# Understanding Commodity Futures and Options

CIS 1100

## for Producers of Livestock and Livestock Products

## Introduction

Risk associated with an adverse price change (price risk) is a normal part of producing livestock and livestock products. The very nature of the markets in which most livestock commodities are sold suggests price risk is an unavoidable part of being involved in the industry. Producers of livestock commodities also purchase important inputs (like feed grains and protein meals) in markets that have significant price variability. Recent domestic farm policy changes and trade barrier reductions also suggest additional price variability will likely occur in the future.

Improving your marketing skills offers one mechanism for recognizing and developing strategies to reduce price risk in your overall business planning activities. Hedging by using commodity futures and option markets in conjunction with your local cash markets can provide additional opportunities to manage price risk. Understanding how futures and options markets work is the first step to using these markets more effectively. This publication is meant to: 1) provide a basic understanding of futures and options markets, and 2) to illustrate how futures and options can be used in marketing livestock commodities and purchasing commodity inputs for livestock operations.

New terminology can represent a significant obstacle to understanding the basic concepts associated with futures and options markets. The approach used in this publication is to introduce and define appropriate terminology (highlighted by **bold print**) when a new concept is initially presented. Following the initial introduction, the appropriate term is used when the concept is part of any following discussions. If use of the new terminology creates confusion, please refer to the glossary of terms provided at the end of this publication. Examples are also provided later in the publication to illustrate use of the concepts in selected alternative marketing strategies. Throughout this publication, prices are expressed in dollars and fractions of dollars (e.g. $.50) and in cents and fractions of cents (e.g. 1.50 cents) depending on the commodity being discussed. Familiarizing yourself with these monetary conventions is important to your overall understanding of futures and options markets.

## The Hedging Concept

Hedging is defined as simultaneously taking equal and offsetting positions on the cash market and futures market. The basic idea behind hedging is to hold a position in both markets at the same time. One of the market positions protects you from an adverse price change in other market. Cash positions in livestock or feed markets are a necessary part of your role as a producer. These necessary cash positions put you at risk from a decline in livestock commodity prices, or an increase in feed prices. Taking an offsetting position in the futures market is a "hedge" against


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the potential for a harmful move in the cash market price. At the same time, the cash market position protects you from losses on your futures market position. The first step in understanding this hedging process is to understand what futures and options markets are and how they work.

## Futures Contracts

A **futures contract** is a standardized contract that specifies a commodity, method and place of delivery, quality, and time of delivery. Futures contracts are traded at specifically designated exchanges (commonly called **futures markets**). Futures markets provide the physical location where the actual trading of futures contracts takes place. Futures markets also supervise and facilitate the trading activity. Table 1 presents a list of the major livestock commodity futures contracts that are currently traded on US exchanges. Since many producers of livestock commodities are also major users of feed inputs, an understanding of both is important. Therefore, table 2 presents a list of the major futures contracts related to feed inputs.

Each commodity and **contract month** (which establishes the time period for delivery) represent a separate contract. Quality and place of delivery requirements are not presented in tables 1 and 2. However, these specifications are an explicit part of all futures contracts.

Price is the only component of the futures contract that is not established prior to an actual trade. Price is determined by the interaction of buyers and sellers in a specific location (called the **trading pit**) designated by the futures exchange. The exchange establishes the time periods when trading takes place, develops and enforces (in conjunction with regulatory authorities) other rules associated with trading, and provides other services needed by the traders. The actual buying and selling that occurs in the trading pit is done by individuals (typically representing organizations) who have purchased the right to trade (called a **seat** on the exchange). Thus, the general public buys or sells futures contracts through a **broker** with access to someone with a seat on the exchange.

**Table 1.** Livestock Commodity Futures Contracts Currently Traded on U.S. Exchanges

| Exchange | Commodity | Contract Quantity | Contract Months |
|---|---|---|---|
| Chicago Mercantile Exchange (CME) | Live Cattle*(fed steers) | 40,000 lb | Feb, Apr, Jun, Aug, Oct, Dec |
| Chicago Mercantile Exchange (CME) | Feeder Cattle* (7-8.5 CWT steers) | 50,000 lb | Jan, Mar, Apr, May, Aug, Sep, Oct, Nov |
| Chicago Mercantile Exchange (CME) | Lean Hogs* | 40,000 lb | Feb, Apr, May, Jun, Jul, Aug, Oct, Dec |
| Chicago Mercantile Exchange (CME) | Frozen Pork Bellies* | 40,000 lb | Feb, Mar, May, Jul, Aug |
| Chicago Mercantile Exchange (CME) | Class III Milk* | 200,000 lb | All calendar months |
| Chicago Mercantile Exchange (CME) | Class IV Milk | 200,000 lb | All calendar months |
| Chicago Mercantile Exchange (CME) | Butter* | 40,000 lb | Feb, Apr, Jun, Jul, Sep, Nov |
| Chicago Mercantile Exchange (CME) | Nonfat Dry Milk | 44,000 lb | All calendar months |
| MidAmerica Commodity Exchange (MCE) | Live Cattle (fed steers) | 20,000 lb | Feb, Apr, Jun, Aug, Oct, Dec |

NOTE: Futures contracts designated with an * indicate options are also available for the futures contract. This table lists the major futures contracts involving livestock commodities. Futures contracts are added, modified, and eliminated periodically, so contract availability and specifications change over time.

**Table 2.** Grain and Feed Ingredient Futures Contracts Currently Traded on U.S. Exchanges

| Exchange | Commodity | Contract Quantity | Contract Months |
|---|---|---|---|
| Chicago Board of Trade (CBT) | Corn* | 5000 bu | Jan, Mar, May, Jul, Sep, Dec |
| Chicago Board of Trade (CBT) | Soybean Meal* | 100 tons | Jan, Mar, May, Jul, Aug, Sep, Oct, Dec |
| Chicago Board of Trade (CBT) | Wheat* (soft red winter) | 5000 bu | Mar, May, Jul, Sep, Dec |
| Chicago Board of Trade (CBT) | Oats* | 5000 bu | Mar, May, Jul, Sep, Dec |
| Kansas City Board of Trade (KC) | Wheat* (hard red winter) | 5000 bu | Mar, May, Jul, Sep, Dec |
| Minneapolis Grain Exchange (MPLS) | Wheat* (hard red spring) | 5000 bu | Mar, May, Jul, Sep, Dec |
| Minneapolis Grain Exchange (MPLS) | Wheat* (soft white) | 5000 bu | Mar, May, Jul, Sep, Dec |
| MidAmerica Commodity Exchange (MCE) | Corn* | 1000 bu | Mar, May, Jul, Sep, Dec |
| MidAmerica Commodity Exchange (MCE) | Soybean Meal | 50 tons | Jan, Mar, May, Jul, Aug, Sep, Oct, Dec |
| MidAmerica Commodity Exchange (MCE) | Oats | 1000 bu | Mar, May, Jul, Sep, Dec |
| MidAmerica Commodity Exchange (MCE) | Wheat* (soft red winter) | 1000 bu | Mar, May, Jul, Sep, Dec |

NOTE: Futures contracts designated with an * indicate options are also available for the futures contract. This table lists the major contracts involving feed inputs. Futures contracts are added, modified, and eliminated periodically, so contract availability and specifications change over time.

The procedures involved in actually trading futures contracts may appear fairly complex. However, only a few basic ideas are essential to understand the idea of hedging. Through your broker, it is possible to sell a futures contract (take a **short position**) today with the understanding that you must **offset** the position (that is, buy back the contract) at a later date.[1] If prices decline between the time you sell and buy the futures contract, you offset (buy back) the contract at a price below your sale price. You receive the gain associated with this "sell high – buy low" transaction. If you initially take a short position and the price increases, you must offset with a buy at the higher price. You suffer the loss associated with this "sell low — buy high" transaction. As a futures trader, it is also possible to buy a futures contract (take a **long position**) with the understanding that you must offset the position with a sell at a later date.[2]

Since a long position implies you are entering as a buyer, impacts of price changes are just the opposite of those discussed for the short position above. That is, you lose when price declines ("buy high — sell low") and gain when price increases ("buy low — sell high").

Trading futures contracts requires the service of a broker with access to the exchange where futures contracts are traded. Your broker conducts trades on your behalf based upon your instructions. You pay a fee to your broker (a **commission**) for executing an order to buy or sell a futures contract. Like payments for any service, commissions vary by broker. Commissions are normally quoted for entering and closing a futures position (called a **round turn**).

Since all traders with a futures position can potentially suffer losses, all traders must put up a deposit (a **margin**) to ensure all losses will be paid. A margin is the money deposited by both the buyer and the seller to guarantee performance under the terms of the futures contract. Minimum **initial margins** are established by each commodity exchange, but individual brokers may have higher margin requirements for their customers. The amount of this margin is substantially less than the full value of the contract. For example, the exchange-established minimum margin on a live cattle contract for a hedger is $500, even though the full value of a contract traded at 75.00 cents is $30,000 ($0.75 times 40,000 pounds). A **margin call** is a notice to the futures trader to deposit additional money if an adverse price move significantly devalues the initial margin deposit. If the market moves against your position by an amount such that your remaining initial margin may not cover additional losses (called the **maintenance margin**), the broker will ask for more money. When the initial margin is eroded to the maintenance level by market losses, you receive a margin call from your broker.

Since the idea of hedging is for losses in one market to be offset by gains in the other market, price changes in the two markets must be related. This price relationship between the cash and the futures market is measured by a concept called **basis**. Basis is the difference between the cash price at a specified location and the futures price. For a hedger, the appropriate cash price is your local cash price. This relationship (or basis) is an important concept in effective hedging. The whole purpose behind hedging is for adverse price moves in the cash market to be offset by favorable price moves in the futures market. If the two markets are not related in some way, hedging doesn't work. Thus, measuring and understanding basis is the key to successful hedging. Appendix tables A1 through A4 provide historic basis data for 400-500 pound feeder cattle, 700-800 pound feeder cattle, fed cattle, and milk, respectively.

Since basis is normally calculated as your local cash price minus the nearby futures price, the value can be positive or negative. Basis is often quoted as **over** (a positive basis) or **under** (a negative basis). "Over" or "under" refers to the cash price being above or below the futures price, respectively.

**The whole purpose behind hedging is for adverse price moves in the cash market to be offset by favorable price moves in the futures market.**

Cash prices, future prices, and basis all vary over time and this variation impacts predictability. In general, less variability implies greater predictability, and greater predictability implies less risk from unexpected changes. The variability of numerical values (like prices and basis) is frequently measured by standard deviation. The standard deviation simply assigns a number to the average amount of variability associated with a series of values. Thus, a lower value associated with the standard deviation implies less variability.

Basis changes have a potential adverse impact on a hedger, and the risk of being unfavorably impacted by a change in the basis is called **basis risk**. The greater potential for predictability (that is, less variability) typically associated with basis is why price risk can be reduced by hedging. Hedging is designed to replace cash price risk with a lower basis risk. Therefore, if basis has a lower variability relative to the cash price, then risk can be reduced by hedging. Figures 1a and 1b use the concept of standard deviation to reflect the lower variability of the basis relative to the cash price. The narrower standard deviation "band" around the basis for feeder and fed cattle in the Pacific Northwest indicates less variability for basis relative to the cash price.

[1]A trader in a short position actually has two alternatives. To offset the short position (as discussed), or to actually deliver the commodity under provisions of the futures contract. Since the process of delivery involves additional transaction costs (and generally does not change the outcome), the delivery alternative is ignored in this discussion. Some contracts have a **cash settlement**, implying an open futures position must be settled with money when delivery is necessary. This cash settlement uses a designated cash price (or designated average price) to determine contract value at delivery.

[2]A trader in a long position actually has two alternatives. To offset the long position (as discussed), or to actually accept delivery of the commodity under provisions of the futures contract. Since the process of accepting delivery involves additional transaction costs (and generally does not change the outcome), the delivery alternative is ignored in this discussion. Some contracts have a cash settlement, implying an open futures position must be settled with money when acceptance is necessary. This cash settlement uses a designated cash price (or designated average price) to determine contract value at delivery.

The purpose of hedging is protection from price risk. Speculating is taking a futures market position when there is no offsetting cash market position. That is, the commodity represented by the futures position is not owned, being produced, or being purchased as an input. As a producer, you can easily move from the protection associated with hedging to a speculative position. Maintaining a position in the futures market without having the physical commodity (or the need to buy the commodity) to offset losses in the futures market is speculating on commodity prices changes. Although you as a livestock producer have the right to speculate in futures, speculating may not be part of your marketing strategy. Thus, it is important to clearly recognize the difference between hedging and speculating.

## Commodity Options

A **commodity option** is a two-party agreement giving the buyer (or **holder**) the right, *but not the obligation*, to take a designated futures position. This potential position can be either a short or a long position in the designated futures contract (called the **underlying futures contract**). The futures position will also be provided at a specified price (called the **strike price**), and the right exists until a pre-established date (the **expiration date**). You purchase the option from the option seller (or **writer**). The writer of an option has the obligation (*not the right*) to provide the option holder with the futures position at the agreed upon strike price. As the buyer, you purchase the option at the going market price (called the **premium**). If cash prices move unfavorably, you may use the option to obtain the protection associated with a futures position. Remember, the option seller is obligated to provide you with the futures position at the strike price. However, you do not want the protection associated with a futures position if cash prices move favorably. As the holder of the option, you choose whether or not to take the futures position. Thus, options are similar to purchasing insurance. You pay the premium, but may or may not need and/or use the protection associated with the right to a futures position.

Two types of options are available for each underlying futures contract. The purchase of a **put option** gives the holder

**Figure 1a.** WA/OR/ID Cash Price (CP) and WA/OR/ID Basis for 400-500 Pound Steers, Plus and Minus One Standard Deviation (Std. Dev.), Average for 1992-2000.

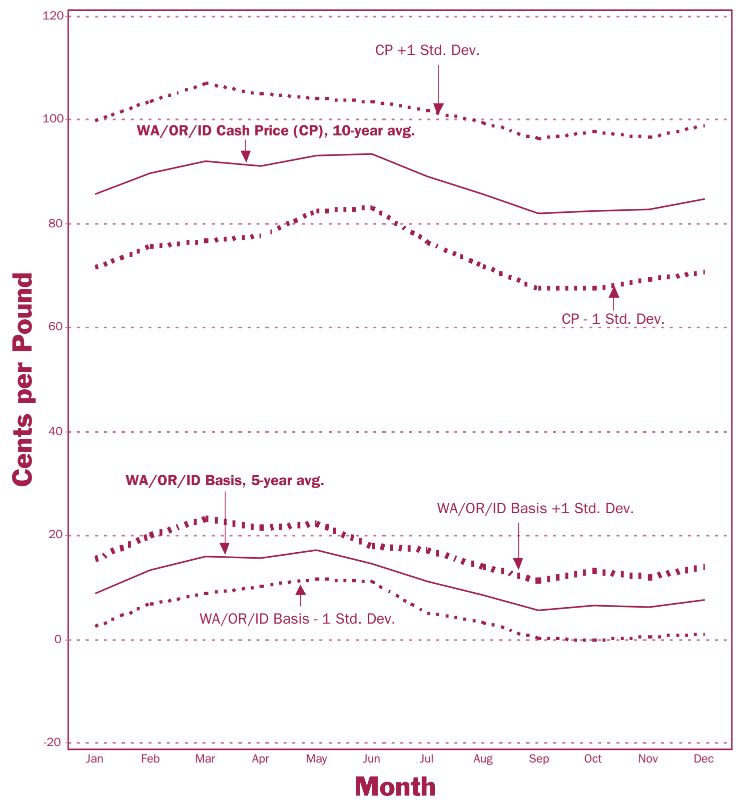
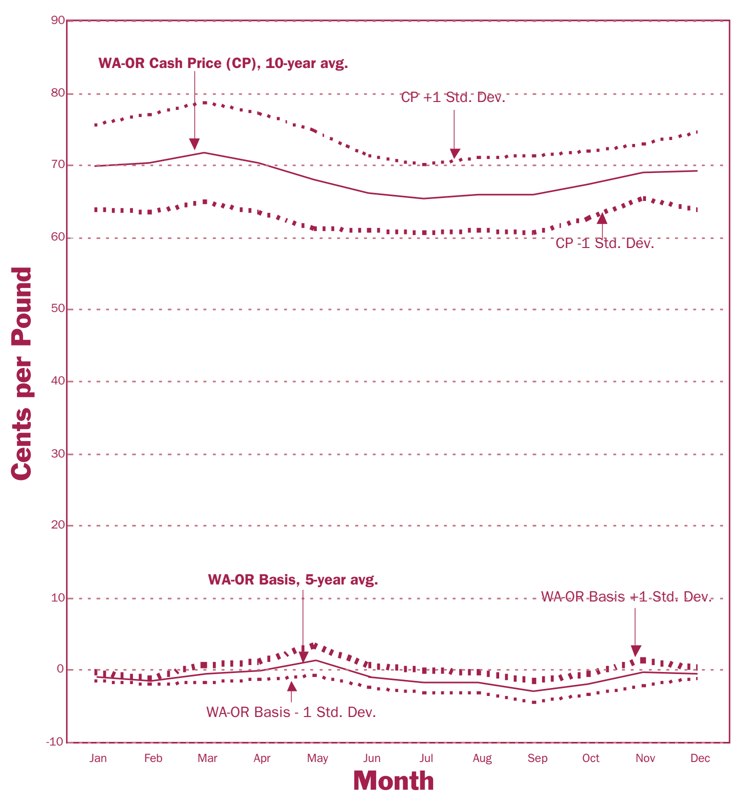



**Figure 1b.** WA-OR Cash Price (CP) and WA-OR Basis for 1100-1300 Pound Steers, Plus and Minus One Standard Deviation (Std. Dev.), Average for 1992-2000.



the right to a short futures position (sell a futures contract) at the strike price. The writer (or seller) of the put is obligated to provide the holder with the short futures position. The purchase of a **call option** gives the holder the right to a long futures position (buy a futures position) at the strike price. In this case, the writer (or seller) of the call option is obligated to provide the holder with a long futures position.

Purchasing a put option protects the holder against falling cash prices. If prices fall, you have the right to a short futures position at the higher strike price. Basically, you have the right to place a hedge at the strike price. A short futures position at a high price means you can offset with a buy at the current lower market price and receive the gain. Purchasing a call option (the right to buy a futures position) protects the holder of the call against rising prices. If prices rise, you have the right to a long futures position at the lower strike price. A long futures position at a low price means you can offset with a sell at the current higher market price and receive the gain.

An option's premium (market value) is influenced by two factors. The first factor, **intrinsic value**, is determined by the strike price relative to the current market price of the underlying futures contract. As an example, assume you purchase a December live cattle put (the right to a short position on December live cattle) with a strike price of 75.00 cents. If the current market price of the December live cattle futures contract is below 75.00 cents (let's say 73.00 cents), you have the right to a short December live cattle futures position at the strike price of 75.00 cents. Since you can offset the short futures position with a buy at the current market price of 73.00 cents, this put option can be turned into a 2-cent per pound gain. Basically, this particular put option gives you (as the holder) the right to sell at a price 2 cents above the current market price. Thus, the obvious value (or intrinsic value) of the put is 2 cents per pound. Anytime a put's strike price is above the current market price of the underlying futures contract, the put option has intrinsic value. The right to sell a futures contract at a price higher than the current market price has obvious value.

A call option (the right to a long futures position) has intrinsic value when the strike price is below the current market price of the underlying futures contract. If you buy a December live cattle call with a strike price of 75.00 cents, the call has intrinsic value when the December live cattle futures price is above 75.00 cents. For example, a 75-cent live cattle call has an intrinsic value of 2.00 cents per pound if the underlying futures contract is trading at 77.00 cents. Basically, you (as the holder of the call) have the right to buy at a price 2.00 cents below the current market price. The right to buy a futures contract at a price below the current market price has obvious value.

**Purchasing a put option protects the holder against falling cash prices.**

An option with intrinsic value is called **in-the-money**. An option with no intrinsic value is called **out-of-the-money**. A put option with a strike price below the underlying futures price (basically, the right to sell low) is out-of-the-money. A call option with a strike price above the underlying futures price (basically, the right to buy high) is also out-of-the-money. If the strike price and underlying futures price are equal, the option is called **at-the-money**.

In addition to an option's premium (or market value) being influenced by intrinsic value, an option also has the potential to establish or increase its intrinsic value before expiration takes place. This second factor influencing the premium is called time value. An out-of-the-money option has no intrinsic value today, but the market price of the underlying futures contract changes over time. For example, assume you have a 75-cent December live cattle put. The current market price of December live cattle futures is 76.00 cents. Since the current market price of the underlying futures contract (76.00 cents) is above the put option's strike price (75.00 cents), the put is out-of-the-money. However, there is some chance that the price of the underlying futures contract (December live cattle) may decline over time. If the price of the underlying futures contract decreases to a level below 75.00 cents, the put option becomes in-the-money and has intrinsic value. Thus, the probability that the price of the underlying futures contract will change by enough (more than 1.00 cent per pound in the above example) to put the option in-the-money determines time value. The same logic provides a time value to in-the-money options, since an appropriate change in the underlying futures price can increase intrinsic value.

Time value is difficult to measure precisely because the potential for a change in the underlying futures price is unknown. However, the amount of time until expiration, how far the option is out-of-the-money, and the price volatility of the underlying futures contract all influence time value. Time value becomes smaller as: 1) the time to expiration decreases, 2) the amount by which the option is out-of-the-money increases, or 3) price volatility of the underlying futures contract decreases. Conversely, time value goes up as: 1) the time to expiration increases, 2) the amount by which the option is out-of-the-money decreases, or 3) price volatility increases.

If an option is in-the-money, the option holder has the right to acquire this value. The option holder can request and get the designated futures position at the strike price (**exercise** the option), and turn this futures position into a gain. However, the marketplace recognizes the option's value. This value is represented by the premium. Thus, the holder currently owns an option and can simply sell the option for the premium. Selling the option is usually easier, and the option holder also gets any time value reflected in the premium. If the option remains out-of-the-money, the option holder does nothing and the option expires worthless on the expiration date. If an option expires worthless, the option holder loses the premium paid when the option was purchased.

# Futures and Options Based Marketing Alternatives

### Hedging for Protection from a Price Drop When Selling a Livestock Commodity

When using a selling hedge (or **short hedge**), your livestock commodity is still sold in the traditional cash market. To place the hedge, you sell an appropriate amount of futures contracts (table 1 on page 3 provides specific contract quantities). This initial sale in the futures market offsets your current or expected cash market position of holding or producing the livestock commodity. The initial sale in the futures market (placing the hedge) is anticipatory, and typically made well before production of the actual livestock commodity is concluded. Futures contracts are generally available between one and two years in advance. To lift the hedge, the futures position is offset when the livestock commodity is sold on the cash market. The following example involves the sale of fed cattle. However, a short hedge can also be used by producers selling other livestock products, such as weaned calves, feeder cattle, and milk.

### A Fed Cattle Hedging Example

This example is designed to show how your net price as a hedger is determined by a combination of the futures market and the cash market. Several important issues are not explicitly addressed, including what proportion of your production to hedge, when to place and lift the hedge, the broker's commission, and margin calls. The focus of the example is on how the outcome of a short hedge relates to both a cash position and a futures position. Additionally, the example uses several cash and futures price changes to demonstrate what circumstances bring about different hedging outcomes.

Assume it is late fall and you have placed 200 head of steers in the feedlot under a retained ownership program. These cattle should be ready for market as slaughter steers in early to mid-May. Currently, the June live cattle futures contract is trading for 74.00 cents and the normal May basis is –1.00 cents (or 1.00 under). The June futures contract is the appropriate contract month for this hedge. June is the closest available contract month to the expected May sale date with no danger of expiration (called the **nearby futures contract**). The hedge would be placed in early November by taking a short position on June live cattle. The number of contracts would be enough to represent 200 head of finished steers (6 contracts at 40,000 pounds each assuming 1200 pounds per steer). The futures contracts will be offset and the cattle sold on the cash market in early to mid-May. The expected price is 73.00 cents (the June futures price of 74.00 cents plus an expected basis of –1.00). The following examples (A through D) summarize outcomes of this hedge under four different circumstances.

**A. Price decreases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in May<br>73.00 cents<br>(place steers on feed) | Jun Futures<br>74.00 cents<br>(sell Jun Futures) | Expected May Basis<br>-1.00 cents |
| 5/05 | Actual Cash Price<br>70.00 cents<br>(sell cash cattle) | Jun Futures<br>71.00 cents<br>(buy Jun Futures) | Actual May Basis<br>-1.00 cents |

Marketing Strategy Outcome
Cash Price = 70.00 cents
Gain on Futures = 3.00 cents (+)
Realized Price = 73.00 cents

This outcome represents a perfect hedge. **Hedging costs** (generally about 0.25 cents per pound to cover broker commissions and interest on your margin) are ignored. You are better off by hedging because the gain on the futures market (3.00 cents per pound) exactly offsets the loss on the cash market (a decline of 3.00 cents). In this example, the basis is exactly as expected (1.00 cent under). Since the basis does not change, your realized price is equal to your expected price.

**B. Price increases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in May<br>73.00 cents<br>(place steers on feed) | Jun Futures<br>74.00 cents<br>(sell Jun Futures) | Expected May Basis<br>-1.00 cents |
| 5/05 | Actual Cash Price<br>76.00 cents<br>(sell cash cattle) | Jun Futures<br>77.00 cents<br>(buy Jun Futures) | Actual May Basis<br>-1.00 cents |

Marketing Strategy Outcome
Cash Price = 76.00 cents
Loss on Futures = 3.00 cents (-)
Realized Price = 73.00 cents

This outcome represents another perfect hedge, and you receive the expected price. However, you would have been better off in the cash market. In this case, the loss on the futures market (3.00 cents per pound) exactly offsets the gain on the cash market (a price increase of 3.00 cents per pound). Again, the basis is exactly as expected (1.00 cent under). Since the basis does not change, your realized price is equal to your expected price. Losing the potential 3-cent per pound gain on the cash market represents the cost of protecting yourself against the chance that prices may have declined. As in the previous example, note that hedging costs are not included.

**C. Price decreases and basis gets larger:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in May<br>73.00 cents<br>(place steers on feed) | Jun Futures<br>74.00 cents<br>(sell Jun Futures) | Expected May Basis<br>-1.00 cents |
| 5/05 | Actual Cash Price<br>70.00 cents<br>(sell cash cattle) | Jun Futures<br>70.50 cents<br>(buy Jun Futures) | Actual May Basis<br>-0.50 cents |

Marketing Strategy Outcome

Cash Price = 70.00 cents
Gain on Futures = 3.50 cents (+)
Realized Price = 73.50 cents

You receive a realized price above the expected price. You are better off by hedging because the gain on the futures market (3.50 cents) more than offsets the loss on the cash market (3.00 cents). The basis is 0.50 cents stronger than expected (-0.50 cents rather than -1.0 cents). A **strengthening basis** (that is, a basis higher than expected) clearly benefits a producer using a short hedging strategy. Your realized price is higher than your expected price because of the stronger basis.

**D. Price decreases and basis gets smaller:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in May<br>73.00 cents<br>(place steers on feed) | Jun Futures<br>74.00 cents<br>(sell Jun Futures) | Expected May Basis<br>-1.00 cents |
| 5/05 | Actual Cash Price<br>70.00 cents<br>(sell cash cattle) | Jun Futures<br>71.50 cents<br>(buy Jun Futures) | Actual May Basis<br>-1.50 cents |

Marketing Strategy Outcome

Cash Price = 70.00 cents
Gain on Futures = 2.50 cents (+)
Realized Price = 72.50 cents

You receive a realized price below the expected price. You are better off by hedging because some of the loss on the cash market is offset by hedging. However, the gain on the futures market (2.50 cents) does not completely offset the loss on the cash market (3.00 cents). The basis is 0.50 cents weaker than expected (-1.50 cents rather than -1.0 cents). A **weakening basis** (that is, a basis lower than expected) clearly hurts a producer using a short hedge. Your realized price is below your expected price (even though you hedged) because of the weaker basis.

## Hedging for Protection from a Price Rise When Buying Inputs for Livestock Feed

When using a buying hedge (or **long hedge**), feed inputs are still purchased in the traditional cash market. As a buyer, you are looking for protection from an increase in cash prices between now and the time the input is purchased for livestock feed. Therefore, to place the hedge you take a long position (a buy) for the appropriate amount of futures contracts to meet your future feed input needs (table 2 on page 2 provides specific contract quantities). This initial purchase in the futures market offsets your expected cash market position of buying inputs to feed your livestock. The initial purchase in the futures market (placing the hedge) is anticipatory, and typically made well before the feed input is actually needed. Futures contracts are generally available between one and two years in advance.

**The initial purchase in the futures market (placing the hedge) is anticipatory.**

To lift the hedge, the long futures position is offset when the feed input is actually purchased on the cash market. The following example involves the purchase of corn for feed. Long hedges can also be used by buyers of other inputs, such as protein meal or feeder cattle.

## An Example of Hedging Expected Grain Purchases

This example is designed to show how your net price as a hedger is determined by a combination of the futures market and the cash market. Several important issues are not addressed, including what share of your total needs to hedge, when to place and lift the hedge, the broker's commission, and margin calls. The focus of the example is on how the outcome of a long hedge is related to both a cash position and a futures position. Additionally, the example uses several cash and futures price changes to demonstrate what circumstances bring about different hedging outcomes.

Assume it is late fall and you have placed 200 head of steers in the feedlot that should be ready for market in early to mid-May. Assume you expect to purchase 140 tons (5,000 bushels) of corn in early February to meet your feeding needs for February and March. Local corn for February delivery is currently selling for $2.80 per bushel, and March corn futures are trading at $2.50 per bushel. The normal February basis is +30 cents (or 30 over). The March contract is the appropriate contract month for evaluating this hedge. March is the closest contract month to the expected purchase date in February with no danger of expiration (that is, the nearby futures contract). The hedge would be placed in November by taking a long position on March corn futures. The number of contracts would be enough to represent 140 tons (5000 bushels or 1 contract). The futures contract will be offset and the corn purchased on the cash market in early February. The expected price is $2.80 ($2.50 plus a basis of +30 cents). The examples on the following pages (E through H) summarize outcomes of this long hedge under different circumstances. As you go through the examples, remember that this is a buying hedge. Thus, losses increase your purchase price and gains reduce your purchase price.

**E. Price decreases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in Feb<br>$2.80<br>(have need for corn as feed in early Feb) | Mar Futures<br>$2.50<br>(buy Mar Futures) | Expected Feb Basis<br>+$0.30 |
| 2/01 | Actual Cash Price<br>$2.50<br>(buy cash corn) | Mar Futures<br>$2.20<br>(sell Mar Futures) | Actual Feb Basis<br>+$0.30 |

Marketing Strategy Outcome

Cash Price = $2.50
Loss on Futures = $0.30 (+)
Realized Price = $2.80

This outcome represents a perfect hedge. Hedging costs (generally about 1.00 or 2.00 cents per bushel) are ignored. However, you are worse off by hedging relative to buying cash grain because the gain on the cash market (a 30-cent per bushel price decline) was exactly offset by the loss on the futures market (30.00 cents). In this example, the basis is exactly as expected (30.00 cents over). Since the basis does not change, your realized price is equal to your expected price.

**F. Price increases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in Feb<br>$2.80<br>(have need for corn as feed in early Feb) | Mar Futures<br>$2.50<br>(buy Mar Futures) | Expected Feb Basis<br>+$0.30 |
| 2/01 | Actual Cash Price<br>$3.30<br>(buy cash corn) | Mar Futures<br>$3.00<br>(sell Mar Futures) | Actual Feb Basis<br>+$0.30 |

Marketing Strategy Outcome

Cash Price = $3.30
Gain on Futures = $0.50 (-)
Realized Price = $2.80

This outcome also represents a perfect hedge. However, you are better off by hedging because the loss on the cash market (a 50-cent price increase per bushel) was exactly offset by the 50-cent gain on the futures market. In this example, the basis is exactly as expected (30.00 cents over) and hedging costs are ignored. Since the basis does not change, your realized price is equal to your expected price.

**G. Price increases and basis gets larger:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in Feb<br>$2.80<br>(have need for corn as feed in early Feb) | Mar Futures<br>$2.50<br>(buy Mar Futures) | Expected Feb Basis<br>+$0.30 |
| 2/01 | Actual Cash Price<br>$3.30<br>(buy cash corn) | Mar Futures<br>$2.90<br>(sell Mar Futures) | Actual Feb Basis<br>+$0.40 |

Marketing Strategy Outcome

Cash Price = $3.30
Gain on Futures = $0.40 (-)
Realized Price = $2.90

With a strengthening basis, you pay a realized price above the expected price. You are still better off by hedging because the gain on the futures market (40.00 cents per bushel) offsets most of the loss on the cash market (50.00 cents). The basis is 10.00 cents stronger than expected (+40.00 cents rather than +30.00 cents). An actual basis that is stronger than expected adversely impacts a buyer using the long hedge as a purchasing alternative. That is, your realized price is higher than your expected price because of the stronger basis.

**H. Price increases and basis get smaller (weakens):**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Expected Price in Feb<br>$2.80<br>(have need for corn as feed in early Feb) | Mar Futures<br>$2.50<br>(buy Mar Futures) | Expected Feb Basis<br>+30 cents |
| 2/01 | Actual Cash Price<br>$3.30<br>(buy cash corn) | Mar Futures<br>$3.10<br>(sell Mar Futures) | Actual Feb Basis<br>+20 cents |

Marketing Strategy Outcome

Cash Price = $3.30

Gain on Futures = $0.60 (-)

Realized Price = $2.70

You are clearly better off by hedging because the gain on the futures market (60.00 cents per bushel) more than offsets the loss on the cash market (50.00 cents). The basis is 10.00 cents weaker than expected (+20.00 cents rather than +30.00 cents). An actual basis that is weaker than expected clearly benefits a buyer using the long hedge as a purchasing alternative. That is, your realized price is lower than your expected price because of the weaker basis.

## Hedging Summary

The net price you receive by hedging (whether a short hedge or a long hedge) is a combination of the cash market and futures market transactions. The general idea is that what is lost or gained in one market is offset by a gain or loss in the other market. *Whether or not your price objective is achieved depends on the expected basis relative to the actual basis when the hedge is lifted.*

The proportion of your total needs to hedge is a management decision, and no single rule works in all situations. Some general rules may be helpful. If hedging is a new marketing strategy for you, start small and see how the process fits into your management style and financial situation. Remember, hedging means your potential loss on the futures market position is offset by gains on the cash market. Thus, you should not hedge more livestock than you expect to produce, or hedge more feed inputs than what will be purchased for feed.

The advantages and disadvantages of using a hedging strategy to market your livestock commodity or purchase feed inputs are offered below.

**Hedging Advantages**

1. Risk of an adverse price change in the cash market is eliminated.
2. Extends time period to make a pricing decision.
3. Generally a very liquid market, allowing a hedger to reverse positions quickly.
4. Basis is normally more predictable than the cash price.
5. Encourages you to place additional attention on your marketing efforts.

**Hedging Disadvantages**

1. Risk of an adverse change in basis.
2. Margin requirements increase interest costs and may cause cash flow problems.
3. Contracts are strictly specified regarding quantity and quality.
4. Eliminates gains from favorable price changes.
5. Requires understanding of futures markets and basis relationships.

## Using Options for Protection from a Price Drop When Selling Livestock Commodities

When using options, your livestock commodity is still sold in the traditional local cash market. You purchase and hold put options (the right to a short futures position) during the production process. The put options are converted to money (if they have value), or are allowed to expire worthless (if they have no value) when the livestock commodity is sold on the cash market. Options represent a potential position in the futures market, so they are in the same increments (for example, 40,000 pounds for live cattle) as the underlying futures contract. The net price you receive for the livestock commodity is a combination of the cash market transaction and the options market transaction. Options provide an opportunity for the producer to establish a minimum price without giving up all of the gain if cash prices rise. Your ability to predict basis determines whether your price objective is achieved. The amount paid for price protection (the premium) is known at the time of purchase. Unlike hedging with a futures contract, there is no margin account to maintain. The following example involves the sale of fed cattle. A put option strategy can also be used by producers of other livestock commodities, including weaned calves, feeder cattle, and milk.

### An Example of Using Options When Selling Fed Cattle

The examples on the following page are designed to show how options can also be used to offset adverse price changes in the cash market. However, with options you obtain protection without giving up all of the gain associated with any favorable cash price movements. The net price to you as the producer is still a combination of the options market and the cash market. Several important issues are not addressed such as what quantity to protect, when to place and lift the protection, selecting a strike price, and the broker's commission. The focus is on how the outcome of an option-based marketing strategy is related to both a cash position and an option position.

The examples use two possible outcomes to illustrate the impact of both a decrease and an increase in the cash price. Although outcomes reflecting basis changes are not displayed, basis changes influence the option-based strategies in essentially the same way basis changes impact the futures-based short hedge strategy (see previous examples C and D).

The time period is late fall and you have placed 200 head of steers on feed (under retained ownership) with plans to finish and sell as slaughter steers in early May. As in the hedging example for fed cattle, June is the nearby futures contract and the expected basis is -1.00 cent (or 1.00 under). June futures are currently selling at 75.00 cents per pound. June puts with a strike price of 75.00 cents (at-the-money) have a current premium (market price) of 1.70 cents per pound. Purchasing June live cattle puts with a strike price of 75.00 cents would establish a minimum price of 72.30 cents per pound (the strike price of 75.00 cents plus an expected basis of -1.00 cent minus the premium of 1.70 cents). The minimum price would be established by purchasing a sufficient number of puts to protect 200 head (6 put options at 40,000 each, or 240,000 pounds). The cost of the puts is the current premium of 1.70 cents per pound times 240,000 pounds ($4,080.00). Remember that buying a June live cattle put with a strike price of 75.00 gives you the right, *but not the obligation*, to a short futures position at 75.00 cents. Essentially, you have the right to establish a hedge at 75.00 cents and you have paid 1.70 cents per pound for that right. The following examples summarize what happens to the option-based marketing strategy when the cash price decreases (I) or increases (J).

In examples I and J, the basis is exactly as expected (1.00 cent under). Changes in the basis will impact the option-based outcomes in exactly the same way basis changes influence the short hedges. That is, a strengthening basis would increase the realized price by the amount of the increase in the basis. A weakening basis would reduce the realized price by the amount of the decrease in the basis.

**I. Price decreases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Minimum Price in May<br>72.30 cents<br>(place steers on feed) | Jun 75.00 Put<br>Premium = 1.70 cents<br>(buy Jun 75.00 put) | Expected May Basis<br>-1.00 cents |
| 5/05 | Actual Cash Price<br>72.00 cents<br>(sell cash steers) | Jun Futures Price = 73 cents<br>75.00 put premium = 2.10 cents<br>(intrinsic value of 2.00 cents<br>with small time value)<br>Sell put for premium of 2.10 | Actual May Basis<br>-1.00 cents |

Marketing Strategy Outcome

Cash Price = 72.00 cents
Sale of 75.00 Put = 2.10 cents (+)
Cost of 75.00 Put = 1.70 cents (-)
Realized Price =72.40 cents

Though broker and interests costs are not included (generally about 0.10 cents per pound), buying the options provides the minimum price protection level. Having the right to enter into a short futures position at 75.00 cents has value if the price of the futures contract declines. In this case, the put has an intrinsic value of 2.00 cents per pound on May 5 because of the right to sell a June live cattle futures contract at 75.00 cents (2.00 cents above the current market price). This potential 2-cent gain associated with exercising into the futures position can be realized by selling the put. The current premium would be equal to at least the 2-cent intrinsic value, plus any remaining time value (0.10 cents per pound in this example). The premium from the sale of the put (2.10 cents) offsets the loss from a declining cash market plus the original cost of the put (1.70 cents). Note the basis was exactly as expected (1.00 cents under).

**J. Price increases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Minimum Price in May<br>72.30 cents<br>(place steers on feed) | Jun 75.00 Put<br>Premium = 1.70 cents<br>(buy Jun 75.00 put) | Expected May Basis<br>-1.00 cents |
| 5/05 | Actual Cash Price<br>77.00 cents<br>(sell cash steers) | Jun Futures Price = 78 cents<br>75.00 put premium = 0.10 cents<br>(right to sell Jun futures<br>at 75.00 or 3.00 cents below the<br>market price of 78.00 cents means<br>the put has no intrinsic value and<br>very little time value)<br>Sell put for premium of 0.10 cents. | Actual May Basis<br>-1.00 cents |

Marketing Strategy Outcome

Cash Price = 77.00 cents
Sale of 75.00 Put = 0.10 cents (+)
Cost of 75.00 Put = 1.70 cents (-)
Realized Price = 75.40 cents

When price increases, you are able to acquire some of the gain in the cash price. Having the right to enter into a short futures position at 75.00 cents has no intrinsic value if the futures price is above 75.00. The put has a small remaining time value represented by the 0.10-cent premium, since expiration of the June put does not occur until early June. Most of your original cost (the premium of 1.70 cents) is forfeited. You can capture the small time value by selling the put for the 0.10-cent premium. Though the cash price increases, you are only able to capture some of the gain. The cost of the put (1.70 cents) offsets part of the gain associated with the higher cash price.

### Using Options for Protection from a Price Rise When Buying Livestock Feed Inputs

When using options to establish a maximum purchase price, feed inputs are still purchased in the traditional local cash market. As a buyer, you are looking for protection from an increase in cash prices between now and the time you actually need to purchase the feed input for your livestock. You buy and hold call options (the right to a long futures position) to offset your expected need to buy commodity inputs to feed livestock. The call options are converted to money (if they have value), or allowed to expire worthless (if they have no value) when the feed input is purchased on the cash market. Options represent a potential position in the futures market, so they are in the same increments as the underlying futures contract (for example, 1,000 or 5,000 bushels for grain).

The net price you pay for the feed input is a combination of the cash market transaction and the option market transaction. Options allow users of livestock feed inputs to establish a maximum purchase price. Furthermore, this maximum price is established without giving up all of the benefits of a decline in cash prices. Your ability to predict basis determines whether your price objective is achieved. The amount paid for the price protection (the option premium) is known at the time of purchase. Unlike hedging with a futures contract, there is no margin account to maintain.

Although the following example involves the purchase of feed, call options can also be used for buying other inputs, such as protein meal or feeder cattle.

### An Example of Using Options When Purchasing Grain for Feed

The following examples are designed to show how options can be used for protection from an increase in cash grain prices. However, with options you obtain this upside protection without giving up all of the gain associated with a decrease in the cash price. The net price to you as the producer is still a combination of the futures market and the cash market. Several important issues are not addressed including the proportion of your total needs to protect, when to place and lift the protection, selecting a strike price, and the broker's commission. The focus of the examples is on how the outcome of an option-based marketing strategy is related to both a cash position and an option position. Additionally, the examples use two possible outcomes to illustrate the impact of a decrease in the cash price and an increase in the cash price. Although basis changes are not illustrated, changes in the basis influence the option-based strategies in essentially the same way basis changes affect the futures-based long hedging strategy (see previous examples G and H).

It is late fall and you have placed 200 head of steers on feed with plans to finish in early May. You expect to purchase 140 tons (5,000 bushels) of corn in early February to meet your feeding needs for February and March. Corn for February delivery is currently selling for $2.80 per bushel, and March corn futures are trading at $2.50. Similar to the corn hedging example presented earlier, March is the nearby futures contract and the expected basis is +30.00 cents (or 30 over).

March calls with a strike price of $2.50 (at-the-money) have a current premium (market price) of 12.00 cents per bushel. Purchasing a March corn call with a strike price of $2.50 per bushel would establish a maximum purchase price of $2.92 per bushel (the strike price of $2.50 plus an expected basis of +30.00 cents plus the premium of 12.00 cents). The maximum price would be established by purchasing a sufficient number of calls to protect your forthcoming purchase of 140 tons of corn (1 contract of 5,000 bushels) at 12.00 cents per bushel. Remember that buying a March corn call with a strike price of $2.50 gives you the right, *but not the obligation*, to a long futures position at $2.50. Essentially, you have the right to establish a long hedge at $2.50 and you have paid 12.00 cents per bushel for that right. The following examples summarize what happens to the option-based marketing strategy when the cash price decreases (example K) or increases (example L).

**K. Price decreases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Maximum price in Feb $2.92 (have need for corn as feed in Feb) | Mar 250 Call Premium = 12.00 cents (buy Mar 250 call) | Expected Feb Basis +30.00 cents |
| 2/01 | Actual Cash Price $2.50 (buy cash corn) | Mar Futures price = $2.20 250 call premium = 1.00 cents (right to buy Mar futures at $2.50 or 30 cents above the market price of $2.20 per bushel means the call has no intrinsic value and very little time value) Sell call for premium of 1.00 cents | Actual Feb Basis +30.00 cents |

Marketing Strategy Outcome

Cash Price = $2.50
Sale of 250 Call = 0.01
Cost of 250 Call = 0.12 (+)
Realized Price = $2.61

Though broker and interest costs are not addressed (generally about 1.00 or 2.00 cents per bushel), you are able to acquire some of the benefit from lower grain prices. Having the right to enter into a long futures position at $2.50 has no intrinsic value if the futures price is below $2.50. In this case, the call has a small time value (1.00 cents per bushel) since it does not expire until the end of February. Most of your original cost (the premium of 12.00 cents) is forfeited, but you capture the small time value by selling the call for the 1-cent premium. Though the cash price decreases, you are only able to capture some of the benefit. The 11-cent net loss on the call (premium paid of 12 cents less the 1-cent sale price) offsets part of the gain associated with the lower cash corn price.

**L. Price increases and basis does not change:**

| Date | Local Cash Market | Futures Market | Basis |
|---|---|---|---|
| 11/01 | Maximum Price in Feb<br>$2.92<br>(have need for corn<br>as feed in Feb) | Mar 250 Call<br>premium = 12.00 cents<br>(buy Mar 250 call) | Expected Feb Basis<br>+30.00 cents |
| 2/01 | Actual Cash Price<br>$3.20<br>(buy cash corn) | Mar Futures Price = $2.90<br>250 call premium = 43.00 cents<br>(intrinsic value of 40 cents<br>with some time value)<br>Sell put for premium of 43.00 | Actual Feb Basis<br>+30.00 cents |

Marketing Strategy Outcome

Cash Price = $3.20
Sale of 75.00 Put = 0.43 (-)
Cost of 75.00 Put = 0.12 (+)
Realized Price = $2.89

Using the call option provides a maximum price protection level for you as a feed buyer. Having the right to enter into a long futures position at $2.50 per bushel has value if the price of the futures contract increases. In this case, the call has an intrinsic value of at least 40 cents per bushel on February 1. This intrinsic value exists because of the right to buy a March corn futures contract at $2.50 per bushel, which is 40 cents below the current market price. The 40-cent gain on the futures position can also be realized by selling the call, since the current premium would be equal to the intrinsic value of 40 cents plus any remaining time value (3 cents in this example). The sale of the March 250 call for 43.00 cents offsets the loss from a rising cash market plus the original cost of the call (12.00 cents).

In examples K and L, the basis is exactly as expected (30.00 cents over). Changes in the basis will impact the call option outcomes in exactly the same way basis changes influenced the long hedges (examples G and H). A strengthening basis would increase the realized price by the amount of the increase in the basis. A weakening basis would reduce the realized price by the amount of the decrease in the basis.

## Options Summary

Similar to hedging, using options in commodity marketing involves the use of the futures and cash market simultaneously. Options provide you with a right to obtain the protection of a hedge (that is, the right to access a futures position at a favorable price). You do not need protection if the price moves in a favorable direction. Since the option is a right rather than an obligation, you as the holder of an option can choose not to exercise it. The out-of-the-money option has no intrinsic value and little time value. You forfeit most of the premium that was paid at the time of purchase, and you take advantage of the favorable movement in the cash price. Not all of the gains from the favorable price change are realized, because any gain is reduced by the amount of the forfeited premium. The advantages and disadvantages of using options to market your livestock commodity or purchase feed inputs are listed below.

**Advantages of Using Options**

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1. Risk of an adverse price change in the cash market is eliminated.
2. Producer obtains some of the gain from favorable price changes
3. Extends time frame to make a pricing decision.
4. Eliminates margin requirements.
5. Generally a very liquid market allowing the producer to quickly reverse positions

**Disadvantages of Using Options**

1. Cost of options (the premium) may be greater than the value of price protection.
2. Risk of an adverse change in the basis.
3. Options on futures are in specified pound or bushel increments and represent some standard quality.
4. Using options requires an understanding of options, futures markets, and basis to evaluate all of the alternatives.

**You do not need protection if the price moves in a favorable direction.**

## General Summary

The use of commodity futures and options provides additional alternatives to include in your list of marketing and/or purchasing strategies. It is important to keep in mind that skillful use of these strategies requires a thorough understanding of how markets for futures and options work.

Additionally, knowledge of basis patterns for your particular cash market is critical to successful use of marketing strategies that use futures and options.

After you develop a thorough understanding of the basic ideas, experience becomes the best teacher. Experience is something that develops with time, and new experiences generally come with some mistakes. Keep in mind that mistakes on small quantities have the same positive impact on learning as mistakes on large quantities, but small mistakes are cheaper.

## Glossary of Terms

**At-the-Money:** A term used to describe a put or call option with a strike price that is equal to the current market price of the underlying futures contract. An at-the-money option has no intrinsic value, so the entire premium represents time value. Option strike prices are typically established in larger increments than futures price quotes, so the two are seldom exactly equal. Thus, an at-the-money option often means selecting a strike price that is as close as possible to the quoted futures price.

**Basis:** The difference between the cash price and the futures price, commonly calculated as the local cash price minus the futures price. The outcomes of all futures- and options-based marketing strategies are a combination of what happens to a cash position and a futures position. Basis provides a single value that reflects the relative relationship between the two markets. Typically, the volatility of basis is less than the volatility in the cash or the futures market.

**Basis Risk:** The risk associated with the inability to predict basis accurately. The outcome of a hedged position is determined by the actual basis relative to the expected basis. Thus, the accuracy of the basis prediction (expected basis) determines the realized hedge price relative to the expected hedge price. Basis risk that is lower than the risk associated with a cash position is necessary for hedging to reduce price risk.

**Broker:** An agent who conducts or arranges for actual futures and options trades per a customer's instructions. The broker represents a firm that has access to the trading floor and charges a commission for this service.

**Call Option:** The right (but not the obligation) to buy a specified futures contract at a stated price on or before a designated expiration date.

**Cash Market:** A market that focuses on buying and selling the physical commodity for immediate or near term delivery. Since the focus of a cash market is the actual commodity, a producer's commodity will eventually be delivered and sold in a cash market.

**Cash Settlement:** A process of discharging a futures contract obligation after expiration occurs. Some contracts (feeder cattle for example) do not allow delivery. The futures obligation is offset by using cash to make up the difference between the futures position price and the current cash price. The cash price is usually some average or index value representing several cash markets.

**Commission:** The fee charged by the brokerage for conducting futures and options trades on your behalf. Such fees vary widely, and generally depend on the customer's trading volume and the additional services provided by the brokerage firm.

**Commodity Option:** The right (but not the obligation) to a specified commodity futures contract position at a stated price during a designated time period. An option can either be the right to a short futures position (a put) or the right to a long futures position (a call).

**Contract Month:** The calendar month when a futures contract matures (also called the delivery month). The contract month establishes a time frame for potential delivery of the commodity (which influences the value of the contract) and determines the last trading day of the futures contract.

**Exercising an Option:** The process used by the holder of an option to convert the right to a specified futures position at a stated price into an actual futures position.

**Expiration Date:** The date when the option holder loses the right to exercise the option. The expiration date for commodity options is determined by the contract month of the underlying futures contract. Expiration dates vary, but are clearly specified by the exchange for each option traded.

**Futures Contract:** A transferable and legally binding agreement whereby the seller agrees to deliver and the buyer agrees to accept delivery of a standardized amount and quality of a commodity at a specified location during a designated time period. The obligation created by the sale or purchase of a futures contract can generally be fulfilled in two ways. A seller (short position) can offset the obligation by taking the opposite position (a buy) on the same futures contract, or deliver the commodity per the agreement. A buyer (long position) can offset the obligation by taking the opposite position (a sell) on the same futures contract, or accept delivery of the commodity per the agreement. Some futures contracts are specified as cash settled, meaning delivery is not allowed and open positions must be settled with money (based upon some designated cash price) rather than delivery of the physical commodity.

**Futures Market:** A market that focuses on the buying and selling of futures contracts. These markets are also called futures exchanges.

**Hedging:** The practice of transferring price risk associated with the cash market by simultaneously holding an offsetting position in the futures market.

**Hedging Costs:** The transaction costs associated with being involved in the futures market as a result of hedging or trading options. These generally include broker's commissions and the interest cost associated with having money deposited in your margin account. Hedging costs vary depending on commissions, interest rates, and the period of time you maintain a futures or option position. Generally, hedging costs are about 0.25 to 0.50 cents per pound for livestock and 1.00 to 4.00 cents per bushel for grains.

**Holder:** The buyer (or owner) of a commodity option. The holder has the right (but not the obligation) to enter into a specified futures position at a stated (strike) price.

**In-the-Money:** A commodity option that has value if exercised immediately. A put is in-the-money if its strike price is above the current market price of the underlying futures contract (the right to sell "high"). A call is in-the-money if its strike price is below the current market price of the underlying futures contract (the right to buy "low").

**Initial Margin:** The initial deposit (generally quoted per contract) necessary to open a long or short futures position. See Margin.

**Intrinsic Value:** The value of a commodity option if immediately exercised. Intrinsic value for an in-the-money put is equal to the strike price minus the current market price of the underlying futures contract. Intrinsic value for an in-the-money call is equal to the current market price of the underlying futures contract minus the strike price. At-the-money and out-of-the-money options have no intrinsic value.

**Long Position:** The designation given to a situation where one has purchased a futures contract. An individual in a long position has an obligation to offset the long position with the sale of the same futures contract, or accept delivery of the commodity.

**Maintenance Margin:** The minimum amount of money (generally quoted per contract) that is required to keep a futures position as losses occur. See Margin.

**Margin:** Money deposited by buyers and sellers of futures contracts to ensure performance. The initial margin is the amount per contract that must be deposited at the time an order to buy or sell a futures contract (or sell an option) is placed. If losses occur from an adverse price move, the initial margin is reduced by the amount of the loss. When the initial margin less the loss reaches a minimum level (the maintenance margin), a margin call is triggered and additional money must be deposited to keep the position.

**Margin Call:** A call from a broker for additional funds to bring the margin up to some minimum level. See Margin.

**Nearby Futures Contract:** The futures contract month with an expiration month closest to the current date or closest to some other specified date.

**Offset:** The commonly used mechanism for eliminating a futures position by taking an opposite position in the same futures contract. A short position (sold a futures contract) can be offset with a long (buying the same futures contract). Conversely, a long position (bought a futures contract) can be offset with a short (selling the same futures contract).

**Option:** See Commodity Option.

**Out-of-the-Money:** A commodity option that has no value if exercised immediately. A put is out-of-the-money if its strike price is below the current market price of the underlying futures contract (the right to sell "low"). A call is out-of-the-money if its strike price is above the current market price of the underlying futures contract (the right to buy "high").

**Over:** The term used to describe a basis with a positive value. Since basis is defined as the cash price minus the futures price, an over basis occurs when the cash price is above the futures price. For example, a fed cattle basis of 1.5 over implies the cash price is 1.5 cents per pound more than the futures price.

**Premium**: The market price (or value) of the option as established by buyers and sellers interacting in the market place. This market-established premium reflects the sum of intrinsic and time value. Option premiums are quoted in the same units of measure as the underlying futures contract (cents per pound, cents per bushel, dollars per hundredweight, etc.).

**Price Risk:** The risk associated with an unfavorable change in the cash market price.

**Put:** The right (but not the obligation) to sell a specified futures contract at a stated price on or before a designated date.

**Round Turn:** The process of entering the futures market with a long or short position and then offsetting your position with an opposite transaction. For futures contracts, brokerage commissions are typically quoted per contract for a round turn.

**Seat:** A position on an exchange that gives the owner the right to conduct actual trades on the trading floor. The number of seats is limited and represents an asset that seat owners can sell to other qualified and willing buyers.

**Short Position:** The designation given to a situation where one has sold a futures contract. An individual in a short position has an obligation to offset the short position with a buy on the same futures contract, or deliver the commodity.

**Speculating:** Buying and selling futures or options contracts for the purpose of earning a profit by correctly anticipating commodity price changes. Speculating in commodity futures and options is generally considered a high-risk investment strategy. Speculation occurs whenever a futures or options position is opened when you do not have or plan to have the physical commodity specified in the contract.

**Strengthening Basis:** Occurs when the basis is getting larger. Since basis can be a positive or negative number, a strengthening basis means a larger positive number or a smaller negative number. Basis gets stronger whenever the cash price increases relative to the futures price.

**Strike Price:** The price at which the holder of a commodity option has the right to enter into the specified futures position should the holder choose to exercise it (also called the exercise price or striking price). The holder of a put has the right to a short futures position (a sell) at the strike price. The holder of a call has the right to a long futures position (a buy) at the strike price.

**Time Value:** The amount buyers are willing to pay for an option in anticipation of a change in the price of the underlying futures contract over time will bring about an increase in the option's value (sometimes called extrinsic value). The premium (which represents the option's market value) is composed of time value and intrinsic value. Thus, the amount by which the premium exceeds the option's intrinsic value measures the time value. For at-the-money and out-of-the-money options (which have no intrinsic value), the entire premium is made up of time value.

**Trading Pit:** An area of the exchange's trading floor where the actual trading of a specific futures contract or option takes place.

**Under:** The term used to describe a basis with a negative value. Since basis is defined as the cash price minus the futures price, an under basis occurs when the cash price is below the futures price. For example, a fed cattle basis of 1.5 under implies the cash price is 1.5 cents per pound less than the futures price.

**Underlying Futures Contract:** The specific futures contract that a commodity option conveys the right to sell (for a put) or buy (for a call).

**Weakening Basis:** Occurs when the basis is getting smaller. Since basis can be a positive or negative number, a weakening basis means a smaller positive number or a larger negative number. Basis gets weaker whenever the cash price decreases relative to the futures price.

**Writer:** The seller of an option (also called the grantor). For a put, the writer has the obligation (not the right) to give the option holder a short position on the underlying futures contract at the strike price. For a call, the writer has the obligation (not the right) to give the option holder a long position on the underlying futures contract at the strike price.

# Appendix - Basis Tables

**Table A1**. Futures Price, Cash Price, and Basis in cents per pound for PNW (WA,OR,ID) for 400-500 Pound Feeder Steers with 10-Year Monthly Average and Standard Deviation

| YEAR<br>Futures Price<br>Monthly Avg. Nearby | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 10-Year Monthly Average | 10-Year Standard Deviation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | 80.04 | 87.77 | 83.39 | 75.83 | 59.37 | 68.87 | 77.45 | 72.62 | 85.78 | 88.88 | 78.00 | 9.26 |
| Feb | 79.10 | 84.73 | 81.37 | 71.71 | 57.94 | 68.23 | 76.09 | 73.90 | 83.65 | 86.66 | 76.34 | 8.79 |
| Mar | 79.85 | 85.56 | 81.68 | 68.36 | 56.71 | 68.38 | 75.40 | 72.17 | 83.78 | 86.34 | 75.82 | 9.48 |
| Apr | 79.33 | 85.59 | 80.34 | 65.97 | 52.43 | 71.47 | 76.35 | 71.96 | 84.28 | 87.63 | 75.54 | 10.63 |
| May | 78.25 | 86.07 | 75.41 | 64.47 | 55.61 | 75.79 | 75.64 | 71.17 | 83.45 | 88.35 | 75.42 | 9.91 |
| Jun | 77.60 | 87.22 | 73.06 | 65.94 | 59.96 | 77.93 | 73.73 | 76.88 | 85.90 | 91.74 | 77.00 | 9.67 |
| Jul | 81.86 | 86.83 | 78.14 | 66.55 | 61.73 | 81.57 | 70.51 | 76.28 | 87.32 | 90.11 | 78.09 | 9.39 |
| Aug | 85.18 | 87.95 | 78.23 | 66.35 | 63.30 | 80.45 | 68.58 | 77.19 | 86.22 | 89.61 | 78.31 | 9.42 |
| Sep | 84.11 | 86.84 | 73.68 | 65.14 | 63.77 | 79.71 | 67.80 | 79.17 | 85.42 | 89.86 | 77.55 | 9.45 |
| Oct | 84.03 | 85.14 | 72.68 | 65.33 | 63.11 | 77.34 | 69.80 | 80.37 | 87.13 | 87.77 | 77.27 | 9.10 |
| Nov | 84.04 | 83.72 | 74.27 | 65.02 | 65.11 | 78.11 | 70.17 | 82.58 | 88.72 | 84.51 | 77.63 | 8.54 |
| Dec | 85.45 | 82.62 | 74.77 | 63.78 | 66.57 | 77.94 | 68.77 | 84.60 | 90.92 | 84.12 | 77.95 | 9.15 |
| Cash Price (WA,OR,ID)<br>4-5 CWT Feeder Steers | | | | | | | | | | | | |
| Jan | 85.01 | 95.96 | 102.41 | 81.63 | 59.65 | 70.16 | 92.50 | 83.67 | 100.61 | n.a. | 85.73 | 14.12 |
| Feb | 82.42 | 99.70 | 104.09 | 78.87 | 64.17 | 79.37 | 91.63 | 86.01 | 102.14 | 108.66 | 89.71 | 14.01 |
| Mar | 84.28 | 103.27 | 105.26 | 80.59 | 63.45 | 81.04 | 96.67 | 86.80 | 109.83 | 108.00 | 91.92 | 15.09 |
| Apr | 94.29 | 105.07 | 100.24 | 77.05 | 63.92 | 88.33 | 96.33 | 83.64 | 109.83 | 94.28 | 91.30 | 13.65 |
| May | 88.02 | 106.72 | 96.24 | 74.49 | | 92.10 | 96.38 | 85.57 | 107.20 | n.a. | 93.34 | 10.92 |
| Jun | 91.31 | 102.52 | 89.56 | 76.14 | | 87.10 | 90.12 | 89.36 | 105.55 | 108.75 | 93.38 | 10.31 |
| Jul | 93.30 | 96.91 | 87.37 | | 60.96 | 91.92 | 89.75 | 88.07 | 104.79 | n.a. | 89.14 | 12.70 |
| Aug | 92.56 | 100.46 | 85.34 | 68.56 | 63.06 | 95.12 | 75.25 | 89.80 | 100.92 | 105.23 | 87.63 | 14.38 |
| Sep | 91.83 | 97.83 | 78.04 | 61.24 | 61.96 | 87.19 | 72.20 | 88.16 | 99.05 | 100.36 | 83.79 | 14.73 |
| Oct | 90.23 | 98.60 | 77.93 | 61.91 | 60.05 | 87.28 | 75.09 | 89.26 | 103.40 | n.a. | 82.64 | 15.12 |
| Nov | 89.94 | 96.89 | 77.50 | 63.14 | 61.55 | 88.14 | 79.43 | 90.46 | 99.63 | n.a. | 82.97 | 13.68 |
| Dec | 91.68 | 93.65 | 78.46 | 63.53 | 62.94 | 89.80 | 83.62 | 96.33 | 103.24 | n.a. | 84.81 | 14.12 |
| Basis (Cash Price - Futures Price)<br>4-5 CWT Feeder Steers | | | | | | | | | | | | |
| Jan | 4.97 | 8.19 | 19.02 | 5.80 | 0.28 | 1.29 | 15.05 | 11.05 | 14.83 | n.a. | 8.94 | 6.50 |
| Feb | 3.32 | 14.97 | 22.72 | 7.16 | 6.23 | 11.14 | 15.54 | 12.11 | 18.49 | 22.01 | 13.37 | 6.61 |
| Mar | 4.43 | 17.71 | 23.58 | 12.23 | 6.74 | 12.66 | 21.27 | 14.63 | 26.05 | 21.66 | 16.10 | 7.21 |
| Apr | 14.96 | 19.48 | 19.90 | 11.08 | 11.49 | 16.86 | 19.98 | 11.68 | 25.55 | 6.66 | 15.76 | 5.64 |
| May | 9.77 | 20.65 | 20.83 | 10.02 | n.a. | 16.31 | 20.74 | 14.40 | 23.75 | n.a. | 17.06 | 5.29 |
| Jun | 13.71 | 15.30 | 16.50 | 10.20 | n.a. | 9.17 | 16.39 | 12.48 | 19.65 | 17.01 | 14.49 | 3.40 |
| Jul | 11.44 | 10.08 | 9.23 | n.a. | -0.77 | 10.35 | 19.24 | 11.79 | 17.47 | n.a. | 11.10 | 6.02 |
| Aug | 7.38 | 12.51 | 7.11 | 2.21 | -0.24 | 14.67 | 6.67 | 12.61 | 14.70 | 15.62 | 9.32 | 5.54 |
| Sep | 7.72 | 10.99 | 4.36 | -3.90 | -1.81 | 7.48 | 4.40 | 8.99 | 13.63 | 10.50 | 6.24 | 5.59 |
| Oct | 6.20 | 13.46 | 5.25 | -3.42 | -3.06 | 9.94 | 5.29 | 8.89 | 16.27 | n.a. | 6.54 | 6.66 |
| Nov | 5.90 | 13.17 | 3.23 | -1.88 | -3.56 | 10.03 | 9.26 | 7.88 | 10.91 | n.a. | 6.10 | 5.78 |
| Dec | 6.23 | 11.03 | 3.69 | -0.25 | -3.63 | 11.86 | 14.85 | 11.73 | 12.32 | n.a. | 7.54 | 6.39 |

**Table A2.** Futures Price, Cash Price, and Basis in cents per pound for PNW (WA,OR,ID) for 700-800 Pound Feeder Steers with 10-Year Monthly Average and Standard Deviation

| YEAR<br>Futures Price<br>Monthly Avg. Nearby | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 10-Year Monthly Average | 10-Year Standard Deviation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | 80.04 | 87.77 | 83.39 | 75.83 | 59.37 | 68.87 | 77.45 | 72.62 | 85.78 | 88.88 | 78.00 | 9.26 |
| Feb | 79.10 | 84.73 | 81.37 | 71.71 | 57.94 | 68.23 | 76.09 | 73.90 | 83.65 | 86.66 | 76.34 | 8.79 |
| Mar | 79.85 | 85.56 | 81.68 | 68.36 | 56.71 | 68.38 | 75.40 | 72.17 | 83.78 | 86.34 | 75.82 | 9.48 |
| Apr | 79.33 | 85.59 | 80.34 | 65.97 | 52.43 | 71.47 | 76.35 | 71.96 | 84.28 | 87.63 | 75.54 | 10.63 |
| May | 78.25 | 86.07 | 75.41 | 64.47 | 55.61 | 75.79 | 75.64 | 71.17 | 83.45 | 88.35 | 75.42 | 9.91 |
| Jun | 77.60 | 87.22 | 73.06 | 65.94 | 59.96 | 77.93 | 73.73 | 76.88 | 85.90 | 91.74 | 77.00 | 9.67 |
| Jul | 81.86 | 86.83 | 78.14 | 66.55 | 61.73 | 81.57 | 70.51 | 76.28 | 87.32 | 90.11 | 78.09 | 9.39 |
| Aug | 85.18 | 87.95 | 78.23 | 66.35 | 63.30 | 80.45 | 68.58 | 77.19 | 86.22 | 89.61 | 78.31 | 9.42 |
| Sep | 84.11 | 86.84 | 73.68 | 65.14 | 63.77 | 79.71 | 67.80 | 79.17 | 85.42 | 89.86 | 77.55 | 9.45 |
| Oct | 84.03 | 85.14 | 72.68 | 65.33 | 63.11 | 77.34 | 69.80 | 80.37 | 87.13 | 87.77 | 77.27 | 9.10 |
| Nov | 84.04 | 83.72 | 74.27 | 65.02 | 65.11 | 78.11 | 70.17 | 82.58 | 88.72 | 84.51 | 77.63 | 8.54 |
| Dec | 85.45 | 82.62 | 74.77 | 63.78 | 66.57 | 77.94 | 68.77 | 84.60 | 90.92 | 84.12 | 77.95 | 9.15 |
| Cash Price (WA,OR,ID)<br>7-8 CWT Feeder Steers | | | | | | | | | | | | |
| Jan | 72.22 | 83.28 | 79.90 | 72.75 | 55.38 | 64.51 | 75.29 | 69.51 | 82.81 | 85.38 | 74.10 | 9.38 |
| Feb | 73.63 | 82.39 | 79.93 | 69.53 | 54.52 | 68.26 | 74.05 | 71.83 | 81.30 | 85.10 | 74.05 | 8.94 |
| Mar | 71.73 | 83.97 | 80.06 | 65.76 | 55.14 | 69.60 | 74.86 | 69.64 | 83.22 | 83.88 | 73.79 | 9.35 |
| Apr | 76.18 | 84.94 | 79.89 | 63.78 | 52.50 | 70.89 | 76.74 | 68.23 | 86.45 | 82.34 | 74.19 | 10.54 |
| May | 76.38 | 87.30 | 74.61 | 65.11 | 54.51 | 74.25 | 74.64 | 69.92 | 83.29 | 79.75 | 73.98 | 9.30 |
| Jun | 75.31 | 84.76 | 73.51 | 64.78 | 58.15 | 77.50 | 71.53 | 71.00 | 83.65 | 82.60 | 74.28 | 8.48 |
| Jul | 79.46 | 81.84 | 74.47 | 64.53 | 59.42 | 76.75 | 65.84 | 73.87 | 85.49 | 88.58 | 75.03 | 9.44 |
| Aug | 79.76 | 84.55 | 73.66 | 63.42 | 59.18 | 78.87 | 62.46 | 74.77 | 80.97 | 86.13 | 74.38 | 9.59 |
| Sep | 80.18 | 83.21 | 70.42 | 60.46 | 57.46 | 75.44 | 62.77 | 72.96 | 81.82 | 84.23 | 72.90 | 9.86 |
| Oct | 77.41 | 82.82 | 69.39 | 62.51 | 56.83 | 74.66 | 65.17 | 73.89 | 84.12 | 82.31 | 72.91 | 9.28 |
| Nov | 78.22 | 81.42 | 68.74 | 59.44 | 58.93 | 73.31 | 65.09 | 74.73 | 83.28 | 76.78 | 71.99 | 8.65 |
| Dec | 79.83 | 78.35 | 68.31 | 61.49 | 61.31 | 73.41 | 65.46 | 80.18 | 86.42 | 77.91 | 73.27 | 8.68 |
| Basis (Cash Price - Futures Price)<br>7-8 CWT Feeder Steers | | | | | | | | | | | | |
| Jan | -7.82 | -4.49 | -3.49 | -3.08 | -3.99 | -4.36 | -2.16 | -3.11 | -2.97 | -3.50 | -3.90 | 1.54 |
| Feb | -5.47 | -2.34 | -1.44 | -2.18 | -3.42 | 0.03 | -2.04 | -2.07 | -2.35 | -1.56 | -2.28 | 1.42 |
| Mar | -8.12 | -1.59 | -1.62 | -2.60 | -1.57 | 1.22 | -0.54 | -2.53 | -0.56 | -2.46 | -2.04 | 2.44 |
| Apr | -3.15 | -0.65 | -0.45 | -2.19 | 0.07 | -0.58 | 0.39 | -3.73 | 2.17 | -5.29 | -1.34 | 2.22 |
| May | -1.87 | 1.23 | -0.80 | 0.64 | -1.10 | -1.54 | -1.00 | -1.25 | -0.16 | -8.60 | -1.45 | 2.69 |
| Jun | -2.29 | -2.46 | 0.45 | -1.16 | -1.81 | -0.43 | -2.20 | -5.88 | -2.25 | -9.14 | -2.72 | 2.80 |
| Jul | -2.40 | -4.99 | -3.67 | -2.02 | -2.31 | -4.82 | -4.67 | -2.41 | -1.83 | -1.53 | -3.07 | 1.34 |
| Aug | -5.42 | -3.40 | -4.57 | -2.93 | -4.12 | -1.58 | -6.12 | -2.42 | -5.25 | -3.48 | -3.93 | 1.43 |
| Sep | -3.93 | -3.63 | -3.26 | -4.68 | -6.31 | -4.27 | -5.03 | -6.21 | -3.60 | -5.63 | -4.66 | 1.11 |
| Oct | -6.62 | -2.32 | -3.29 | -2.82 | -6.28 | -2.68 | -4.63 | -6.48 | -3.01 | -5.46 | -4.36 | 1.73 |
| Nov | -5.82 | -2.30 | -5.53 | -5.58 | -6.18 | -4.80 | -5.08 | -7.85 | -5.44 | -7.73 | -5.63 | 1.56 |
| Dec | -5.62 | -4.27 | -6.46 | -2.29 | -5.26 | -4.53 | -3.31 | -4.42 | -4.50 | -6.21 | -4.69 | 1.27 |

**Table A3.** Futures Price, Cash Price, and Basis in cents per pound for PNW (WA-OR) for 1100-1300 Pound Fed Steers with 10-year Monthly Average and Standard Deviation

| YEAR<br>Futures Price<br>Monthly Avg. Nearby | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 10-Year Monthly Average | 10-Year Monthly Std. Dev. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | 74.50 | 79.20 | 73.41 | 73.75 | 65.11 | 65.12 | 65.15 | 62.26 | 69.98 | 78.41 | 70.69 | 6.03 |
| Feb | 77.92 | 80.73 | 74.06 | 74.08 | 64.18 | 68.48 | 63.50 | 64.76 | 70.09 | 80.69 | 71.85 | 6.64 |
| Mar | 78.20 | 82.12 | 76.57 | 70.45 | 63.57 | 68.46 | 64.76 | 67.24 | 72.51 | 79.01 | 72.29 | 6.42 |
| Apr | 77.19 | 80.10 | 75.18 | 66.68 | 59.85 | 67.50 | 67.24 | 66.65 | 73.15 | 77.53 | 71.11 | 6.45 |
| May | 73.22 | 76.24 | 66.73 | 60.83 | 59.96 | 65.39 | 66.60 | 63.42 | 68.16 | 72.22 | 67.28 | 5.32 |
| Jun | 72.65 | 76.04 | 64.30 | 63.22 | 63.65 | 64.63 | 64.38 | 65.50 | 68.53 | 73.23 | 67.61 | 4.70 |
| Jul | 73.17 | 74.17 | 67.67 | 62.91 | 66.49 | 65.84 | 62.31 | 63.80 | 67.20 | 73.72 | 67.73 | 4.48 |
| Aug | 74.25 | 75.18 | 70.12 | 62.62 | 69.09 | 66.97 | 59.79 | 65.61 | 66.49 | n.a. | 67.79 | 5.02 |
| Sep | 75.32 | 74.48 | 69.94 | 64.95 | 72.54 | 68.23 | 60.31 | 67.18 | 67.78 | n.a. | 68.97 | 4.75 |
| Oct | 75.38 | 72.80 | 68.33 | 66.05 | 70.43 | 67.48 | 63.10 | 70.68 | 70.00 | n.a. | 69.36 | 3.64 |
| Nov | 74.71 | 73.23 | 69.56 | 68.24 | 67.22 | 67.10 | 63.28 | 69.48 | 72.44 | n.a. | 69.47 | 3.55 |
| Dec | 77.53 | 72.76 | 69.92 | 67.44 | 66.02 | 66.69 | 60.23 | 69.39 | 76.68 | n.a. | 69.63 | 5.44 |
| Cash Price (WA-OR)<br>11-13 CWT Fed Steers | | | | | | | | | | | | |
| Jan | 72.58 | 78.53 | 72.40 | 72.52 | 63.92 | 64.99 | 63.51 | 62.00 | 68.40 | 77.14 | 69.60 | 5.88 |
| Feb | 76.28 | 79.56 | 72.18 | 72.79 | 62.03 | 66.47 | 61.54 | 62.82 | 68.18 | 78.80 | 70.07 | 6.86 |
| Mar | 77.37 | 81.55 | 74.38 | 70.47 | 62.62 | 68.79 | 63.27 | 64.48 | 71.85 | 80.83 | 71.56 | 6.95 |
| Apr | 77.35 | 81.47 | 74.15 | 66.71 | 60.11 | 68.13 | 64.74 | 64.82 | 73.44 | n.a. | 70.10 | 6.90 |
| May | 76.19 | 79.95 | 67.47 | 63.54 | 57.97 | 66.59 | 64.39 | 64.19 | 70.04 | n.a. | 67.81 | 6.75 |
| Jun | 73.50 | 74.97 | 62.43 | 64.29 | 60.07 | 64.00 | 62.23 | 63.78 | 68.02 | n.a. | 65.92 | 5.18 |
| Jul | 72.30 | 73.25 | 63.80 | 62.80 | 61.97 | 64.22 | 59.08 | 62.78 | 66.43 | n.a. | 65.18 | 4.73 |
| Aug | 73.03 | 74.27 | 64.89 | 62.08 | 65.84 | 65.10 | 57.95 | 63.74 | 65.36 | n.a. | 65.81 | 5.06 |
| Sep | 74.05 | 72.69 | 64.53 | 62.53 | 68.47 | 63.47 | 56.81 | 64.86 | 64.08 | n.a. | 65.72 | 5.30 |
| Oct | 75.37 | 71.18 | 65.27 | 63.84 | 69.67 | 66.07 | 59.25 | 67.59 | 65.94 | n.a. | 67.13 | 4.61 |
| Nov | 75.06 | 72.64 | 68.03 | 67.01 | 70.32 | 67.39 | 61.37 | 68.24 | 69.79 | n.a. | 68.87 | 3.85 |
| Dec | 77.10 | 72.12 | 68.23 | 66.50 | 65.73 | 65.40 | 60.10 | 69.98 | 75.70 | n.a. | 68.98 | 5.37 |
| Basis (Cash Price - Futures Price)<br>11-13 CWT Fed Steers | | | | | | | | | | | | |
| Jan | -1.92 | -0.67 | -1.01 | -1.23 | -1.19 | -0.13 | -1.64 | -0.26 | -1.58 | -1.27 | -1.09 | 0.59 |
| Feb | -1.64 | -1.17 | -1.88 | -1.29 | -2.15 | -2.01 | -1.96 | -1.94 | -1.91 | -1.89 | -1.78 | 0.32 |
| Mar | -0.83 | -0.57 | -2.19 | 0.02 | -0.95 | 0.33 | -1.49 | -2.76 | -0.66 | 1.82 | -0.73 | 1.30 |
| Apr | 0.16 | 1.37 | -1.03 | 0.03 | 0.26 | 0.63 | -2.50 | -1.83 | 0.29 | n.a. | -0.29 | 1.24 |
| May | 2.97 | 3.71 | 0.74 | 2.71 | -1.99 | 1.20 | -2.21 | 0.77 | 1.88 | n.a. | 1.09 | 2.07 |
| Jun | 0.85 | -1.07 | -1.87 | 1.07 | -3.58 | -0.63 | -2.15 | -1.72 | -0.51 | n.a. | -1.07 | 1.47 |
| Jul | -0.87 | -0.92 | -3.87 | -0.11 | -4.52 | -1.62 | -3.23 | -1.02 | -0.77 | n.a. | -1.88 | 1.58 |
| Aug | -1.22 | -0.91 | -5.23 | -0.54 | -3.25 | -1.87 | -1.84 | -1.87 | -1.13 | n.a. | -1.98 | 1.45 |
| Sep | -1.27 | -1.79 | -5.41 | -2.42 | -4.07 | -4.76 | -3.50 | -2.32 | -3.70 | n.a. | -3.25 | 1.39 |
| Oct | -0.01 | -1.62 | -3.06 | -2.21 | -0.76 | -1.41 | -3.85 | -3.09 | -4.06 | n.a. | -2.23 | 1.39 |
| Nov | 0.35 | -0.59 | -1.53 | -1.23 | 3.10 | 0.29 | -1.91 | -1.24 | -2.65 | n.a. | -0.60 | 1.69 |
| Dec | -0.43 | -0.64 | -1.69 | -0.94 | -0.29 | -1.29 | -0.13 | 0.59 | -0.98 | n.a. | -0.64 | 0.68 |

**Table A4**. Futures Price, Cash Price, and Basis in dollars per hundredweight (CWT) for PNW and Western Milk Marketing Orders Using CME Class III Futures and Mailbox Cash Prices with 3-Year Monthly Average and Standard Deviation

| | PNW Order | | | | | | Western Order | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year<br>Class III Futures Price<br>Monthly Average | 1999 | 2000 | 2001 | 3-Year Monthly Average | 3-Year Monthly Std. Dev. | Year<br>Class III Futures Price<br>Monthly Average | 1999 | 2000 | 2001 | 3-Year Monthly Average | 3-Year Monthly Std. Dev. |
| Jan | 16.27 | 10.05 | 9.99 | 12.10 | 3.61 | Jan | 16.27 | 10.05 | 9.99 | 12.10 | 3.61 |
| Feb | 10.27 | 9.54 | 10.27 | 10.03 | 0.42 | Feb | 10.27 | 9.54 | 10.27 | 10.03 | 0.42 |
| Mar | 11.62 | 9.54 | 11.42 | 10.86 | 1.15 | Mar | 11.62 | 9.54 | 11.42 | 10.86 | 1.15 |
| Apr | 11.81 | 9.41 | 12.06 | 11.09 | 1.46 | Apr | 11.81 | 9.41 | 12.06 | 11.09 | 1.46 |
| May | 11.26 | 9.37 | 13.83 | 11.49 | 2.24 | May | 11.26 | 9.37 | 13.83 | 11.49 | 2.24 |
| Jun | 11.42 | 9.46 | 15.02 | 11.97 | 2.82 | Jun | 11.42 | 9.46 | 15.02 | 11.97 | 2.82 |
| Jul | 13.59 | 10.66 | 15.46 | 13.24 | 2.42 | Jul | 13.59 | 10.66 | 15.46 | 13.24 | 2.42 |
| Aug | 15.79 | 10.13 | 15.55 | 13.82 | 3.20 | Aug | 15.79 | 10.13 | 15.55 | 13.82 | 3.20 |
| Sep | 16.26 | 10.76 | 15.90 | 14.31 | 3.08 | Sep | 16.26 | 10.76 | 15.90 | 14.31 | 3.08 |
| Oct | 11.49 | 10.02 | 14.60 | 12.04 | 2.34 | Oct | 11.49 | 10.02 | 14.60 | 12.04 | 2.34 |
| Nov | 9.79 | 8.57 | 11.31 | 9.89 | 1.37 | Nov | 9.79 | 8.57 | 11.31 | 9.89 | 1.37 |
| Dec | 9.63 | 9.37 | | 9.50 | 0.18 | Dec | 9.63 | 9.37 | n.a. | 9.50 | 0.18 |
| Cash Price ($/CWT)<br>Mailbox-PNW Order | | | | | | Cash Price ($/CWT)<br>Mailbox-Western | | | | | |
| Jan | 16.07 | 11.26 | 12.39 | 13.24 | 2.52 | Jan | 16.10 | 10.67 | 11.26 | 12.68 | 2.98 |
| Feb | 14.42 | 11.20 | 12.51 | 12.71 | 1.62 | Feb | 12.33 | 10.69 | 11.45 | 11.49 | 0.82 |
| Mar | 14.37 | 11.30 | 13.37 | 13.01 | 1.57 | Mar | 12.87 | 10.35 | 12.51 | 11.91 | 1.36 |
| Apr | 11.46 | 11.37 | 14.02 | 12.28 | 1.50 | Apr | 11.29 | 10.08 | 13.11 | 11.49 | 1.53 |
| May | 12.10 | 11.68 | 14.82 | 12.87 | 1.70 | May | 11.34 | 10.13 | 14.23 | 11.90 | 2.11 |
| Jun | 12.67 | 11.83 | 15.35 | 13.28 | 1.84 | Jun | 11.73 | 10.13 | 14.97 | 12.28 | 2.47 |
| Jul | 12.64 | 11.92 | | 12.28 | 0.51 | Jul | 12.53 | 10.80 | n.a. | 11.67 | 1.22 |
| Aug | 13.19 | 11.85 | | 12.52 | 0.95 | Aug | 13.72 | 10.69 | n.a. | 12.21 | 2.14 |
| Sep | 14.13 | 12.17 | | 13.15 | 1.39 | Sep | 14.62 | 11.34 | n.a. | 12.98 | 2.32 |
| Oct | 13.64 | 12.01 | | 12.83 | 1.15 | Oct | 12.47 | 10.96 | n.a. | 11.72 | 1.07 |
| Nov | 13.46 | 12.16 | | 12.81 | 0.92 | Nov | 10.96 | 10.60 | n.a. | 10.78 | 0.25 |
| Dec | 11.45 | 12.61 | | 12.03 | 0.82 | Dec | 10.39 | 11.01 | n.a. | 10.70 | 0.44 |
| Basis (Cash Price - Futures Price)<br>PNW Order | | | | | | Basis (Cash Price - Futures Price)<br>Western Order | | | | | |
| Jan | -0.20 | 1.21 | 2.40 | 1.14 | 1.30 | Jan | -0.17 | 0.62 | 1.27 | 0.57 | 0.72 |
| Feb | 4.15 | 1.66 | 2.24 | 2.68 | 1.30 | Feb | 2.06 | 1.15 | 1.18 | 1.46 | 0.52 |
| Mar | 2.75 | 1.76 | 1.95 | 2.15 | 0.53 | Mar | 1.25 | 0.81 | 1.09 | 1.05 | 0.22 |
| Apr | -0.35 | 1.96 | 1.96 | 1.19 | 1.33 | Apr | -0.52 | 0.67 | 1.05 | 0.40 | 0.82 |
| May | 0.84 | 2.31 | 0.99 | 1.38 | 0.81 | May | 0.08 | 0.76 | 0.40 | 0.41 | 0.34 |
| Jun | 1.25 | 2.37 | 0.33 | 1.32 | 1.02 | Jun | 0.31 | 0.67 | -0.05 | 0.31 | 0.36 |
| Jul | -0.95 | 1.26 | | 0.16 | 1.56 | Jul | -1.06 | 0.14 | n.a. | -0.46 | 0.85 |
| Aug | -2.60 | 1.72 | | -0.44 | 3.05 | Aug | -2.07 | 0.56 | n.a. | -0.76 | 1.86 |
| Sep | -2.13 | 1.41 | | -0.36 | 2.50 | Sep | -1.64 | 0.58 | n.a. | -0.53 | 1.57 |
| Oct | 2.15 | 1.99 | | 2.07 | 0.11 | Oct | 0.98 | 0.94 | n.a. | 0.96 | 0.03 |
| Nov | 3.67 | 3.59 | | 3.63 | 0.06 | Nov | 1.17 | 2.03 | n.a. | 1.60 | 0.61 |
| Dec | 1.82 | 3.24 | | 2.53 | 1.00 | Dec | 0.76 | 1.64 | n.a. | 1.20 | 0.62 |

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