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Introduction

"If you trade a million pounds of oil a year or a million bushels of beans, if you have it all hedged you can trade any portion of that any day you want to. If you don't hedge it, you're exposed to a million pounds of oil or a million bushels of beans everyday."

Gene Bryant
Member
Chicago Board of Trade

You'll never be able to eliminate risk. But there are ways to manage it. By incorporating Chicago Board of Trade futures and options contracts into your procurement practices, you'll be better able to manage the effects of changing ingredient prices.

We've compiled this special strategy booklet to help you manage your ingredient costs. It highlights several futures and options applications that you can use to compare to your current buying practices.

If you are new to futures hedging, you should first understand that it is essential to have a good correlation between the price of the ingredient you use and the price of the related commodity traded on a futures exchange. Although most ingredients are not directly traded on futures exchanges, food processors use the markets to cross hedge their ingredient price risks because of the strong price correlation with traded commodities. Common cross hedges include:

- Corn futures to hedge the price risk of corn flour or corn meal
- Wheat futures to hedge flour prices
- Soybean oil futures to hedge refined soyoil, canola oil, or palm oil

It's a good practice to determine the correlation between your ingredient price and the futures price before you enter into a futures or options contract.

To make the best use of this strategy booklet, you should be familiar with basic futures concepts such as futures contracts, options contracts, hedging, basis, margins, the clearing process, and option terminology. If you need a refresher course, consult the glossary at the back of this booklet or review *Agricultural Futures for the Beginner*, *Agricultural Options for the Beginner*, and *Understanding Basis*. All three CBOT® publications are available online.

Part 1: Strategies for Upside Price Protection

Putting a Lid on Rising Prices



Long Futures

If you're interested in protecting yourself against rising prices, you can buy (go "long") futures. You might also be interested in this strategy if you want to plan or budget your purchases ahead of time so you know what to expect for the upcoming year.

Position

Purchase the futures contract month closest to, but not before, the time you plan to take delivery of your ingredients. For example, in May, your company knows it will need to take delivery of soybean oil by November 1. Since December is the futures contract month closest to the time, but not before, the company plans to take delivery of soybean oil, you'll track the December futures prices daily. (The Chicago Board of Trade does not trade a November soybean oil futures contract.)

Once you purchase or price (i.e., forward contract) ingredients from your supplier, you will close out (offset) your futures position by selling the same amount and type of futures contracts initially purchased.

Offsetting a futures position is the most common way (about 99% of the time) to close out a futures position. The other alternative is to accept delivery of the commodity according to the terms of the futures contract. Economically speaking, you will usually fair better by offsetting your futures position and taking delivery of the actual commodity through your regular supplier.

Pros

- Protection against higher prices.
- Lock in a purchase price without committing to a specific supplier.
- Performance of futures contract guaranteed by Board of Trade Clearing Corporation.
- Weaker basis decreases final purchase price.
- Easier to plan budgets since purchase price is established before delivery.

Cons

- Stronger basis increases final purchase price.
- Can't benefit from lower market prices.
- Margin capital required.

The Ups and Downs of Basis

To effectively hedge in the futures market, you'll need to understand basis. Simply stated, basis is the price difference between a specific "cash" commodity and the related futures price.

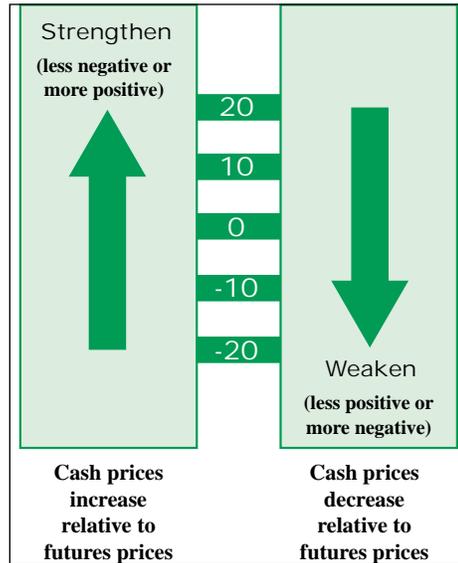
Example

Wheat cash price	\$3.20
Wheat futures price	<u>\$3.00</u>
Basis	+\$0.20

In this case, the basis is 20 cents over the wheat futures contract. In other words, the supplier is offering to sell wheat at 20 cents over the futures price.

The reasons for the price difference are transportation costs between delivery locations, storage costs and availability, and variations between local and worldwide supply and demand of a given commodity. In any event, this difference in price plays an important part in what you actually pay for ingredients when you hedge.

If the actual basis is weaker (less positive/more negative) than the expected basis figure, the actual purchase price will be lower than you expected. On the other hand, if the actual basis is stronger (more positive/less negative) than the expected basis, the actual purchase price will be higher than you expected. As an ingredient buyer, you'll benefit from a weakening basis. In going through the examples in this strategy booklet, keep this thought in the back of your mind. Check out how the outcomes vary when the basis changes. Regardless of how you purchase your ingredients (i.e., cash market, futures, options), basis affects your final ingredient price.



Hedging allows you to offset your price risk, but you'll still have basis risk. The good news is basis is generally predictable. Even though prices can vary greatly from year to year, the basis variation is relatively stable. With hedging, you are most concerned with the basis for the time period in which you will take delivery of your ingredients. For example, if you're planning on taking delivery of your ingredients in March you will want to estimate the March basis. This estimate will come from an evaluation of historical basis records in your area.

Talk to your suppliers. They may be able to provide you with basis history. Or, begin compiling your own history by checking various news services that provide cash grain information. Look for locations near your supplier and begin charting cash prices against the nearby futures contract price. Keep track using a daily or weekly format. Over time, you should see a pattern and can use this information when making a decision about whether (or when) to hedge or use a long-term purchase agreement.

Expected Purchase Price Equals:

$$\text{Futures Price} + \text{Expected Basis} = \text{Expected Purchase Price}$$

Example

Assume you're a snack food manufacturer wanting to establish a purchase price for soybean oil you will need by late February. During mid-November, when March soybean oil futures are trading at 22 cents per pound, the local basis for February delivery is 5 cents over March soybean oil futures. Since the price level is attractive but the basis is strong, (historically the basis has been weaker averaging 3 cents over March futures for February delivery) you decide it's a good time to hedge your ingredient costs by purchasing enough soybean oil futures contracts to cover your expected soybean oil requirements.

Based on this information, the expected soybean oil cost is 25 cents per pound:

$$\begin{array}{rclcl} \text{Futures Price} & + & \text{Expected Basis} & = & \text{Expected Purchase Price} \\ \$.22 & + & \$.03 & = & \$.25 \end{array}$$

That's true as long as there's no change in the basis. As you can see from the table on the next page, no matter what happens to the futures price if the basis is as expected, your purchase price is locked in at 25 cents a pound.

How Many Futures Contracts Do I Need?

If you're ultimate goal is to purchase wheat flour but you're using wheat futures to hedge your price risk, go ahead and determine the basis by subtracting the wheat futures price from the local wheat cash price. Both prices should be available from news wire services or your local suppliers. Next, calculate the number of wheat futures contracts you'll need to purchase. It typically takes 2.35* bushels of wheat to produce a hundredweight of flour. Therefore, multiply your flour requirements in hundredweights times 2.35 to determine the number of bushel equivalents of wheat. A futures contract consists of 5,000 bushels. So, divide bushel equivalents by 5,000 bushels to arrive at the appropriate number of contracts to hedge.

Converting Wheat Price to Flour Price

To convert a wheat price to an ingredient price, a common formula for wheat flour is:

$$\begin{array}{r} \text{wheat price per bushel} \times 2.35/\text{cwt}^* \\ - \text{millfeed credits/cwt} \\ + \text{milling margin/cwt} \\ + \text{freight/cwt} \\ \hline = \text{delivered flour cost/cwt} \end{array}$$

*We're using a standard conversion factor of 2.35. You'll want to use your supplier's conversion factors in determining the number of contracts needed to hedge.

In Feb. Mar Futures Are:	+/-	Actual Basis	=	Cash Price	+/-	Futures (-)Gain (+) Loss*	=	Purchase Price
\$20	+	\$03	=	\$23	+	\$02 L	=	\$25
\$21	+	\$03	=	\$24	+	\$01 L	=	\$25
\$22	+	\$03	=	\$25	-	\$0	=	\$25
\$23	+	\$03	=	\$26	-	\$01 G	=	\$25
\$24	+	\$03	=	\$27	-	\$02 G	=	\$25

*To calculate the futures gain or loss, use this formula:

Futures gain/loss = futures price at delivery/offset time - futures price at initiation

Now, the story changes if the basis is different than expected. If the basis is weaker than expected (e.g., -.01), the purchase price will be lower. If, on the other hand, the basis is stronger than expected (e.g., +.05), the purchase price will be higher.

In Feb. Mar Futures Are:	+/-	Actual Basis	=	Cash Price	+/-	Futures (-)Gain (+) Loss	=	Purchase Price
\$20	+	\$05	=	\$25	+	\$02 L	=	\$27
\$20	-	\$01	=	\$19	+	\$02 L	=	\$21
\$22	+	\$05	=	\$27	-	\$0	=	\$27
\$22	-	\$01	=	\$21	-	\$0	=	\$21
\$24	+	\$05	=	\$29	-	\$02 G	=	\$27
\$24	-	\$01	=	\$23	-	\$02 G	=	\$21

Note: Commission and transaction costs are not included in these calculations.

Establish a Ceiling Price Without a Floor

Long Call

Another way to establish protection against rising prices is to buy (go “long”) a call option, an option that gives the buyer the right to buy the underlying futures contract at the strike price on or before the option expires. A call option gives you a ceiling purchase price but allows you to take advantage of falling prices. The price of this market flexibility is the option premium, which is paid in full when you purchase the call.

Position

Buy a call option with the contract month closest to, but not before, the time you plan to take delivery of your ingredients. You need to select a call with a strike price that best meets your market and price objectives as well as your firm’s risk exposure guidelines.

When you are ready to purchase ingredients from your supplier, you can

simultaneously close out your long call position. If futures prices rise (*above the strike price*), you can either offset or exercise the call option to achieve your needed price protection. In most cases, you’ll want to offset rather than exercise. Economically speaking, you will usually fair better by offsetting your option and taking delivery of the ingredients from your supplier. For more information on offset vs. exercise, see the sidebar. On the other hand, in a falling futures market (*below the strike price*) you won’t need protection, so you can let the option expire or offset (sell) it to capture any remaining time value.

Pros

- Eliminate upside price risk—establish a price “ceiling.”
- Establish a maximum purchase price without committing to a supplier.

Offset vs. Exercise

Once you’ve purchased or sold an option, there are three different methods to close out the position. Generally, the most common way to close out a position is by offsetting it—taking a second market position opposite your initial one, i.e., sell if you first bought or buy if you first sold—prior to the last trading day of an option. Offsetting an option before expiration is the only way you’ll recover any remaining time value. It also precludes the risk of being assigned a futures position if you originally sold an option and want to avoid the possibility of being exercised against.

Another choice you have is to exercise the option, provided you bought the option. Only an option buyer can exercise; and the option seller runs the risk that he or she will be exercised against at any time. When an option position is exercised, both the buyer and the seller are assigned a futures position. Call buyers are assigned a long futures position; call sellers are assigned a short futures position. Put buyers are assigned a short futures position; put sellers are assigned a long futures position. Unfortunately, if you decide to exercise rather than offset, you will only obtain the option’s intrinsic value and won’t be able to regain any remaining time value.

The only other possibility is you could do nothing at all and let the option expire.

- May benefit if price falls. A food processor can consider the premium the cost of price insurance. Check with your tax advisors to see how this cost should be handled on the books.
- Maximum cost is known upfront and limited to the premium paid.
- Weaker basis results in a better buying price.
- No margin capital required.
- The different available strike prices allow you to tailor this strategy to meet your firm's needs.

Cons

- Although no margin capital required, premium cost is paid in full.
- Stronger basis increases final purchase price.

Expected Ceiling Price Equals:

$$\text{Call Strike Price} + \text{Expected Basis} + \text{Call Premium} = \text{Expected Ceiling Price}$$

Example

Assume you're a tortilla manufacturer planning on taking delivery of corn flour in early June. By March, you start to become concerned about reports indicating higher corn prices and—given the competitive nature of the business—would like to lower your ingredient costs if the market falls. At the time, July corn futures

Calculating Intrinsic Value and Time Value

Option premium can be divided into two parts: intrinsic value and time value. Intrinsic value is the "built-in" value of an option. It is the difference between the option strike price and the underlying futures price. For example, the intrinsic value of a \$3.50 December wheat call when December wheat futures are trading at \$3.60 is 10 cents (\$3.60 underlying futures price - \$3.50 strike price). The holder has the right to buy at \$3.50, while the market is trading at \$3.60, so the \$3.50 call has a "built-in" value of 10 cents. If December wheat futures were trading at \$3.46, the \$3.50 call would have no intrinsic value. It's not worth exercising a \$3.50 call when you can purchase wheat futures at \$3.46.

Time value is equal to the option premium less intrinsic value. If a \$3.50 December wheat call sold for 24 cents when December wheat was trading at \$3.60, the call would have 14 cents of time value (\$.24 premium - \$.10 intrinsic value = \$.14 time value). For options with no intrinsic value, the entire premium equals time value. During the life of an option, time value erodes. By the time an option expires the only remaining value, if any, is the intrinsic value.

While option premium can be broken down into two components, intrinsic value and time value, option premium as quoted in the newspaper or by on-line quote services is the total premium.

are trading at \$2.18 and the basis is relatively strong (25 cents over July), so you decide to buy a \$2.20 July corn call for 12 cents. The call option gives you protection against rising prices, but if prices fall you're not locked in. The expected buy basis for June is about 15 cents over July futures.

Under these market conditions, the tortilla manufacturer's expected ceiling price for corn is:

$$\begin{array}{rcccccccc} \text{Call Strike Price} & + & \text{Expected Basis} & + & \text{Call Premium} & = & \text{Expected Ceiling Price} \\ \$2.20 & + & \$0.15 & + & \$0.12 & = & \$2.47 \end{array}$$

No matter how high the futures price rallies, the ceiling cost for corn is \$2.47 a bushel. Of course, if the basis is stronger (more than 15 cents over July futures, e.g., 25 cents over), the ceiling cost will be higher. The opposite also applies. If the basis is weaker (less than 15 cents over July futures, e.g., 5 cents over), the effective purchase price will be lower.

In reviewing the table below, you can see how the option lowers your purchase price if futures fall below the \$2.20 strike price. This is one of the key benefits of options and a primary reason why they continue to grow in popularity among hedgers. Although the long call option strategy provides you with protection against higher ingredient prices, your firm will be able to take advantage of lower prices if the market moves lower.

We're assuming there is no remaining time value left in the option. Any remaining time value would work to your advantage since you purchased an option and later offset it.

In May Jul Futures Are:	+/-	Basis	=	Cash Price	+/-	Option (-)Gain (+)Loss*	=	Purchase Price
\$1.70	+	\$0.15	=	\$1.85	+	\$0.12 L	=	\$1.97
\$1.95	+	\$0.15	=	\$2.10	+	\$0.12 L	=	\$2.22
\$2.20	+	\$0.15	=	\$2.35	+	\$0.12 L	=	\$2.47
\$2.45	+	\$0.15	=	\$2.60	-	\$0.13 G	=	\$2.47
\$2.70	+	\$0.15	=	\$2.85	-	\$0.38 G	=	\$2.47

Note: Commission and transaction costs are not included in these calculations.

*To calculate the option gain/loss, use this formula:

Option gain/loss = futures price (at delivery/offset time) - strike price - premium paid; maximum option loss = premium paid

Lower Your Buying Price in a Stable Market

"We have two primary commodity pricing objectives. One is to help our businesses meet their financial objectives by managing volatile commodity prices. And the second is to buy our inputs at as competitive levels as possible. We feel futures allow us to meet both of those objectives."

*Mike Cleary
Director of Commodity &
Ingredient Purchasing
Quaker Oats Company*

Short Put

If you anticipate the market remaining stable, you can lower the buying price of your ingredients by selling (going "short") a put option, an option that gives the buyer the right to sell the underlying futures contract at the strike price on or before the option expires. By selling a put option as a long hedger, you can lower the purchase price of your ingredients by the amount of premium received from the option sale provided the market remains relatively stable. If the futures market falls below the put's strike price, you'll be able to buy the cash commodity at a lower price than you originally expected (the cash and futures markets generally move parallel to each other), but you will lose on the short put. If the futures market falls below the strike price by more than the premium, your losses on the short put offset the lower price paid to your supplier. If the futures market rallies, the **only** protection you have against the higher ingredient price is the premium collected from selling the put.

Position

Sell a put option with the contract month closest to, but not before, the time you plan to take delivery of your ingredients from your supplier. Since you are selling an option, you will collect the option premium—which you can use to reduce the effective purchase price of your ingredients. But there are added risks when selling put options. There's the possibility you will be exercised against or assigned a long futures position if the market price moves below the put strike price. When you are ready to purchase or price ingredients from your supplier, you can simultaneously offset your short put position by buying back an identical put option with the same strike price and contract month to prevent being exercised against or you can let the option expire.

Because of the risks involved with selling put options, additional positions in options, futures, or the cash market are sometimes used to reduce the level of risk exposure. If you decide to sell put options, it is generally less risky selling out-of-the-money options than selling in- or at-the-money puts. In all cases, it's a good idea to evaluate different strike prices and to select the one that best meets your needs.

Pros

- As the option seller, you receive the option premium immediately. The premium lowers your final purchase price provided the market remains stable.

- You are protected from upside price movement up to the amount of the premium received.
- Weaker basis results in a better purchase price.
- Performance is guaranteed by the Board of Trade Clearing Corporation.

Cons

- As the option seller, you must assume price risk and post margin.
- Upside price protection runs out if the futures price rises above the strike price by more than the premium received.
- The decision to exercise is in the hands of the option buyer. The option seller can be notified of an exercise any time before the option expires or is offset. To offset, you would buy back the same number and type of options as you initially sold.
- Stronger basis increases the final purchase price.
- Floor price is established. If the market drops, you cannot take advantage of lower prices because of losses on the put option.

Expected Pricing Formulas

In a rising market in which the futures price stays above the put's strike price, your purchase price equals:

$$\text{Futures Price} + \text{Basis} - \text{Put Premium Received} = \text{Purchase Price}$$

If the market moves below the put's strike price, you'll be able to buy your ingredients at a lower price than you originally expected but you will lose on your short put position. Bottom line—you lock in a floor but there's no ceiling. In this case, your purchase price equals:

$$\text{Put Strike} + \text{Basis} - \text{Put Premium Received} = \text{Purchase Price}$$

Example

As an ingredient buyer for a cookie manufacturer you'd like to improve the company's competitive position by purchasing ingredients at a lower price. The market for its primary ingredient, rolled oats, has been relatively stable for a long time and the company's analysts are forecasting a similar trend. May oat futures have been trading within a 2-cent range for several weeks averaging \$1.60 per bushel.

Based on its analysis, the company decides to sell an out-of-the-money \$1.40 May put for 8 cents. With an expected basis of 5 cents under the May oat futures for early April, the company's minimum purchase price is:

Put Strike	+	Basis	-	Premium Received	=	Purchase Price
\$1.40	+	(-.05)	-	\$.08	=	\$1.27

Regardless of how much the May futures price falls below the \$1.40 strike price, the purchase price remains at the floor price established by selling the put as long as basis is as expected. Let's test this position against a variety of possible futures scenarios in April. We're assuming there is no remaining time value left in the option. Any remaining time value will increase the company's final purchase price since it sold an option.

In Apr. May Futures Are:	+/-	Actual Basis	=	Cash Price	+/-	Put Option (-) Gain (+) Loss*	=	Purchase Price
\$1.00	-	\$.05	=	\$.95	+	\$.32 L	=	\$1.27
\$1.20	-	\$.05	=	\$1.15	+	\$.12 L	=	\$1.27
\$1.40	-	\$.05	=	\$1.35	-	\$.08 G	=	\$1.27
\$1.60	-	\$.05	=	\$1.55	-	\$.08 G	=	\$1.47
\$1.80	-	\$.05	=	\$1.75	-	\$.08 G	=	\$1.67

Note: Commission and transaction costs are not included in these calculations.

*To calculate the short put option profit/loss, use this formula:

Option gain/loss = futures price (at delivery/offset time) - put strike price + premium received; however, maximum option profit = premium received.

As you can see, the company can't improve its ingredient purchase price when futures are below the put strike price of \$1.40. Actually, once the futures price falls below \$1.40, the manufacturer begins to lose money on the put, which effectively offsets the lower ingredient price paid to the supplier. Also note, protection against higher prices is limited to the premium received once futures move above the put strike price of \$1.40.

Establish a Buying Range with a Ceiling and a Floor Price

"Nabisco needs to control and have predictable, consistently low commodities and raw material costs in order to consistently deliver that kind of value-added product to the consumer."

Mike Mardy

CFO

Nabisco Biscuit Company

Long Call/Short Put

Combining a long call and a short put position provides you with a buying price range. This range is established on the top end by the long call and the bottom end by the short put.

Position

Buy a call option and sell a put option with the contract month that most closely follows the time you plan to take delivery of your ingredients. When you are ready to purchase your ingredients from your supplier, you can offset the position by selling back the call and buying back the put.

The strike price of the options determines your price range. You would choose a lower strike price for the put option (i.e., a floor price), and a higher strike price for the call option (i.e., a ceiling price). As with all the strategies discussed here, selecting that range depends on a company's price objectives and risk exposure. The premium received from selling the put allows you to reduce some of the premium costs of the call. You effectively lower the ceiling price by selling the put.

Pros

- Price range is established.
- Better planning—you can report an expected price range for your ingredient purchases.
- Cost protection is reduced by the put premium received.
- Added flexibility in selecting your supplier of ingredients, i.e., take advantage of today's prices without committing to a specific supplier.
- Final purchase price improves if basis weakens.
- Performance is guaranteed by the Board of Trade Clearing Corporation.

Cons

- Downside pricing potential is limited by put strike price (floor).
- Margin capital required as a result of the short put.
- Put option can be exercised by the buyer at any time.
- Purchase price can increase if basis strengthens.
- Required to pay call premium in full when position is initiated.

Expected Pricing Formulas

Evaluating the possibilities, add to your selected strikes (both call and put) the anticipated basis and the net option premium (call premium paid minus the put premium received). In other words, your *expected floor purchase price equals*:

$$\text{Put Strike} + \text{Expected Basis} + \text{Call Premium Paid} - \text{Put Premium Received}$$

Your expected ceiling price equals:

$$\text{Call Strike} + \text{Expected Basis} + \text{Call Premium Paid} - \text{Put Premium Received}$$

Example

Let's assume you're the purchasing manager for an in-store bakery. You're concerned about rising wheat flour prices and like the benefits of a call option—establishing a ceiling price but still being able to lower the purchase price if the market falls. What bothers you, though, is the call premium is a little higher than you'd like to pay. To help lower its cost, you decide to simultaneously sell a put option. So, on June 15, you buy a \$3 September wheat call for 20 cents and sell a \$2.80 September wheat put for 8 cents. The wheat basis is historically about 15 cents over the September wheat futures contract during early August when you plan to take delivery of the wheat flour.

Based on the strike prices of the two options, you've established a buying range from \$3.07 to \$3.27:

$$\begin{array}{rcccccc} \text{Put Strike} & + & \text{Expected Basis} & + & \text{Call Premium Paid} & - & \text{Put Premium Received} \\ \$2.80 & + & \$.15 & + & \$.20 & - & \$.08 = \$3.07 \\ & & & & & & \text{(floor price)} \end{array}$$

$$\begin{array}{rcccccc} \text{Call Strike} & + & \text{Expected Basis} & + & \text{Call Premium Paid} & - & \text{Put Premium Received} \\ \$3.00 & + & \$.15 & + & \$.20 & - & \$.08 = \$3.27 \\ & & & & & & \text{(ceiling price)} \end{array}$$

As you can see from the table on the next page, no matter how high or how low prices move, the purchase price falls within the \$3.07 to \$3.27 range. What will affect the final price is a change in the basis and the remaining time value. As explained earlier, any remaining time value when/if the options are offset will affect the final purchase price.

In Aug. Sep Futures Are:	Actual + Basis	Cash = Price	+/-	Put Option (-) Gain (+) Loss*	+/-	Call Option (-) Gain (+) Loss*	=	Purchase Price
\$2.50	+ \$.15	= \$2.65	+	\$.22 L	+	\$.20 L	=	\$3.07
\$2.75	+ \$.15	= \$2.90	-	\$.03 G	+	\$.20 L	=	\$3.07
\$3.00	+ \$.15	= \$3.15	-	\$.08 G	+	\$.20 L	=	\$3.27
\$3.25	+ \$.15	= \$3.40	-	\$.08 G	-	\$.05 G	=	\$3.27
\$3.50	+ \$.15	= \$3.65	-	\$.08 G	-	\$.30 G	=	\$3.27

Note: Commission and transaction costs are not included in these calculations.

*To calculate the option gain/loss, use these formulas:

Put option gain/loss = futures price (at delivery/offset time) - put strike price + put premium received; maximum put option profit = premium received

Call option gain/loss = futures price (at delivery/offset time) - call strike price - call premium paid; maximum call option loss = premium paid

Enhancing Hedging Precision with Serial Options

Serial options give you added flexibility in your price risk management. These short-term options fill in the months not in the regular commodity cycle, providing year-round risk management and trading opportunities. For example, in addition to the March, May, and July corn standard options, serials provide expirations in April, priced in terms of May futures, and June, priced in terms of July futures.

Part 2: Comparative Buying Analysis

Strategy Analysis for Protection Against Rising Prices

"I think there are several things that have to be in place before you develop a risk management program in any company. One is make sure that your business leaders really understand the futures markets, how they operate. Another is to make sure that your purchasing staff or the people that are responsible for executing the trades really understand the fundamentals of the market."

*Mike Cleary
Director of Commodity &
Ingredient Purchasing
Quaker Oats Company*

Let's look at a specific example and follow it through different marketing alternatives to see which works best under a stable, rising, or falling market.

We'll cover five strategies:

- Long futures
- Long call
- Short put
- Long call/short put
- Spot cash purchase

The set-up

It's November and a bakery decides to establish a purchase price for flour it will need by late February. The local supplier is currently offering to sell wheat flour through a long-term purchase agreement. Taking into consideration a negotiated milling margin, millfeed credits, and freight rate, the bakery calculates the wheat portion cost of flour to be \$3.35 per bushel. With the CBOT March futures contract currently trading at \$3.00 per bushel this equates to a wheat basis of 35 cents over March wheat futures. Based on the company's historical records, the average wheat basis for late February is 20 cents over March. Because the basis is strong (35 cents over March), the company decides to hold off entering a long-term purchase agreement with its supplier. Instead, the bakery evaluates a variety of buying strategies using the futures market. We'll follow the outcomes under a variety of scenarios as market conditions change.

The company has a variety of hedging alternatives in the futures market and will follow some of these as market conditions change. We're assuming there is no remaining time value left in the options.

Initial Market Conditions

Historical basis for late Feb delivery: \$.20 over Mar (+.20 March)

Current basis for long-term purchase agreement: \$.35 over Mar (+.35 Mar)

Long-term purchase price @ \$3.35/bu

March CBOT wheat futures @ \$3.00/bu

March CBOT 3.00 wheat call @ \$.18/bu

March CBOT 2.80 wheat put @ \$.10/bu

Scenario 1: Higher Prices at Delivery

Actual wheat basis in late February at mill +.15 March CBOT wheat futures
March CBOT wheat futures @ \$4.25/bu
March CBOT 3.00 wheat call @ \$1.25/bu
March CBOT 2.80 wheat put @ 0 (expires worthless)

Long futures

\$3.15 (\$3.00 futures at initiation + \$.15 basis)

- Protected against higher wheat price.
- Gain of \$1.25 in futures position offset the higher cash market price (\$4.25 sold Mar futures - \$3.00 bought Mar futures).

Long call

\$3.33 (\$3.00 call strike + \$.15 basis + \$.18 call premium paid)

- Protected against higher price at a cost of 18-cent option premium.
- Gain of \$1.07 on long call offset higher cash market price (\$4.25 current futures - \$3.00 call strike - \$.18 premium paid).

Short put

\$4.30 (\$4.25 current futures + \$.15 basis -
\$.10 put premium received)

- Only 10-cent upside protection (option premium received).
- Risky strategy under volatile market conditions.

Long call/short put

\$3.23 (\$3.00 call strike + \$.15 basis + \$.18 call premium paid
- \$.10 put premium received)

- Purchase price range established.
- Gain of \$1.07 on the call option and 10-cent gain on put option help offset higher price paid for wheat.

Spot cash purchase

\$4.40 (\$4.25 current futures + \$.15 basis)

- Had **no** protection against higher wheat prices.

General comments: Ranking of strategies—(1) long futures, (2) long call/short put, (3) long call, (4) short put, (5) spot cash purchase. Buying futures provided upside protection at no cost. Long call/short put provided upside protection at a reduced cost. Call option provided upside protection for a cost. Short put had limited upside protection. Spot purchase, doing nothing to manage risk, is pure speculation. All the strategies benefitted from a weakening basis (moved from +.35 March to +.15 March).

Scenario 2: Lower Prices at Delivery

Actual basis in late February at mill +.25 March CBOT wheat futures
 March CBOT wheat futures @ \$2.50/bu
 March CBOT 3.00 wheat call @ \$0 (expires worthless)
 March CBOT 2.80 wheat put @ \$.30/bu

Long futures

\$3.25 (\$3.00 futures at initiation + \$.25 basis)

- Locked in a price level when strategy was initiated.
- Protected against higher futures prices but cannot take advantage of lower price levels. Loss on futures raised lower ingredient prices.
- Cannot benefit from lower prices.

Long call

\$2.93 (\$2.50 futures at delivery + \$.25 basis + \$.18 call premium paid)

- Benefitted from lower prices.
- Cost of upside price protection, the 18-cent option premium, is not recovered when the futures market moves below strike price.

Short put

\$2.95 (\$2.80 put strike + \$.25 basis - \$.10 put premium received)

- Purchased flour at lower price but 20-cent loss on option position increased final purchase price (\$2.50 current futures - \$2.80 put strike + \$.10 premium received).

Long call/short put

\$3.13 (\$2.80 put strike + \$.25 basis + \$.18 call premium paid - \$.10 put premium received)

- Stayed within anticipated buying range.
- Cost of price protection lowered by put premium received.

Spot cash purchase

\$2.75 (\$2.50 futures at purchase time + \$.25 basis)

- Company took its chances and benefitted from falling prices.
- Lucky but not smart.
- No protection if prices rise.

General comments: Ranking of strategies—(1) spot cash purchase, (2) long call, (3) short put, (4) long call/short put, (5) long futures. Spot cash purchase had the best result but consider yourself lucky. It is more prudent to use some form of risk management. The long call strategy gives you the best of both situations—protection in a rising market and opportunity in a falling market. Basis improved but not as much as expected.

Scenario 3: Stable Prices at Delivery

Actual basis in late February at mill +.20 March CBOT wheat futures
March CBOT wheat futures @ \$3.00/bu
March CBOT 3.00 wheat call @ \$0 (expires worthless)
March CBOT 2.80 wheat put @ \$0 (expires worthless)

Long futures

\$3.20 (\$3.00 futures at initiation + \$.20 basis)

- Protected against higher prices.
- In stable market, same result as a spot cash purchase. Transaction costs, however, will slightly raise actual purchase price.

Long call

\$3.38 (\$3.00 futures at delivery + \$.20 basis
+ \$.18 call premium paid)

- Higher purchase price due to option premium.
- Protected against higher costs and could take advantage of possible lower market prices.

Short put

\$3.10 (\$3.00 futures at delivery + \$.20 basis
- \$.10 put premium received)

- Purchase price lowered by the 10-cent premium received.
- Risky strategy if prices move up; only protection is the amount of premium received.

Long call/short put

\$3.28 (\$3.00 call strike + \$.20 basis
+\$.18 call premium paid - \$.10 put premium received)

- Purchased ingredients within expected buying range.
- Higher purchase price due to option premium but not as high as long call strategy. Premium received from short put reduced strategy cost.

Spot cash purchase

\$3.20 (\$3.00 futures at delivery + \$.20 basis)

- No change in expected purchase price since the market is stable.
- Risky.
- Absolutely *no* protection if prices rise.

General comments: Ranking of strategies—(1) short put, (2) long futures, (3) spot cash purchase, (4) long call/short put, (5) long call. In a stable market environment, the company will end up paying the miller \$3.20. What increases this effective purchase price is the amount and type of price protection you choose to use. Since you are collecting premium instead of paying premium the short put improves (lowers) your effective purchase price.

Summary: Strategy Analysis

	Rising Market Basis: +.15	Falling Market Basis: +.25	Stable Market Basis: +.20
Long \$3.00 futures	\$3.15	\$3.25	\$3.20
Long \$3.00 call	\$3.33	\$2.93	\$3.38
Short \$2.80 put	\$4.30	\$2.95	\$3.10
Long \$3.00 call/ short \$2.80 put	\$3.23	\$3.13	\$3.28
Spot cash purchase	\$4.40	\$2.75	\$3.20

Hind Sight Is 20/20

In comparing the price outcome of the different strategies, it becomes pretty obvious that no particular one works best every time. And since we can't predict the future, there's no telling ahead of time which strategy is going to give you the best results.

We can't predict the future, but we can plan for it. It's a matter of evaluating your risk tolerance, market expectations, and ultimate price goal, then selecting the strategy that fits best.

Part 3: Strategies for Downside Price Protection

Protecting Inventory Values



As a buyer of commodities concerned about rising ingredient prices, the focus of this book is on strategies geared to the long hedger. We've included a couple of strategies, however, in case you find yourself in a situation where your cash market position changes. For instance, a short futures or long put strategy may be appropriate if you'd like to protect the value of stored inventory over an extended time period.

Or maybe you've entered into a long-term pricing commitment, and over time there has been a dramatic change in market fundamentals. The outlook is for continued falling prices, so you might enter a short futures position or long put position to protect your contracted price and stay competitive.

Short Futures

Short futures means selling futures contracts. This strategy is attractive if you anticipate prices going lower and want protection.

Position

Sell the futures contract month closest to, but not before, the time you plan to use your inventory or take delivery of a commodity agreed upon through a long-term purchase agreement. Once you use the inventory or take delivery from your supplier, you close out (offset) your futures position by purchasing the same amount and type of contracts as initially sold. Although this strategy provides you with some flexibility in case your market expectations change, you could wind up second guessing yourself. Some firms prefer to stick with the purchase price already established that meets their objectives.

Pros

- Inventory values protected.
- Benefit from falling prices.
- No basis risk.

Cons

- Higher price increases final purchase price.
- Margin capital required.
- Cannot benefit from basis improvement.

Example

In January, when the local basis is weak, a restaurant corporation enters a long-term purchase agreement with its supplier to buy soybean oil at 22.50 cents/lb for delivery in mid-April.

Later, the restaurant corporation notices a change in key fundamental factors, indicating a drastically lower soybean oil market. Due to the competitive nature of its business, the company decides to sell May futures to improve its purchase price if and when the market falls. At the end of February, the restaurant corporation sells May soybean oil futures at 22 cents. Since a purchase price for the cash oil has already been established, the restaurant corporation will not be affected by a change in the basis.

The following chart looks at various outcomes should the market fall, as expected, or possibly rally.

In Apr. May Futures Are:	Cash Price Long-term Purchase Agreement	+/-	Futures (-) Gain (+) Loss*	Purchase Price
\$.18	\$.2250	-	\$.04 G	\$.1850
\$.20	\$.2250	-	\$.02 G	\$.2050
\$.22	\$.2250	-	\$ 0 G	\$.2250
\$.24	\$.2250	+	\$.02 L	\$.2450
\$.26	\$.2250	+	\$.04 L	\$.2650

Note: Commission and transaction costs are not included in these calculations.

*To calculate the futures gain or loss, use this formula:

Futures gain/loss = futures price at initiation - futures price at offset

As you can see from the table above, if the company is correct in its revised market analysis and prices fall, the actual purchase price could be reduced. But if the company is wrong and prices rise, it would end up paying more for the soybean oil than it had originally planned.

Flexible Price Protection

"We stuck our foot in the water and found the water to be nice and warm, and we just continued on increasing our activity to where it has reached a level now that we stay fully hedged."

Arthur Green
President
SUNLIGHT FOODS, INC.

Long Put

Another way to establish protection against falling prices is to buy a put option. Like the short futures hedge, you can improve your cash purchase price if the market drops. Unlike the short futures hedge, this strategy limits your loss to the cost of the option should the market move higher.

Position

Buy a put option selecting the contract month that most closely follows the time you plan to use your inventory or take delivery of the commodity agreed upon through a long-term purchase agreement. Once you use the inventory or take delivery from your supplier, you can close out your option position. Most likely, you would offset the position by selling the same amount and type of contracts you initially bought.

As with any option position, you should evaluate different strike prices and select the one that best meets your price objectives.

Pros

- Lower your purchase price or protect the value of stored inventory if the market drops.
- No basis risk.
- No margin capital required.
- Price flexibility.
- Cost limited to the option premium.

Con

- Purchase price increases by the cost of the option.

Example

Let's take another look at the last example. But this time, assume the restaurant corporation hedges its price risk with a put option. Just to review, in January when the basis was weak, the company entered a long-term purchase agreement with its supplier to take delivery of soybean oil in mid-April at 22.50 cents/lb. In February, soybean oil prices started tumbling as a result of key fundamental factors changing. Although the company was initially satisfied with the price established in the long-term purchase agreement, it feared prices would continue falling and decided to purchase an at-the-money soybean oil put for further protection. May soybean oil futures were trading at 22 cents, and the 22 put was trading for a premium of .5 cent per pound.

The following chart looks at various outcomes should the market fall, as expected, or possibly rally. We're assuming there is no remaining time value left in the option. Any remaining time value would work to your advantage since you purchased an option and later offset it.

In Apr. May Futures Are:	Cash Price Long-term Purchase Agreement	+/-	Option (-) Gain (+) Loss*	Purchase Price
\$.18	\$.2250	-	\$.035 G	\$.19
\$.20	\$.2250	-	\$.015 G	\$.21
\$.22	\$.2250	+	\$.005 L	\$.23
\$.24	\$.2250	+	\$.005 L	\$.23
\$.26	\$.2250	+	\$.005 L	\$.23

*To calculate the option gain or loss, use this formula:

Option profit/loss = strike price - futures price (at delivery/offset time) - premium paid; maximum option loss = premium paid.

As you can see from the table above, if the company is correct in its market analysis and prices fall, the effective purchase price could be reduced by the profit on the put option. But if the company is wrong and prices rise, it could end up paying more (the premium paid) for the soybean oil than it had originally planned. Keep in mind, the additional cost is **limited** to the put premium paid.

Comparing Short Futures and Long Put

If prices fall, both the short futures and long put strategy provide you with price protection. The actual purchase price, however, will be higher under the long put scenario if prices fall due to the option premium paid.

If the market rallies, be aware that under the short futures strategy your actual purchase price will continue to increase, whereas the long put will establish a ceiling "maximum" price equal to the cash price plus the premium paid.

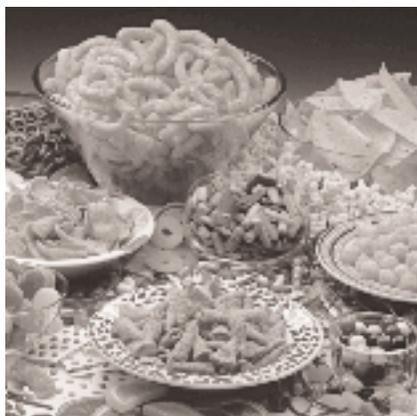
Just a reminder: The restaurant corporation locked in a cash purchase price through its long-term purchase agreement. Any change in basis will have absolutely no effect on the final purchase price.

For More Information

We'd all like to avoid price risk. But since we can't, we can do the next best thing: manage it. Futures and options are tools that can help you better manage your company's risk and make budget planning a little easier. Ultimately, you will need to find a commodity broker that specializes in agricultural hedging who you feel comfortable with. If you have specific questions about hedging or the CBOT markets, call one of our product managers at 312-341-7955.

The strategies presented in this booklet are just a sample of the many available. If you'd like additional materials about the futures and options markets, be sure to visit our web site at www.cbot.com and click on **Knowledge Center** and then on **Publications**.

Glossary



at-the-money option—an option whose strike price equals, or is approximately equal to, the current market price of the underlying futures contract.

basis—the difference between the price of a commodity and the price of a related futures contract, i.e., cash price - futures price = basis.

call option—an option that gives the option buyer the right to buy (go “long”) the underlying futures contract at the strike price on or before the expiration date of the option.

cash market—a market in which physical commodities are bought and sold.

cash price—the price of an ingredient through a particular supplier.

Clearing Corporation—the organization that clears Chicago Board of Trade futures and futures options trading activity to make sure buyers’ and sellers’ records agree and that contracts are honored.

commission—fees paid to a broker for executing a futures or options order.

correlation—the causal relationship between changes in the value of the futures contract and changes in the value of the hedged item.

cross hedge—a hedge initiated to cover price risk in one commodity using a different but related futures contract when there is no futures contract available for the item being hedged (e.g., hedging wheat flour with wheat futures).

exercise—the action taken by the holder of a call if he or she wishes to purchase the underlying futures contract or by the holder of a put if he or she wishes to sell the underlying futures contract.

expiration date—the last day an option can be exercised. Options expire during the month preceding the futures contract delivery month. For example, March wheat options expire in February.

forward contract—a cash market agreement in which a seller agrees to deliver a specific cash commodity to a buyer sometime in the future at a predetermined price. Also referred to as a long-term purchase agreement.

futures contract—a contract traded on a futures exchange for the delivery of a specified commodity at a future time. The contract specifies the item to be delivered and the terms and conditions of delivery.

futures market—a market in which futures contracts are bought and sold.

futures price—the price of a specific futures contract.

hedge—buying or selling a futures or options contract for protection against the possibility of a price change in the physical commodity or ingredient one is planning on buying or selling.

hedger—a market participant who buys or sells a futures or options contract for protection against the possibility of a price change in the physical commodity or ingredient.

in-the-money option—a call is in the money if its strike price is below the current price of the underlying futures contract (i.e., if the option has intrinsic value). A put is in the money if its strike price is above the current price of the underlying futures contract (i.e., if the option has intrinsic value).

intrinsic value—the dollar amount that would be realized if the option were to be exercised immediately. See in-the-money option.

long—buying a futures or options contract.

long hedge—buying a futures or options contract to protect the purchase price of a commodity or ingredient one is planning to purchase.

long-term purchase agreement—a cash market agreement in which a seller agrees to deliver a specific cash commodity to a buyer sometime in the future at a predetermined price. Also referred to as a forward contract.

margin—in the futures and futures/options markets, this is an amount of money deposited to ensure fulfillment of the contract at a future date. Both buyers and sellers of a futures contract must initiate and maintain a margin account. Only sellers of options are required to initiate and maintain a margin account. Option buyers do not have margin requirements.

offset—taking a second market position opposite to the initial position (also referred to as close out).

option—within the futures industry, this is a contract that conveys the right, but not the obligation, to buy or sell a futures contract at a certain price for a limited time. See call option and put option.

out-of-the-money option—a call or put option that currently has no intrinsic

value. That is, a call whose strike price is above the current futures price or a put whose strike price is below the current futures price.

premium—the price of a particular option contract as determined by option buyers and sellers at a futures exchange. Premium does not include related brokerage commission fees. The premium is the maximum cost (loss) an option buyer may be subject to.

put option—an option that gives the option buyer the right to sell (go “short”) the underlying futures contract at the strike price on or before the expiration date of the option.

serial options—Short-term option contracts based on the nearby futures and trading for approximately 30 days to expire during months not in the regular commodity cycle.

short—selling a futures or options contract.

short hedge—selling a futures or options contract to protect the value of a commodity or ingredient one currently owns.

spot cash price—the current ingredient price quoted by your suppliers.

strengthen—refers to basis movement where the price of a cash commodity increases relative to the price of a specific futures contract. A long hedger does not benefit from a strengthening basis. A short hedger benefits from a strengthening basis.

strike price—the price at which the holder of a call (put) may choose to exercise his or her right to purchase (sell) the underlying futures contract.

time value—the amount by which an option’s premium exceeds the option’s intrinsic value. If an option has no intrinsic value, its premium is composed entirely of time value.

transaction costs—commission fee and opportunity cost of margin capital.

underlying futures contract—the specific futures contract that may be bought or sold by the exercise of an option.

weaken—refers to basis movement where the price of a cash commodity declines relative to the price of a specific futures contract. A long hedger benefits from a weakening basis. A short hedger does not benefit from a weakening basis.



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