CHAPTER 9

MARKETING PRACTICES TO REDUCE THE RISK
OF PRICE FLUCTUATIONS

A. Market Conditions

For most agricultural producers, marketing refers to the selling of their commodities. However, the livestock industry also purchases commodities such as corn or soybeans as an input for feed. Therefore, a feedlot may be not only a seller of cattle, but also a buyer of corn. A corn producer will simply be a seller of corn. This implies that there are two primary participants in commodity markets: the buyer and the seller. For the remainder of this chapter we will refer to marketing participants as either buyers or sellers.

Purchasers of agricultural commodities may be domestic companies, individuals, government entities and programs, or foreign buyers. Agricultural producers can participate in these and other markets, although they will probably not actually communicate with the purchasers in each market. A company may purchase the commodity from a seller, and then resell to another buyer and so on. As the product changes ownership, it generally increases in value due to further processing and/or carrying charges such as transportation and storage. This process is referred to as adding marketing utility to a product.

Each of these markets offers a price for the commodity purchased. In this chapter we will look at farm level prices, not prices further along the processing chain. The same type of commodity may differ in price from one location to another, depending on the amount of marketing utility that has been added. Additionally, a price change may occur in one market but not in another.

For example, corn being sold at the Port of Houston, Texas will differ in price from similar grade corn sold in Chicago. This difference will result from a variety of sources such as transportation costs, regional supplies, regional demands, and other causes that are beyond the scope of this chapter. In addition, prices will vary within a given market over time. This price variability creates a price risk to agricultural producers, or sellers, no matter where they are located.

Thus, *market price risk* occurs because the price may vary from the time the producer plants or begins feeding, until they are ready to sell. The buyer and the seller are subject to this risk, and as a result will have a difficult time budgeting cost or estimating profits. This chapter is not about what markets a producer should sell into, but rather how they can decrease their risk of an adverse price change. An adverse price change would be a price increase for a buyer, or a price decrease for a seller. First, we will look at why prices fluctuate.

B. Why Prices Fluctuate

In today's economy, agricultural producers cannot simply plant a crop or raise livestock and expect a continuous profit, since input costs and output prices continually change. The fluctuation of output price is the main focus of this chapter. This type of activity, as previously discussed, will

increase the farmer's risk of loss from those price variations. These price variations come from many sources.

Generally, variations in price stem from variations in supplies of agricultural commodities or changes in demand. If we assume a constant demand for a given commodity, when supplies are high, prices will be low. The opposite is also true. If supplies are low, prices are typically high. If supply is held constant, an increase in demand will cause prices to rise and if demand is decreased, holding supply constant, that commodity's price will fall.

For example, the number of cattle in the feedlots may dictate the supply of cattle. The supply of crops may fluctuate as a result of both the previous year's production and anticipated production for the current year. These fluctuations may lead to high prices during planting and low prices during harvest, or vice-versa. Prices may also stay constant because of a combination of offsetting factors.

The price level may also fluctuate due to changes in weather conditions, foreign demand, health concerns, or other factors. Essentially, any factor that will cause a change in either the supply of a commodity or the demand for that commodity may affect that commodity's price.

The three different situations have potential to produce very different commodity prices, and therefore affect a crop producer's profit.

Commodity Value

A

B

C

Planting   Growing   Harvest
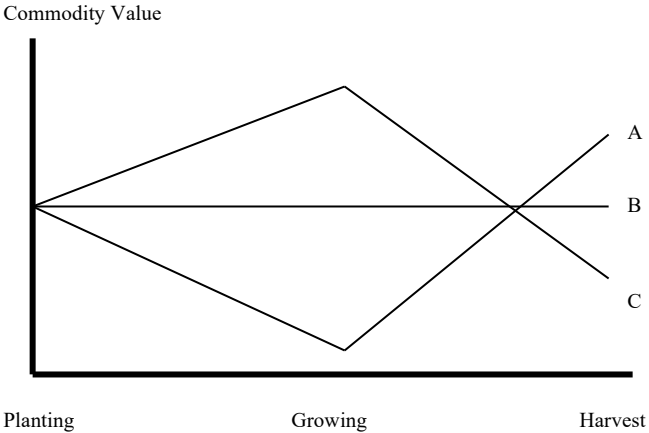
Situation A has a low crop price when planting, but a high price during harvest. Each situation differs, which is why producers must continually track market reports, extension specialist opinions, and other sources to make sure they have a grasp on market conditions and outlook. Once this is accomplished, marketing tools may then be used to avoid the harvest price decrease for crop C (sellers), or gain from the harvest price increase for crop A (buyers).

Three primary marketing tools can be used to reduce the risk of adverse price changes. They are forward contracting, hedging in the futures market, and hedging in the options market.

C. Using Forward Contracting

Forward contracting (sometimes called forward pricing) occurs when a buyer and seller make a contract that sets the amount, price, and quality of product that will be delivered by the seller to the buyer. The price may be negotiable, but depends on the buyer's and seller's outlooks on the market. These two participants usually meet and together negotiate this contract and its details. First, we will look at the buyer's side.

The Buyer's Side of Forward Contracting
If the buyer wanted to own the commodity today, they could purchase it at the current cash market price. A buyer wishes to forward contract so they may have the commodity in the future to meet their needs, and not be unsure what the price will be. In addition to reducing their price risk, the buyer in a forward contract wishes to make a purchase for the lowest price possible.

For example, consider a feedlot owner (buyer) purchasing corn for feed. If the buyer believes the price is headed down, their desired contract corn price will be lower than the current corn price. If the buyer expects corn prices to rise, the contract price offered will be higher than the current corn price.

If the buyer believes the price is going down, why not wait and buy in the future at the lower price? The answer is that the buyer still has price uncertainty, and that presents a risk. This contract allows the buyer to set a price and reduce the price uncertainty. The fact that it is believed that the price will be declining can help the buyer negotiate a price lower than the current market price.
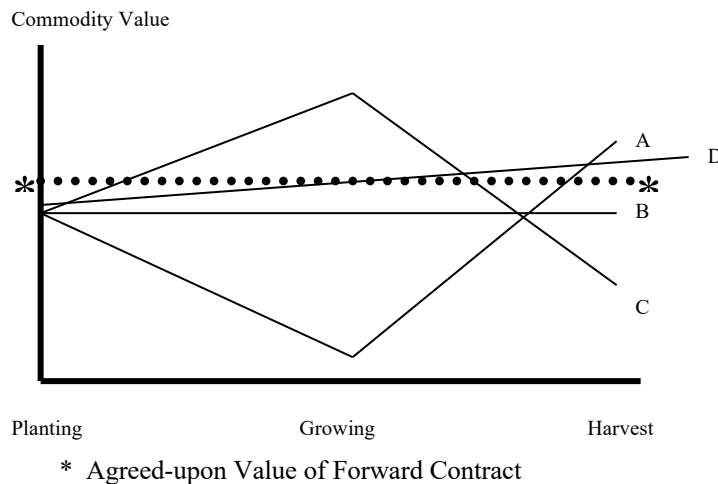
The Seller's Side of Forward Contracting
Sellers also use forward contracts to lower their risk of price uncertainty. In addition to lowering price risk, the seller of a contract also wishes to sell at the highest possible price. If the market price is expected to move higher, the seller will desire a price above the current price. If the price is expected to fall, a price lower than the current market price would be considered reasonable. However, this is true only for a growing crop, which will not be harvested until sometime in the future. If the crop is already harvested and stored, and they believe that the price will drop, they would simply remove the crop from storage and sell at the current price. There is no incentive to negotiate a price lower than current.

Consider another example. Using situation C in following graph with the same corn commodity, look at the producer (seller) of corn. If the expectation is that corn prices will rise, the value of the contract will be agreed upon at some level above the current price, as indicated by the *.

However, suppose harvest time brings a lower commodity value, because of an unexpected yield increase. (Remember, an increase in supply causes equilibrium price to decline, all else held constant.)

This higher yield causes the price to be lower because of excess supplies. The value of the contract (*) will be higher than the market-determined price of situation C during harvest time. In this case, forward contracting reduced the producer's (seller's) price risk and provided him with a more

favorable price than what the market offered (C). Therefore, this producer protected himself from price risk and received a higher price.

Commodity Value

Planting   Growing   Harvest

* Agreed-upon Value of Forward Contract

However, consider situation D occurring instead of C. The seller still anticipates the market price to rise. This producer receives a lower price from the forward contract (*) than could have been received in the market under situation D. However, the corn producer still receives the risk protection from price variability. The price difference is an opportunity cost of protecting from the risk of changing prices.

The forward contract is sometimes difficult to negotiate because the seller and buyer must agree upon several uncertain situations. However, the foundation of a forward contract is based on the buyer and seller agreeing on a mutually beneficial price. This price may be what the seller needs to receive for a reasonable profit, and what the buyer can pay and still keep costs low. In either case, both parties must be satisfied with the contract's value.

Consider another example of buying corn for feed to be delivered and used at some future time. Since prices are unknown, the buyer has a difficult time estimating feed cost. In order to reduce that price risk, they buy corn through a forward contract. Through this type of purchase, they know their cost of corn. This buyer is then able to budget costs and better estimate profits.

The seller of the corn forward contract is also unsure of the future price. The contract provides a fixed, known price and decreases the price risk. Through this marketing tool, buyers and sellers are able to reduce their risk of uncertain prices.

Note that a forward contract is an agreement between a specific seller and a specific buyer. The contract is generally not an instrument that can be traded or sold to another party. If a producer enters a forward contract to provide feeder steers to a feedlot, they are expected to be the ones to fulfill the contract and deliver the livestock. In this sense, forward contracts (unlike the futures contracts discussed next) are not considered marketable.

D. The Futures Market

The futures market began in the late 1800s when grain crops were bought and sold for delivery at some time in the future. Today, just as in the past, the futures market is a center for buyers and sellers to meet (although usually not physically) and trade contract obligations for future delivery.

Buyers	→	Clearing House Connects buyers and sellers to buy and sell specific contracts	←	Sellers
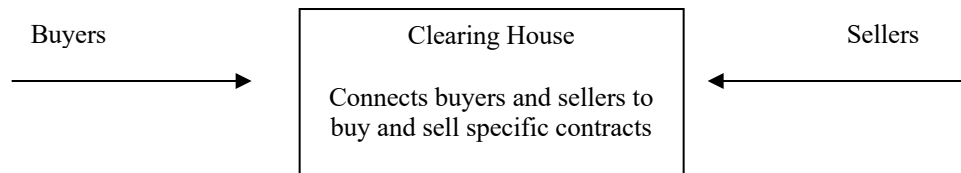
Futures contracts are written documents that call for the future delivery of a specific quantity of a commodity, with given quality, at a certain time and place. For example, a corn contract represents 5,000 bushels of a certain quality of corn. This is a detail of the contract that is not negotiable. Futures contracts are traded based on the month of delivery. For example, corn contracts are traded for delivery in March, May, July, September, and December. Each of these months represents delivery dates. Once a particular delivery month has been selected, all details of the contract are fixed and the only negotiable part is the price.

In 1970, 14 million futures contracts were traded in the market. By 1990 that number had risen to 350 million futures contracts. The 70's were a period of high agricultural commodity prices, so the use of the futures market to ensure a good price for producers was not needed. However, in the 80's and the 90's agricultural commodity price levels have been quite variable and the need to ensure a favorable price has increased.

The following illustrates the futures market value of corn contracts. Corn is traded in 5,000 bushel contract units and is traded based on the price per bushel.
As previously stated, the month for each contract represents its delivery month. For example, a corn contract can be traded for delivery in March, May, July, September, and December. The contracts can be bought or sold by market participants up until their delivery date.

CORN				
Month	High	Low	Last	Change
MAR	2144	2134	2140	+2
MAY	2212	2204	2206	-2
JUL	2282	2272	2276	0
SEP	2340	2334	2336	0
DEC	2416	2406	2412	0

The table above shows the way futures contracts are priced. The four-digit numbers represent dollars, cents, and eights of cents, so a price of 2276 would represent $2.27 and 6/8 of a cent per bushel. The March contract is presently trading for $2.14 per bushel (column marked Last). This

contract has traded for as high as $2.14 4/8 per bushel and as low as $2.13 4/8 per bushel for the trading day. The Change column shows that it is currently trading for two-eighths of a cent more than (+) the previous day's close. This quote reflects the value of all of the currently traded corn futures contract values.

Note that a price of, for example, 2144 on the 5000 bushel contract would yield a contract value of $ 2.14 ½ x 5000 = $10,725.00. While contracts are priced per bushel, and we consider them at the per-bushel price, remember that an actual trader purchasing a contract will have to pay the full contract value.

Futures contracts are bought and sold in futures markets such as the Minneapolis Grain Exchange, Chicago Board of Trade, or the Chicago Mercantile Exchange. There are all types of commodities being sold in the futures market. Some of these include agricultural products (corn, soybeans, soybean oil, feeder cattle, etc.), metals such as gold and silver, oil, financial instruments, and stock indexes.

The market determines the prices of futures contracts, such as the corn contract values in the previous example. Through the buying and selling process, as some people bid to purchase and others either accept or reject these offers, the market price will always reflect the current value of that commodity. Participants in the futures market are allowed to take two actions, either buy one or more contracts, or sell them.

Some terms must be understood so these two transactions are more easily followed. A *BUY* action is a *LONG* position, while a *SELL* action is a *SHORT* position. This is summarized in the table below. In essence, a long position means that you have something to sell, or will have something to sell. For example, if a trader purchases a futures contract, he is then in a long position, since he has something to sell. A corn farmer will have corn to sell, so although he does not have something to sell now, he will have corn to sell. Therefore, the corn farmer (and generally any producer) is in a long position.

On the other hand, a feedlot that needs to purchase corn to feed is in a short position. It will have to buy at some time in the future, so it is short now. A trader who has initially sold a futures contract, will have to buy one before delivery date so that she can meet her obligation. She is therefore short in that futures contract.

> ### INITIAL ACTION
> LONG POSITION = BUY ACTION
> SHORT POSITON = SELL ACTION

So a participant is long in the futures market when they are buying a futures contract, and short in the market when they are selling a futures contract. How, then, can a trader sell something that they do not own? With the futures markets, that is perfectly legal and possible. The only stipulation is that the trader must buy the same contract at some time before the delivery date, to cover the short position.

As an example, suppose on September 1ˢᵗ I sell you a $20 US Gold coin (valued at around $800 for the amount of gold in it). I sell it to you for $810, payable now, but we agree that I won't deliver it for three months (Dec. 1). I am short one gold coin, since I owe it to you, and I have until December 1ˢᵗ to buy one from somewhere to cover my short position. If the price stays below $810, my gamble paid off and I will make some money. However, if the price goes up above $810 before I buy it, then I will lose money. I had better watch the gold markets closely! If the price of the gold coin goes down, I will probably want to hold off purchasing, to make more money. However, if the price goes up, I have a decision to make: buy now and protect my profit, or wait and hope it goes back down. If I wait so long that it goes above $810, I will have a loss, but I am obligated to buy the coin at the high price to fulfill my contract to you.

So how does a participant enter the futures market? The futures market is unlike the stock market where financial instruments (stocks or bonds) are traded. The stock market requires an individual to own a stock before they can sell it. Participants in the futures market can sell contracts without owning the commodity.

If a participant takes a short position they can exit the market by buying the same contract (specific month) that they sold, before it's maturity. Participants can also get into the futures market by taking an initial long position and exit the market by selling the same commodity contract (specific month). Once the opposite and offsetting position is taken, the participant is no longer liable for any contract obligation. This is how participants avoid actually having to accept or deliver a commodity contract.

How then is value created in the futures market? Participants earn a profit by the value of the contract increasing or decreasing, depending on their initial position, before they exit the market. For example, if an individual or business takes a long position and then later sells the exact same contract for more than the purchase price, they earn a profit. If a participant takes a short position in the futures market, and then later buys the contract back for less than the initial selling price, they also earn a profit.

There are two participants in the futures market: speculators and hedgers. Hedgers are interested in managing their risk of uncertain price changes and can either buy or sell futures contracts. Hedgers either own or wish to own the commodities that they are buying and selling in the futures market. These participants are normally in the futures market for a longer period of time than speculators.

Speculators are willing to accept the price risk for hedgers in the hope of making a short-term profit. A speculator profits by buying low and then selling high, or by selling high and then buying low. Hedgers trade contracts like a speculator, but are primarily interested in reducing their risk of losing money due to varying prices of the commodities they sell.

Corn Value

	Planting	Growing	Harvest

Speculator's Interest

Hedger's Interest
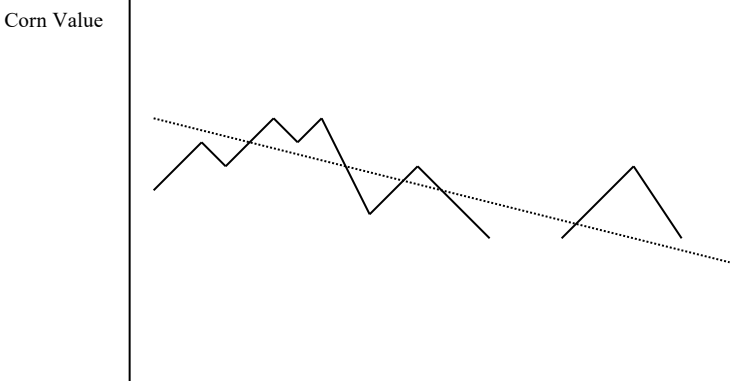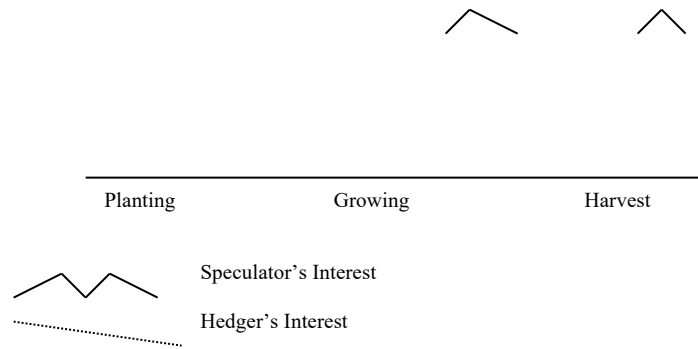
The cash market is where corn (the actual commodity) is bought and sold, while the futures market is where corn *contracts* are bought and sold. To simplify the explanation assume that the price of corn moves the same in each market, so the movements are related. The previous graph illustrates how the speculator is interested in small short-term ups and downs in the futures value of corn. The hedger is mainly interested in the general trend of prices, especially as the time relates to when the producer normally grows and then sells their commodity.

So the hedger wishes to protect from adverse price changes in corn. A seller would take a short position in the futures market during planting. This short position will protect from the risk of a decrease in price. However, someone must be willing to buy the same contract from the hedger. This is the purpose of the speculator and is handled through the clearing house. The speculator would, in some situations, take the long position. So the speculator will buy at what he believes to be the low price and ride the contract to the high points where he hopes to sell for a profit.

The hedger who started this trend is still locked in a short position in the futures market, looking to have long-term price risk protection. The hedger's income from the hedge is from selling high (a short position), and in the long-term future buying back at a lower price, therefore protecting from the cash commodity's loss in value. This profit is added to the selling price of the corn, which protects the seller's net corn price. This will then provide the seller with more certain revenues.

We have talked about a hedger selling a contract to protect from a decreasing selling price, but who would wish to buy, or take an initial long position in a future contract? The answer to that is the agricultural producer who wishes to lock in input costs, and reduce the uncertainty of them increasing. This is, for example, the cattle producers who wish to purchase corn to feed. If prices are low, they can go long in a futures contract for corn to insure their price for feed in the future.

	REASON FOR BUYING	REASON FOR SELLING
Hedgers	To provide price protection from the rising cost of inputs	To provide price protection from declining commodity prices
Speculators	To profit from rising prices	To profit from declining prices

Now we will go into more detail about what the hedger does to accomplish the reduction of price risk.

D. Hedging Using the Futures Market

In hedging, an individual or business is trying to protect from price fluctuations that could negatively affect their income or commodity value.

A farmer or rancher really does not wish to sell or buy commodities on the futures market. Instead, they wish to reduce the risk of price variation, and sell their commodity at a local market or cash market. First, we have to look at why a hedger participates in these two markets. These are the cash market, and then the futures market.

Markets in Which a Hedger Participates	
<u>Cash Market</u>	<u>Futures Market</u>
sell commodity at local market for cash.	buy or sell contracts to benefit from long term price change

The cash market is the local market, or other location where an agricultural producer sells their commodity. The futures market is where the risk of price variation is offset. Both the cash and the futures market tend to move in the same direction.

If the value of corn decreases in the cash market, the value of the futures contracts will also decrease. Of course, there are different months of contracts for the futures market, and one price for the cash market, so this may not be an equal change, but they do move in the same direction.

The difference between the cash market and the futures market is referred to as the basis.

$$\text{Basis} = \text{Cash Market} - \text{Futures Market}$$

We will use this concept in some of our later examples. This *basis* generally represents the transportation, storage, and interest expense in moving the crops or livestock to the futures market locations and in holding the commodity until the contract month. Usually the futures price exceeds the cash price, so the basis is predominately negative.

Trading futures contracts requires extensive work on the part of the hedger because the market depends on several conditions and can cost the producer money if not used correctly.

The idea of a hedge is to take the opposite position in the futures market from the position the producer has in the cash market. If a producer is long in the cash market (has or will have product to sell), then they should go SHORT in the futures market and SELL a corn contract. This will protect the corn producer from a decreasing price at the rate of 5,000 bushels of price protection from one contract. The more the expected production, the more contracts are needed for a full hedge.

For example, a corn producer hedged his or her corn to reduce the price risk. The producer took a short position on the same amount of corn expected to be produced and as the value of the corn declined in the cash market, the producer was able to offset the loss with the gains on the futures contracts. The gain was created because the producer sold high on the futures and bought back low.

Consider another example where you are a feedlot operator and wish to purchase corn to feed your cattle. You are worried that the price will increase, which will increase the cost of feed. To try to avoid this risk you could hedge your position in the opposite way as the corn producer did. This time the feedlot operator is looking for someone to SELL corn to him, so that makes him SHORT in the cash market (needs or will need to buy product). For the feedlot manager to protect himself from a price increase, he would then go LONG in the futures market and BUY a corn contract. This long-buy, short-sell idea uses a little terminology, but shows why producers would want to hedge.

One way to think about this is that whatever the market participant wants or needs to do in the cash market at some time in the future, he should do in the futures market in the present. If you will need to **buy** corn in the future, **buy** an equivalent number of corn contracts now (one contract for each 5000 bushels of actual corn to be bought). If you will have corn to **sell** in the future, **sell** corn contracts now. The idea is to hold an opposite position in each market. When the time comes to move in the physical product market, the hedger will be buying one thing and selling another (either buying corn and selling contracts, or buying contracts and selling corn). That way when the price moves, he will lose money in one market and make money in the other, leaving a net of zero (or close to it, as we shall see.)

Hedging Examples

The farmer wishes to hedge some of the price variability risk by taking the opposite position in the futures market than they have in the cash market. The producer is long in the cash (someone is going to buy their commodity), so they need to be short in the futures.

EXAMPLE 1
The producer sees that corn prices are expected to fall, and the current price is fully acceptable to the producer. The producer estimates the yield to be 5,000 bushels so one contract will cover the hedge. The cash market price during planting is $3.65 and it is estimated than the corn will be harvested in July. To cover the hedge the producer decides to take a short position with a September contract. This contract currently has a value of $3.95 per bushel. In July the producer sells the corn on the cash market for $3.45 and the hedge is removed by buying the September contract at $3.25 per bushel.

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EXAMPLE 1

TRANSACTION DATE          CASH MARKET          FUTURES MARKET                    BASIS

Decide to hedge           $3.65/               Sell September Corn      =        +0.30
5,000 bushels of          bushel               1 contract at
corn                      December 2005        $3.95 bushel

Decide to remove          $3.45/               Buy September Corn       =        +0.30
hedge of September        bushel               1 contract at
corn                      July 2006            $3.75 bushel
                          --------------       -------------------
                          $-0.20/bu            $+0.20/bu
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As you can see, in December the producer decided to sell a September corn contract to begin the hedge. The producer picked September so that they could be sure that corn is harvested, and ready for sale. The correct month's contract to choose is the nearest one to the actual cash transaction, but not before it (there is no August contract). Around July, the producer is ready to sell the actual corn and remove the hedge. There is a 20-cent per bushel loss from the decline of the cash market since the position was taken. However the gain from the hedge in the futures market was 20 cents per bushel. So the loss occurred in the cash market was equaled by the gain made in the futures market, with the basis staying constant over the period of the hedge (0.30 basis). So the net price received per bushel is:

<div align="center">

July Cash Price $3.45/bushel
+ Gain in the futures $0.20/bushel

= Net price $3.65/bushel

</div>

Note that when profit or loss in the futures market is combined with the actual price received, the net price will be equal to the initial cash price at the start of the hedge. As we shall see, this occurs because in this example, the basis did not change, but stayed at 0.30. For this reason, we call the initial cash price at the start of a hedge the "lock-in" price.

The change in basis allows the hedger to analyze what the additional gain or loss will be from the hedge. The previous EX 1 shows no change in basis, so there is no additional profit from the locked in beginning cash price. Again, the beginning hedge cash price is the locked in producer price, as long as the basis remains constant. This is sometimes called the "perfect hedge" and seldom exists in reality. In most cases, basis will change slightly, causing the Net price to vary slightly from the lock-in price. However, the basis generally changes by only a few cents, while the actual price of the product changes by much more. For this reason, the producer is exchanging the risk that the product price will change, for the risk that the basis will change. This then reduces overall risk.

(EXAMPLE 2)

Let us go through a few more examples to see how a changing basis affects profits. Consider a similar example, except that the basis is narrowing. Assume the beginning cash price is $3.65 with a September corn contract price of $3.50 and the futures September corn is trading for $3.60.

EXAMPLE 2			
TRANSACTION DATE	CASH MARKET	FUTURES MARKET	BASIS
Decide to hedge corn for September	December cash $3.65/bushel	SELL September futures $3.90	= 0.25
Lift hedge in July	Sell corn cash $3.50/bu	BUY September futures $3.60	= 0.10
	-----------------	--------------------	
Change	-0.15 bu (loss)	+0.30 bu(gain)	= -0.15 bu

The hedge was set in December using a September contract with at 0.25 basis. This means the price of the September contract is $3.90 per bushel.

In July the hedge was lifted and the basis NARROWED to 0.10, and this narrowing is signified by the negative basis (-10). In other words, the cash price became closer to the futures price. The cash price had fallen by $0.15 per bushel of corn. With a $0.10 per bushel basis, the corn futures price is now at $3.60 per bushel of corn. However, the futures corn contract was sold at a price of $3.90 and repurchased at a price of $3.60 per bushel, so the hedge in the futures market created + $0.30 per bushel of income from the price decrease.

Cash Price July $3.50 bushel
+Additional price from futures $0.30 bushel

Net price received $3.80 bushel

The actual price received was above the "lock in" beginning cash price by the amount that the basis narrowed. The original lock in hedge cash price was $3.65 per bushel and the basis narrowed by $0.15 per bushel, so the overall cash price received with the narrowing basis is $3.80 per bushel.

EXAMPLE 3
The original hedging future and cash prices are the same, but show a different price for July. Assume the cash price for corn is $3.35 and the September corn futures is $3.70.

EXAMPLE 3			
TRANSACTION DATE	CASH MARKET	FUTURES MARKET	BASIS
Decide to hedge corn for September	December cash $3.65/bushel	SELL September futures $3.90	= 0.25
Lift hedge in July	Sell corn cash $3.35/bu	BUY September futures $3.70	= 0.35
	-----------------	--------------------	
	-0.30 bu	+0.20 bu	= +0.10 bu

In this example, the corn producer lost $0.30 in the decline of the cash market and gained only $0.20 a bushel in the futures. That -0.10 overall loss shows the WIDENING of the basis. The net price received is then:

$$\begin{array}{l} \text{July Cash Price \$3.35} \\ +\text{ Gain in the Futures \$0.20} \\ \hline \text{Net price received \$3.55 bushel} \end{array}$$

The basis WIDENING shows the corn producer that he will not receive the locked in hedge cash price of $3.65 per bushel. Instead the actual price received is less than the locked in price, and the difference will be by the same amount that the basis widened. Since the basis widened there will be a loss of $0.10 per bushel from the hedged price of $3.65 per bushel. That gives a net price of $3.55 per bushel.

Even though the producer experienced a widening basis, he still received a greater price than the July cash price, which would have been the price received if he had not hedged or forward contracted.

The examples above demonstrate that the change in basis from the beginning of the hedge to the end can tell you what type of profits you will receive from the hedge.

This idea of the basis narrowing (high net price) and widening (lower net price) works as long as the futures price exceeds the cash price, which causes the basis to be negative. That is the usual case, but if the cash price is greater than the futures price the relationship works in the opposite direction.

Hedging the futures market does provide an agricultural producer, whether seller or buyer, the prospect of reducing the risk of adverse price changes. This is accomplished by a change in the cash market being approximately equal to the change in the future market over the same period of time. Producers taking a position in the futures market, opposite from their cash position, allows them the opportunity to reduce their price risk.

Most grain contracts are 5,000 bushels, and cattle contracts are 40,000 pounds for live cattle, and 50,000 pounds for feeder cattle. As a result, the cost for buying or selling these contracts can be a lot of money. It does not all have to be put up at once, but a certain percent value (called margin) does. This is to ensure the payment of the contract by the broker. Also, a hedger is locked into their position in the futures market. If the market moves in the wrong direction, the broker will require additional margin. When this occurs, the term is a *margin call*.

So if the hedger is not sure of the markets future direction, hedging may result in a significant commitment of capital to maintain the hedged position. Another alternative to price protection is to use the Options Market, which we will now examine.

E. Hedging in Options Market

The *Options Market* is a sort of "side betting game" to the futures market. Instead of trading contracts, the participants trade the right to buy or sell a certain futures contract at a specific price. The hedger follows the same strategy they did in the futures market hedge. They take the opposite position as they hold in the cash market.

For example, if a corn producer wishes to reduce their price risk, then they would take a short position in the futures market. The same idea holds true in the options market. However, instead of selling corn futures, the hedger would purchase the RIGHT to SELL a futures contract at a specific price and for a specific contract month. The hedger in this case is not going short, but is purchasing the right to go short at a future time, if he so desires. This specific price to buy or sell a contract is called a strike price. This right expires or must be exercised by the month that the option contract matures. If the buyer of the option chooses to exercise it, he would pay the strike price for the futures contract.

This strike price is a price that the hedger wishes to lock in, or ensure that they will receive. In the previous examples of hedging using the futures market, the lock in price was the beginning cash price. Using options, the lock in price is the Strike Price.

Options are traded at a value that is determined by the market called a *premium*. The premium, then, is the price of the option: what the option buyer will pay the option seller. Almost exclusively, hedgers such as agricultural producers will only buy options, and never sell them. The buyer of an option is the one who decides whether the exercise it, or let it expire unused. Because of this fact, large changes in price can cause extremely large gains and losses for the participants. The buyer of the option has the ability to exercise and accept the gains, while letting the option expire and not incurring the losses. The seller of the option has to accept whatever the buyer chooses to do. If the buyer chooses to let the option expire, the seller profits in the amount of the premium received from the buyer. However, if the buyer chooses to exercise the option (obviously, only if he will profit and the seller will lose), then the losses that the seller obtains can be very large. Therefore, normally only speculators will sell options, and hedgers will buy them.

If the market is moving down, a speculator or a hedger would probably wish to sell a needed number of futures contracts and buy them back later at a lower price. The hedger does not have to sell options to realize this. The right to SELL a futures contract at a certain strike price is called a *PUT option*. If the market is expected to go up, a speculator or hedger will probably wish to buy some futures contracts to protect themselves from increasing commodity input cost. The option to BUY a futures contract is called a *CALL option*. Note that whether the desire is to be able to buy or sell a futures contract, the hedger will always be buying an option, never selling.

A CALL Option	Gives the buyer the right, but not the obligation, to BUY a futures contract at the specified strike price (call the contract away from someone)
A PUT Option	Gives the buyer the right, but not the obligation, to SELL a futures contract at the specified strike price (put the contract on someone)

The strike price is very important because if the contract does not reach that value, the option will never be exercised. Why would a hedger want to exercise an option that would cost him money? However, if the price of the contract reaches and surpasses the strike price, the hedger would exercise the option and make money on it.

For example, a May call option with a strike price of $2.30 is selling for one-eighth of a cent ($0.00125) per bushel of corn. As with futures contract prices, the last digit of an option premium represents eighths of a cent per bushel for grain crops.

	Options (Corn)				Futures Market (Corn)		
	MAY		JULY				
SP	Put	Call	Put	Call	MAY	2200	-14
2.00	1	194	3	260	JULY	2260	-16
2.10	4	32	14	174			
2.20	40	6	44	105			
2.30	112	1	102	62			
2.40	204	1	176	34			
2.50	304	1	260	23			

Consider an example of a May call option with a strike price of $2.00 per bushel that is selling for "194" per bushel. The premium for the right to BUY a contract at $2.00 (per bushel) is 19 and 4/8 cents per bushel. The premium, then, is the cost to buy a specific kind of option for a specific futures contract. The premium for different contracts will vary, depending on how close the strike price is to the actual futures contract price.

The difference between the costs of the two previous options is their strike prices. The far right of the table shows the current futures contract's value. A May contract is traded for $2.19 and 4/8 per bushel. The first call option we looked at was cheaper than the second example because it is an *out-of-the-money option*. In other words, the current RIGHT TO BUY contract at $2.30 is not currently making money, because it is only currently worth $2.19 and four-eights. Buying it at $2.30 and only being able to currently sell at $2.19 and four-eighths leaves no current profit.

The higher valued call option at a strike price of $2.00 is called an *in-the-money option*, because it is currently offering a profit. The current price is $.194/8 per bushel, and the $2.00 strike price call option would allow the owner to buy the same option for $2.00, and then immediately sell it for $2.20 per bushel. Even considering the cost of the option .19 4/8 per bushel plus premium of 2.00, we still have room for profit.

The put option gives the buyer the right to SELL at whichever strike price is chosen. In-the-money put options are those that are at or above the current May price of $2.20. Therefore, these have the

highest premiums. Out-of-the-money put options are below the current price, have less expensive premiums, and offer the hedger an inexpensive option to protect against decreasing prices.

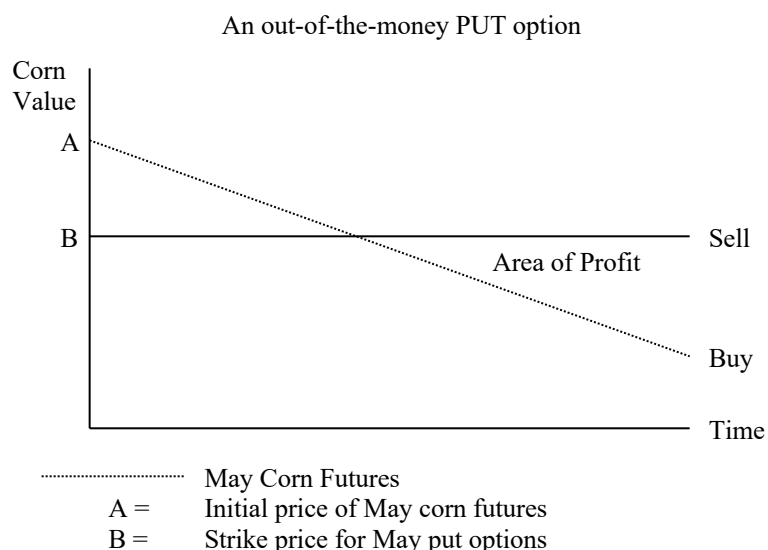Using the Options Market Instead of the Futures Market

A futures contract obligates the seller of a contract to either buy back the same contract or settle for the difference between the initial price and the matured price. In addition to an obligation, if the market goes opposite of the anticipated direction, the participant can have unlimited losses.

However, an option allows the participant to select a monthly futures contract market direction, at a specific price, and know exactly what their total risk of loss is. The known risk of loss is the premium cost, since that is all that the options buyer would be out if he decided not to exercise it. In this way, the buyer can put a limit on the total losses. If the market moves in a direction opposite that which the buyer anticipated, then their only loss is the premium. Therefore, the advantage for the use of the option to participants is the known risk of loss.

However, futures contacts tend to closely follow the cash price movements, which provide a better hedge against price changes. So if the hedger is satisfied with the locked in price and the basis, a futures contract will provide a better means of hedging price risk than an options contract. Why? Because the buyer would not have to pay the premium to get the price insurance. An options contact provides a better hedging device when the market direction is unsure.

The idea for a hedger is to protect from adverse price variation, and using an option is a way to provide relatively inexpensive protection. Using an futures contract locks in a price, whereas using an option allows the buyer to only lock in the price if it gets worse, while all him to take advantage of price movements that are better.

Consider a corn producer who desires to protect himself from a decline in corn price, but does not wish to lock in a hedge position in the futures market because the decline of price is not certain. The situation outcome is shown in the following graph.

An out-of-the-money PUT option

Corn Value

A

B   Sell
                                    Area of Profit

                                                          Buy

                                                          Time

.... May Corn Futures
A =   Initial price of May corn futures
B =   Strike price for May put options

The current price of May corn futures is noted by point (A). The strike price is set out of the money, to provide an inexpensive option. The producer buys a PUT option, which gives him the right to SELL a May futures contact at the strike price. The market does take a down turn and the hedge is created at the strike price, so the producer exercises the option to SELL a contract at the strike price, and locks it in.

Consider the same situation, but a different outcome.

An out-of-the-money PUT option


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          May Corn Futures
    A =   Initial price of May corn futures
    B =   Strike price for May put options
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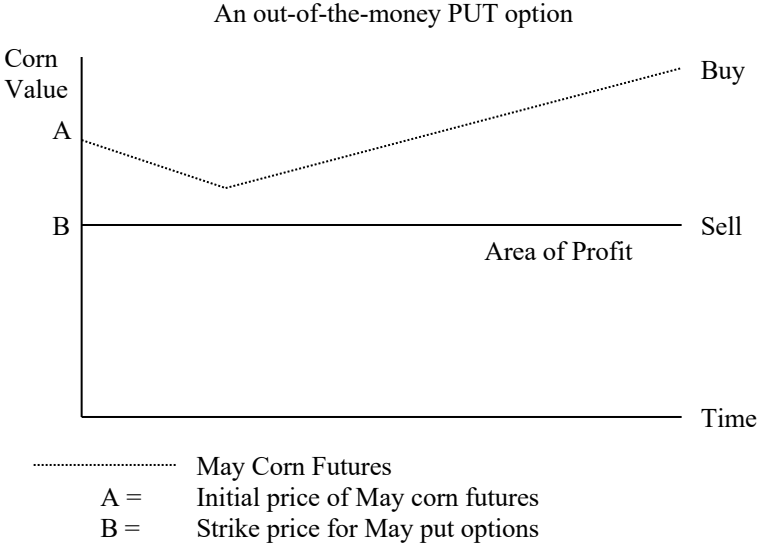
The producer is unsure of the market direction. So instead of locking in a price by buying a futures contract, he chooses a strike price and purchases a May PUT option at strike price of (B). The market does move upward and the May option goes unused. The only loss the hedger experienced was the cost of the premium, but it was more than made up for by the increase in price. When the market price headed up, the corn producer was not locked in a hedged position so he would be able to capture those gains. He could also then purchase a futures contract and lock-in at the higher price, if he thought it might later drop back down.

Option Hedging Examples

EXAMPLE 1
Farmer Brown, a corn producer, decides that the price of corn will probably decline over the next two months. It is currently March and the producer is looking at July corn futures. The corn producer does not want to enter into the futures market and be locked into a contract position because the price may still rise, so he elects to use a put option. The corn price for July futures is currently at $3.30 a bushel and the producer estimates that he needs a price of around $3.10 a bushel to generate a profit.

To ensure this minimum price of $3.10, a put option at a $3.20 strike price for July corn with a premium of $0.10 a bushel is purchased. The premium cost for a single corn contract is $500 (5,000*0.10). The corn producer exercises the option in April when July corn futures is trading for below $3.20. Since the price has decreased, the producer is ready to lock in a hedged price. When he exercises the option, he takes a short position in the futures market and the situation now becomes the same as a straight hedge. The option allows the producer to protect from a price decrease, but limited his losses if the price happened to rise.

In July the futures contract is trading for $2.80 per bushel with a $-0.10 basis. The net price received for Farmer Brown's corn is as follows:

EX1 (A)	Exercise the option at $3.20 strike price and sell
	Offset the position at $2.80 and buys
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	Current Cash Price $2.70

If a $-0.10 basis exists, the cash price is the future price less $0.10. The futures is at $2.80 less $0.10 gives a cash price of $2.70 a bushel, as shown in EX1 (B).

EX1 (B)	Futures Current Price $2.80
	Less the Current Basis 0.10
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	Current Cash Price $2.70

The last factor to consider is the cost per bushel of purchasing the put option. Since the futures price is listed per bushel, the options premium is also on a per bushel basis. In the example above, our corn producer purchased an option at a cost of $0.10 per bushel. To find the net price received, we follow the procedure discussed in the previous two sections and find the new price as follows in EXERCISE 1 (C).

EX1 (C)	The cash price is $2.70
	Plus the profit from the option is +0.40
	Less option cost of -0.10
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	The net price received is $3.00 a bushel of corn

So the producer receives an overall net price of $3.00 per bushel of corn. Remember, to cover the full production the producer must purchase enough options to allow him to then purchase enough contracts to cover his expected production, if he chooses to exercise. If the producer expects to produce 20,000 bushels, then 4 corn futures contracts will be needed to cover the price risk of the entire production (4 * 5,000 bu = 20,000 bu).