead of futures for risk management: Hedgers can preserve the benefits of favorable price movements while protecting themselves against unfavorable movements. But there is a cost of gaining this benefit in the form of options premiums.

What are Futures Contract Options?

In a generic sense, the purchase of an option gives the buyer the right to purchase something else. The right does not involve an obligation. Options are common in real estate markets. For example, you might buy an option to purchase property at a negotiated price or you might buy the right to purchase a vacant lot in Madison, Wisconsin, for a price of \$25,000 any time

between May 1, 1993, and December 31, 1993. If the real estate market in Madison goes up between May and December, you would likely exercise your option and buy the property. If the market falls, you would let your option expire.

What you pay for the option depends on two factors: (1) the price for the real estate that is listed in the option relative to its current value; and (2) general expectations with respect to real estate market conditions. If the current market value of the property is \$25,000 and the price listed in the option is \$30,000, then the option value would be much smaller than if the listed option price was \$25,000. In a rising real estate market, you would expect to pay more for the option to purchase the property at a pre-negotiated price than in a stagnant or falling market. In any case, you can dispose of your option in one of three ways: You can exercise the option and purchase the property, you can let it expire, or you can sell the option to someone else.

Futures contract options are similar to real estate options. You can buy a call, which is the right—but not the obligation—to purchase a futures market contract at a specified price. You can then exercise the call, which allows you to buy the underlying futures contract at the set price, you can let the call expire, or you can sell the call to someone else. If you sell a call, then you take on the obligation to provide the futures contract if the buyer of the call decides to exercise.

If the futures contract price rises *above* the fixed price in your call, you would have an incentive to either exercise your right to purchase the contract at the lower price or sell the call if you were not interested in taking on the commitment to receive delivery of the commodity. It is likely that you could sell the call for more than

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you paid for it if the price of the futures contract was increasing. If the futures contract price falls *below* the fixed price in your call, you would likely let the call expire—you would not want to buy the contract at more than what it is currently selling for in the futures market.

There is a second type of futures contract option known as a put. A put is the right—but not the obligation—to sell a futures contract at a specified price. Like calls, put options are both bought and sold. Put buyers can exercise them, sell them, or allow them to expire. If the futures market price falls *below* the price specified in the put, then it would normally be profitable for the buyer to either exercise, or sell, the put. If the futures market price rises *above* the price specified in the put, then the buyer would normally allow the put to expire—you would not want to sell the futures contract at less than what it is currently selling for in the futures market. The seller of a put option has the obligation to purchase the underlying futures contract if the buyer of the put decides to exercise.

Both calls and puts have two essential elements: (1) The futures contract delivery month; and (2) the futures contract price (called the strike price).¹ For example, an option to sell (a put) a May 1994 cheddar cheese contract at a price of \$1.20 per pound is denoted as a *May 120 put*. An option to buy (a call) a February 1994 cheddar cheese contract at a price of \$1.35 is a *February 135 call*.

As in all markets, there has to be a buyer and seller on each side of the options transaction. Buyers of puts and calls are called option holders. Sellers are called option writers. Generally, the writers or sellers of options are speculators. The use of options for hedging purposes normally involves buying calls and puts.

What Does it Cost to Buy a Futures Contract Option?

The price of an option is called its premium. The premium represents the maximum amount the option holder can lose. Premiums for puts and calls are related to two primary factors. The first is the strike price relative to the current trading value of the underlying futures contract. The difference is known as the intrinsic value of the option, and is equal to the gross profit an option holder could earn if the option were exercised. The second factor affecting the value of an option is the time between the option transaction and the expiration of the contract. This affects the time value of the option.

At any time, there will be trading in several options for the same contract month representing different strike prices. Some strike prices will be above the current contract price and some below. The premium will be related to the benefits of being able to buy or sell the contract at the strike price. For example, if the current price of the July 1994 cheddar cheese contract is \$1.25, a July 120 call would be expected to have a premium of at least 5 cents. The right to buy a July futures contract at 5 cents less than its current value would be worth 5 cents or more. The call option has an intrinsic value of 5 cents and may have additional time value. A July 120 put would have a much smaller premium. The right to sell a July futures contract at less than its current value would not be worth much since it has no intrinsic value, only time value.

Call options with strike prices *below* the current futures price and put options with strike prices *above* the current futures price have intrinsic value. That is, there is a clear economic benefit of being able to purchase the contract at less than its current cost (call) or sell it at more than its current cost (put). Options that have intrinsic value are called “in the money” options; those without intrinsic value are “out of the money”; and those with strike prices equal to the current futures contract price are, not surprisingly, “at the money.” In general, the more in the money an option, the higher will be the premium.

Even out of the money options may have time value. We noted above that a July 120 put would not be worth much if the current July 1994 futures price were \$1.25. This would be especially true if we were talking about June 1994 and the futures market for cheese was stable. But if the July 120 put is purchased a year earlier in July 1993, then it could have considerable time value. The buyer is essentially paying for a whole year to see whether the July 1994 futures contract price will fall below \$1.20, thereby permitting a profit. In general, the more time between option purchase and expiration, the higher will be the premium. Time value also may change at different strike prices. At higher strike prices there is less of a chance that the call option will come into the money during the time prior to option expiring.

Volatility in the price of the underlying futures contract also affects the time value of options contracts. If there are rapid and frequent price movements for a

¹The strike price is sometimes called the striking price or the exercise price.

futures contract, then there is a greater likelihood that prices will move to a level that will make exercising the option profitable than if futures prices are relatively stable. Therefore, the option writer will want a greater premium for taking a greater risk of having the option exercised. In general, the greater the volatility in futures prices, the greater the premium for the options contract.

Assume that the July 1994 cheese futures contract is trading at \$1.20 per pound. Hypothetical premiums for “in the money,” “at the money,” and “out of the money” options are illustrated in Chart 1. The premiums are illustrative only, and should not be construed as representing likely values.

Chart 1. Values and Premiums of

<i>Call Option</i>				
Strike Price		Intrinsic Value	Time Value	Total Premium
\$1.00	In the Money	\$0.20	\$0.06	\$0.26
1.05		0.15	0.05	0.20
1.10		0.10	0.04	0.14
1.15		0.05	0.03	0.08
1.20	At the Money	0.00	0.02	0.02
1.25		0.00	0.01	0.01

<i>Put Option</i>				
Strike Price		Intrinsic Value	Time Value	Total Premium
\$1.00	Out of the Money	\$0.00	\$0.01	\$0.01
1.05		0.00	0.01	0.01
1.10		0.00	0.02	0.02
1.15		0.00	0.02	0.02
1.20	At the Money	0.00	0.03	0.03
1.25		0.05	0.04	0.09

What Do the CSCE Cheddar Cheese Options Look Like?

The cheddar cheese and nonfat dry milk options are very similar to the underlying futures contract. Specifications for these options are listed in the chart above.

How Can Options Be Used for Hedging Price Risk?

Like futures trading, options trading can shift the risk of unfavorable price movements in the cash market to speculators. The difference is that hedgers using options can lock in minimum or maximum price objectives (subject to the same basis risk as applies to futures

market hedging) and simultaneously benefit from favorable price movements. However, there is a cost to achieve this asymmetric protection in the form of the options premium. There is no such premium involved in futures market hedging.

Purchasing an option can be viewed as buying price protection insurance for future cash market transactions. The insurance premium in this case is the option premium. If you don’t need the insurance (prices move in your favor), you still pay the premium. If you do need the insurance (prices move against you), then the insurance pays off in the form of helping to ensure a price or profit objective through offsetting options market gains.

The insurance analogy can be carried further to look at purchasing options at different strike prices. When you buy automobile insurance, you can select from different deductibles for the collision and comprehensive portions of the package. If you choose a zero or very low deductible, then your cost will be relatively high in comparison to choosing, say, a \$1,000 deductible. By choosing a high deductible, you are limiting your risk, but, at the same time, you are self-insuring up to the deductible amount. In other words, you are willing to bear part of the cost of having a wreck, but not all of it.

If you buy “at the money” options to provide price protection, then you will pay more than if you buy put or call options that are “out of the money.” An “at the money” option is the same as a “zero deductible” insurance policy; it protects the current futures contract price. An “out of the money” option will cost less; the further “out of the money,” the smaller the premium. But, at the same time, the “out of the money” option will protect a price objective that is less than or greater than (put or call respectively) the current futures contract price—there is a “deductible” representing the willingness of the purchaser to self-insure the difference between the strike price and the current futures contract price.

To illustrate the use of put options to protect against a price decline, suppose you are holding cheese inventory in July 1993 and are worried about a price collapse before you sell your cheese in December 1993. You see that the cheese futures contract in February 1994 is trading at \$1.20 per pound. Given your basis prediction, this cheddar cheese price would allow you to achieve your price objective for the cheese you will be selling in the cash market.

To hedge your inventory value, you could buy an “at the money” February 1994 put option for cheddar cheese (a February 120 put). The premium for this option is 3 cents per pound, or \$1,200 (there will also be broker costs, which we will ignore). Since this is an “at the money” put, it has no intrinsic value but a 3-cent time value.

You have paid a premium of \$1,200 to ensure your price objective. That is your maximum liability in the options market. Your put option will either expire worthless, in which case you are out \$1,200; you may be able to sell it at a profit (if the futures price falls far enough below \$1.20); or you might exercise it, which will allow you to take on a short position in the February 1994 cheddar cheese futures contract at \$1.20 per pound. Your hope is that the option will expire worthless, which will mean that your cash market price objective will be exceeded.

In December, you are ready to sell your cheese. First, let’s assume that the February 1994 cheddar cheese contract is trading at \$1.15, 5 cents under the strike price in your put option. At the same time, the value of your cheese inventory has fallen 5 cents. You get 5 cents less than you expected for your cheese. But your put option may now be worth 6 cents—3 cents more than you paid for it. Note that the put is now “in the money” by 5 cents. The other penny could be the remaining time value. Since it is nearer the expiration date of the option, the time value is less than it was when you purchased the option.

You sell the put, pocketing the 3 cent per pound profit to offset most of the cash market loss. You have achieved your price objective less 2 cents per pound. Alternatively, you could exercise the option and take on a short position in the February 1994 futures contract at \$1.20. You could then cover the short position by buying the February 1994 futures contract at \$1.15. This would fetch you 5 cents per pound futures market profits (less brokerage fees), but you still have the options premium of 3 cents, for a net gain of 2 cents per pound from futures and options trading.

But what if prices went up from what you expected? Suppose that at the time you are ready to sell your cheese, the February 1994 cheddar contract is trading at \$1.40 per pound? Your put option is worthless; you are out the \$1,200 premium. But your cheese is now worth 20 cents more than you expected. Hence your net gain is 17 cents per pound (20-cent cash market gain less 3-cent premium).

This example illustrates the difference between futures contract hedges and options hedges. If you had attempted to lock in your cash market price objective using a short futures contract, you would have done better with falling prices than using the put option. Because of the declining time value of the option, you did not achieve your price objective, even with a constant basis. With a constant basis, the gain from the futures market hedging transaction would have completely offset the cash market loss.

But with a rising market, the option hedge can be preferable to the futures hedge. Assuming a constant basis, the futures hedge would have meant exactly offsetting gains and losses in the cash and futures markets. You would have achieved your price objective, but you would not have benefitted from the rising cash market. In contrast, the options hedge allowed you to garner all of the cash market increase except for the option premium.

How Would Cheddar Cheese and Nonfat Dry Milk Options Trading Be Used in the Dairy Industry?

Hedging with options can be used by cheese and nonfat dry milk manufacturers, distributors, retailers, and others with a cash market interest in these and related dairy products, including farm level milk. Firms with product to sell would normally buy put options to hedge; those with product to buy would normally purchase call options. In any case, the use of options limits the risk of unfavorable price changes while preserving the gains from favorable price movements. But hedging with options involves a premium cost that does not apply to hedging with futures contracts.

Trading futures options offers the dairy industry an alternative to hedging in futures contracts as a means to reduce market price risks. Futures options offer some advantages over hedging in futures. The holder of options receives protection against adverse price movements without sacrificing benefits from favorable price movements. With hedging in futures contracts, both maximum and minimum prices are set. Buying put and call options also has an advantage over hedging in futures in that margin money and margin calls are avoided. The option premium—the maximum outlay for an option purchase—is known in advance. If options are offset rather than exercised, futures transactions and associated broker’s commissions are also avoided.

Put options also afford dairy plants the opportunity to offer minimum price forward contracts to dairy

farmers. A cash forward contract hedged through the sale of futures contracts sets the maximum as well as the minimum milk price. In contrast, plants could afford to pay more than the minimum price if the forward price contract was backed by the purchase of a put option. Put options can also be used directly by dairy farmers to provide downside price protection while preserving upside gains.

The use of options is no easier than hedging on the futures market. Understanding basis and the basis risk is just as important with options as with futures hedging. Options traders need to closely watch futures contract prices in comparison to the option strike price in order to take advantage of “in the money” options opportunities. With “out of the money” options a comparison of net results from letting the option expire or offsetting the option should be compared. This involves careful monitoring of premiums.

Price protection through the purchase of put or call options also involves a cost that is not incurred when hedging is done through futures market transactions. That cost is the premium for the put or call. Buying a put option to protect against a price decline will be an inferior strategy to selling short in the futures market if prices do, indeed, fall. Similarly, buying a call is inferior to going long in the futures market if prices increase. Consequently, whether hedging is done through options or futures trading depends partly on how confident the hedger is in the direction of price movements.

Cheese and nonfat dry milk futures options will be preferred by some over hedging on the futures market. Others will use cheese and nonfat dry milk futures options in addition to or in combination with hedging on the futures market.

Chart 2. Important Specifications for Cheese and Nonfat Dry Milk in Options Contracts

SPECIFICATION	CHEESE CONTRACTS	NONFAT DRY MILK																				
Trading Unit	One cheddar cheese futures contract—equivalent to 10,500 pounds of cheddar cheese. [see leaflet M-12]	One nonfat dry milk futures contract—equivalent to 11,000 pounds of nonfat dry milk. [see leaflet M-12]																				
Price Quotation	Cents per pound.	Cents per pound.																				
Delivery Months	February, May, July, September, November.	February, May, July, September, November.																				
Trading Hours	2:15 p.m. to 3:15 p.m., New York time.	2:15 p.m. to 3:15 p.m., New York time.																				
Minimum Price Change	1/100 cents per pound, equivalent to \$1.05 per contract. <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><i>Futures Contract Price</i></td> <td style="text-align: center;"><i>Strike Price</i></td> </tr> <tr> <td colspan="2" style="text-align: center;"><i>Increments</i></td> </tr> <tr> <td style="text-align: center;">Less than \$1.10</td> <td style="text-align: center;">\$.025</td> </tr> <tr> <td style="text-align: center;">\$1.10 up to \$2.00</td> <td style="text-align: center;">\$.050</td> </tr> <tr> <td style="text-align: center;">\$2.00 or more</td> <td style="text-align: center;">\$.100</td> </tr> </table>	<i>Futures Contract Price</i>	<i>Strike Price</i>	<i>Increments</i>		Less than \$1.10	\$.025	\$1.10 up to \$2.00	\$.050	\$2.00 or more	\$.100	1/100 cents per pound, equivalent to \$1.10 per contract. <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><i>Futures Contract Price</i></td> <td style="text-align: center;"><i>Strike Price</i></td> </tr> <tr> <td colspan="2" style="text-align: center;"><i>Increments</i></td> </tr> <tr> <td style="text-align: center;">Less than \$1.10</td> <td style="text-align: center;">\$.025</td> </tr> <tr> <td style="text-align: center;">\$1.10 up to \$2.00</td> <td style="text-align: center;">\$.050</td> </tr> <tr> <td style="text-align: center;">\$2.00 or more</td> <td style="text-align: center;">\$.100</td> </tr> </table>	<i>Futures Contract Price</i>	<i>Strike Price</i>	<i>Increments</i>		Less than \$1.10	\$.025	\$1.10 up to \$2.00	\$.050	\$2.00 or more	\$.100
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