Farm and Industry Short Course
Grain Marketing

Price Protection through Futures Options

Lecture 4 January 30, 2004

Using futures markets to hedge price risk has the advantage of protecting market participants when prices move against their business interests, but the disadvantage of not allowing them to benefit from advantageous price moves in the cash market. Futures options offer market participants the opportunity to protect themselves from adverse price moves while retaining the opportunity to benefit from advantageous price moves.

An option provides the owner the right, but not the obligation, to do something. An option on a futures contract provides the owner the right, but not the obligation, to enter into a futures contract at a specific price at any time over the life of the option. For a potential hedger, a futures option provides the right, but not the obligation, to hedge. The potential hedger would want to exercise this right if prices move in a direction that reduces the value of the cash position, but not hedge if prices move in a favorable direction.

There are two types of futures options, a call option and a put option. A call option that gives the owner the right to buy the underlying futures contract at the strike price, and a put option that gives the buyer the right to sell the underlying futures contract at the strike price. It is important to note that call and put options are separate financial instruments, not opposite sides of the same transaction. For example, if a trader buys a corn call option, and then buys a corn put option, he/she would not have offset the first purchase with the second. Instead, two options would be owned; one which would allow for the purchase of corn futures contract and one which would allow for the sale of a corn futures contract.

To use a futures option in a price risk management program, the option buyer needs to decide first between a call and a put option (the right to have a buying hedge or a selling hedge), and then the specific delivery month and price to be protected. Before these decision can be made, it is important to understand the unique characteristics of the options market.

Options Markets and Terminology

The first important characteristic of the options market is the expiration date of a given option. The expiration date refers to the last day on which the option can be used. Once the option expiration date passes, the owner of the option no longer has the right to buy or sell a futures contract using the option. Futures contracts for grain expire in the third week of the month. For example, the November soybean futures contract usually expires about the 21st of November. The corresponding options, however, expire a month earlier.

In other words, a November soybean put option (the right to sell a November soybean contract at the price specified in the option) expires a month before the futures contract, or about October 21. If you own a put option for November soybeans and do not exercise your right to sell a soybean futures contract for November delivery by October 21 (if that is the option expiration date) at the price specified in the option, that right is forfeited. Since the November futures contracts will continue trading for another month, you can still sell soybeans in the futures market for November delivery, you just no longer have the right to sell at the specific price guaranteed by the put option. You will have to sell at whatever the current market price is for November delivery. The day the option expires is called the expiration date, and is critical in determining an option's price. In general, the longer to expiration, the more expensive an option will be.

The specific price at which an option allows you to enter the futures market is called the strike price. Options strike prices are set at specific amounts, and never change. For example, options for corn futures contracts have strike prices at 10-cent intervals. There will be put options (the right to sell a corn futures contract) with strike prices of $1.80 per bushel, $1.90 per bushel, $2.00 per bushel, $2.10 per bushel, and so on. The strike prices do not change when futures prices change, but the option's value does. Assume corn futures prices for December delivery are currently $2.00 per bushel. An option with the right to buy corn futures (that would be a call option) at $1.80 would be worth more than an option with the right to buy corn futures at $2.20, but both options could be actively traded. If prices on the futures market fall, both options will become less valuable. The right to buy a corn futures contract at any specific price becomes less valuable as the futures prices themselves go down. Conversely, the value of put options will tend to increase as futures prices fall. The right to sell at any pre-determined price (the strike price) will become increasingly valuable the lower futures prices go.

For any given expiration date (i.e., delivery month) there will be lots of options available, each with different strike prices. Table 1 is an example. Note that the March corn futures price on November 2 closed at $2.15 per bushel. There were both put and call options available with strike prices above and below the closing futures price in ten cent intervals. However, there were no options with strike prices exactly equal to the closing futures price. This is usually the case. When using the options market, one has to determine the strike price at which he/she wants the right hedge, but generally will not be able to purchase the right to hedge at exactly the current futures price. Selecting the appropriate strike price will be discussed later.

An important piece of information in Table 1 is the option premium. The is the price of each option, and is determined by the interaction of buyers and sellers in an option pit, just as the futures price is determined in the futures trading pit. The premium is the only part of an option that is negotiable. A grain futures option is always for one futures contract (5000 bushels at the Chicago Board of Trade or 1000 bushels at the Mid-America Exchange), has a fixed expiration date related to the delivery date of the underlying futures contract (that is, the contract month the option lets you buy or sell) and a pre-specified strike price that does not change. As the option gets closer to its expiration date, the premium changes. In addition, the premium changes as the

underlying futures price changes. The option premium is what an option buyer must pay to acquire the right to buy or sell a specific futures contract at the strike price. The option seller collects the premium. Regardless of whether the option right is exercised (regardless of whether a futures contract is actually bought or sold) the option seller collects the premium from the buyer, and it is not returned. In this since, it is like an insurance premium. You insure you car against a reduced value due to an accident. To acquire the insurance, you pay a premium. If you have an accident that reduces the value of the car, you exercise your right to be reimbursed for the damage. However, the insurance company keeps your premium. If you choose not to exercise your right (the car is not damaged) the insurance company still keeps your premium. Options sellers are selling price insurance. If prices deteriorate (go down for a cash market seller or go up for a cash market buyer), you exercise the option and institute a hedge at the option's strike price. If prices do not deteriorate, you do not exercise the option. In either case, the seller keeps the premium. Initially, we are only concerned with buying options to protect cash prices. However, selling strategies will be examined in the section on advanced options use.

The option premium is influenced by the amount of time before the option expires (called the time value) and the relationship between the strike price and the current price of the underlying futures contract (called intrinsic value). The option premium can be expressed as:

Premium = Time Value + Intrinsic Value

The intrinsic value is represented by the immediate profit an option holder could earn in the futures market if the option were exercised. Intrinsic value is either positive or zero. For example, assume the current futures price for a soybean contract is $5.35 per bushel. A put option (the right to sell a soybean futures contract) with a $5.50 strike price would have an intrinsic value of 15 cents per bushel. If you owned the option, you could exerciser the right it provides you and sell a soybean futures contract for $5.50 per bushel, turn right around and buy soybeans in the futures market at the current price of $5.35 per bushel, earning a profit of 15 cents per bushel in the futures market (sell for $5.50, and buy for $5.35). An option will never sell for less than its intrinsic value. In other words, nobody is going to sell you an option with a guaranteed profit associated with exercising it for less than the guaranteed profit. Put options have positive intrinsic value when the strike price is above the current futures price (i.e., option owners have the right to sell futures at a price higher than the current price in the futures market). If a put option has a strike price below the current futures price, the intrinsic value is zero; there is no immediate profit opportunity from owning that option. Call options have intrinsic value when the strike price is below the current futures price (the option lets you buy a futures contract at a price below the current market price), and zero intrinsic value when the strike price is above the current futures price.

The time value in an option represents two things: 1) the amount of time before the option expires, and 2) the volatility of the underlying futures price (or the probability that intrinsic value will increase before the option expires). The value associated with time to

maturity diminishes with each passing day. The closer the option is to expiring, the shorter the time available to use the option, thus the less time value associated with it. However, this decaying time value component can be offset by volatility. The more the futures prices are moving from day to day, the more volatile the futures market. The more volatile the futures market, the more likely it is that the intrinsic value in an option can increase before the option expires. Thus, the more volatile the market, the greater the time value component associated with volatility. If volatility increases as the option approaches expiration, it is actually possible for the time value to increase even though the option is approaching expiration.

We do not observe an option's time value directly, but can calculate it by subtracting the intrinsic value (the difference between the strike price and the current futures price) from the option premium. Using the example above, if the put option with the $5.50 strike price were selling for 25 cents per bushel, than the time value would be 10 cents. We already established that the intrinsic value was 15 cents, and any part of the premium left over after accounting for the intrinsic value is the time value.

Using Put Options for Protecting Sales Prices

Consider again the soybean farmer from the hedging examples. If the producer was concerned about soybean prices falling between planting and harvest, but did not want to commit to a futures hedge in case prices ended up rising, he/she might consider buying a put option on the November soybean futures contract. If prices fall between planting and November, the producer would exercise the option and hedge his/her production at the pre-determined strike price.[1] If prices rise, the producer would simply let the option expire, and sell soybeans at the higher cash price. In either case the producer would forgo the premium paid for the option.

Example 1 illustrates the use of a put option to protect a sales price. Since the option guarantees a minimum, but not a maximum sales price, the net price received is different depending on whether prices rise or fall. Also, since there are several different strike prices being traded for each delivery month, the producer has some discretion in deciding what minimum sales price to establish. The higher the minimum price established (i.e., the higher the strike price of the option chosen) the more expensive the put option premium. Various market participants will make different decisions regarding the optimal trade-off between strike price and option premium. For the example here, the soybean producer chooses the option with the strike price closest to, but just below the current futures price. This option has no intrinsic value, but will be the first to acquire intrinsic value if futures prices fall. Since the option purchase is a futures market transaction, the soybean producer still goes through a futures broker, and the expected minimum net selling price is discounted by the amount of the futures broker's commission.

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[1] In reality, if prices were falling the put option would become more valuable. The option owner could either exercise the option and hedge, or the producer could sell the option to someone else in the options market and use the proceeds from the option sale to offset the lower cash price received when the soybeans are sold.

Example 1. Establishing a Minimum Sales Price with a Put Option.

Assume it is May 1, and a grain farmer wants to establish a minimum sales price for October harvested soybeans. November soybean futures contracts are trading for $6.50 per bushel. A November soybean put option with a $6.50 strike price is selling for 30 cents (30 cents/bu. * 5000 bushels results in a total option cost of $1500).

Date	Futures Market	Cash Market	Basis
May 1	Grain farmer buys 3 November soybean option contracts for 30 cents per bushel each. Strike Price = $6.50	Establishes an expected minimum November selling price of $6.50+(-$0.40)-$.30-$.01 (Futures + Basis – Prem. - Comm.) $5.79	Expected to be -$0.40

Scenario 1. Assume the November futures contract is $5.50 when the cash sale is made in October, and basis turns out as expected. The producer sells the cash soybeans for $5.10 per bushel (futures is $5.50 and the basis is -$0.40). He then exercises the right to sell 3 November futures contracts for $6.50 per bushel, and buys them back at the current price of $5.50 per bushel. The basis was accurately forecast, and he receives his expected net minimum selling price.

Date	Futures Market	Cash Market	Basis
October	Grain farmer exercises soybean option contracts, and hedges at $6.50. sell futures at $6.50 buy futures at $5.50 futures profit $1.00 option premium -$0.30 broker's comm. -$0.01 ------ Net Futures Profit $0.69	Sells 15,000 bushels of soybeans to the local coop cash price $5.10 futures profit +$ 0.69 ------- **Net Selling Price $5.79**	 -$0.40

The combination of a cash price of $5.10/bu. plus a futures profit of $0.69 nets the grain producer an effective soybean price of $5.79/bu., which is what was expected.

Scenario 2. Assume the November soybean futures price is $6.90 in October. The producer allows the soybean put options to expire, and sells soybeans in the cash market at the higher price. The basis was accurately forecast and cash prices are $0.40/bu. below futures in October.

Date	Futures Market	Cash Market	Basis
October	Grain farmer allows soybean options to expire. The option premium is lost. Option premium -$0.30 broker's comm. - $0.01 ------ Net Futures Loss $0.31	Sells 15,000 bushels of soybeans to the local coop cash price $6.50 futures loss - $0.31 ------- **Net Selling Price $6.19**	-$0.40

The combination of a cash price of $6.50/bu. minus a futures loss of $0.31 nets the grain producer an effective soybean price of $6.50 /bu., which is more than received with a hedge.

Scenario 3. This is the same as scenario 1, except in this case the basis turns out to be weaker than expected by $0.10/bu. A weaker basis means that the cash price is lower relative to futures than had been expected.

Date	Futures Market	Cash Market	Basis
October	Grain farmer exercises soybean option contracts, and hedges at $6.50. sell futures at $6.50 buy futures at $5.50 futures profit $1.00 option premium -$0.30 broker's comm. -$0.01 ------ Net Futures Profit $0.69	Sells 15,000 bushels of soybeans to the local coop cash price $5.00 futures profit +$ 0.69 ------- **Net Selling Price $5.69**	-$0.50 (10 cents weaker than expected)

While the futures option did protect the cash position from most of the price decline, the unexpected weakening of the basis resulted in a lower net sales price than originally anticipated.

Scenario 4. This is similar to scenario 3, except that the basis ends up stronger than expected. A stronger than expected basis means that the cash price is higher relative to the soybean futures price than had been originally anticipated.

Date	Futures Market	Cash Market	Basis
October	Grain farmer exercises soybean option contracts, and hedges at $6.50. sell futures at $6.50 buy futures at $5.50 futures profit $1.00 option premium -$0.30 broker's comm. -$0.01 ------ Net Futures Profit $0.69	Sells 15,000 bushels of soybeans to the local coop cash price $5.20 futures profit +$0.69 ------- **Net Selling Price $5.89**	-$.30 (10 cents stronger than expected)

This time the producer ends up better off then expected as the result of a stronger basis. Futures prices over the hedge period fell by more than cash prices resulting in a stronger than expected cash market. In the case of rising prices (such as in scenario 2), cash price would have to increase more then futures prices for the basis to strengthen.

Conclusion

The net minimum selling price established with a put option will not change if prices fall over the hedge period as long as the basis is accurately forecast. The net sales price will go up if prices rise, but the option premium will be forfeited because the put option will expire worthless. Prices must rise by more than the option premium before a put option will yield a higher net selling price than a futures market hedge. Options on futures contracts do contain basis risk and it is therefore critical to have as accurate an expectation of basis as possible in order to minimize the possibility of receiving a net selling price that is less than the expected selling price.

As with a futures hedge, it is critical to have a good forecast of the basis that will exist when the cash sale occurs. Otherwise, the producer has little confidence in where the actual minimum sales price will end up.

An additional advantage of seeking price protection by purchasing futures options is that margin calls do not come into play. When an option is bought, the premium is paid in its entirety, and the option owner cannot lose more in the futures market than the initial option premium.

To calculate the expected minimum sales price from a put option the option owner would localize the option strike price by adding the local basis, subtract the option premium as a cost of doing business (this will reduce the effective minimum sales price), and subtract the futures broker's commission. Note that the expected minimum sales price is calculated relative to the option strike price, not the current futures price. The current futures price is not relevant because the option provides the opportunity to enter the futures market at the option strike price, regardless of where the current futures price happens to be. Table 2 provides a template for calculating the expected minimum sales price associated with a put option.

Selecting the appropriate strike price for a put option can be a challenging task, and there is no "correct" strike price to choose. The strike price chosen will be a function of the individual risk preferences of the hedger. However, there are some things to consider. For example, the higher the strike price for a put option, the larger the premium. The more expensive the premium, the higher prices would have to go before the market participant would be better off with the option than with a futures market hedge. In example 1, the $6.50 strike price provides an expected minimum selling price of $5.79/bu., while the straight hedge with a current November futures price of $6.50 provides an expected net selling price of $6.09/bu. The 30-cent difference between the two prices is explained by the option premium (30 cents). In addition, if the futures price and the strike price were not equal the difference between the expected minimum selling price from an option and the expected selling price from a hedge would reflect the price differences as well as the option premium.

If futures prices rise 30 cents by harvest (i.e., November futures are $6.80 in October) the put option with a $6.50 strike price and a hedge using the November futures contract would result in the same price. At this price, the option is allowed to expire worthless (there is no value to the right to sell futures at $6.50 if, at option expiration, the current futures price is above that level), and the grain producer sells cash soybeans for $6.10 per bushel (current futures price of $6.80 + (-$0.40 basis) - $0.30 option premium - $0.01 broker's comm.), or the net selling price expected from a hedge placed when futures were $6.50 per bushel. Thus, for the option buyer to receive a net benefit from rising prices, prices would have to rise at least 30 cents/bu., or the price of the option. For any price increase less than 30 cents per bushel the grain producer would have received a higher sales price with a hedge. Therefore, when a put option is chosen it is critical to believe that the market has the potential to rise by more than the amount of the option premium. If a hedger does not believe this is likely, the option is not attractive relative to the hedge;

Table 2. Template for Calculating Expected Minimum Net Selling Price from a Put Option.

Strike Price _____

+ Expected Basis _____

- Option Premium _____

- Brokers Commission _____

_____

= Expected Minimum Net Selling Price

in other words the price protection given up by buying the option is not justified based on upside price potential.

There are two basic strategies employed in buying put options. The first is to protect current price levels while maintaining the opportunity to benefit if prices rise. This usually involves picking a strike price closest to, but just below the current futures price for a put option.[2] The second is to use options for disaster protection. This involves protecting prices at levels well below current levels. For example, if futures prices are currently $6.50/bu., a producer may decide to protect against prices falling below $6.00, while at the same time maximizing any benefits associated with improving prices. The put option with a $6.00 strike price will be very cheap (the right to sell futures at $6.00 when current prices are $6.50 is not all that valuable), and therefore any small increase in price levels will reflect a net selling price above that which could be provided by a futures hedge. Assume that the $6.00 strike price option premium is 5 cents. The expected minimum net selling price established with that put option would be $6.00 (strike price) + (-$0.40 (basis)) - $0.05 (premium) - $0.01 (broker's comm.), or $5.54/bu. While this is well below the expected price from the hedge or the expected minimum price from the $6.50 strike price option, prices now only need to rise 5 cents per bushel before the net selling price received is higher than that established with a straight hedge.

Like hedging, the only thing that will impact the minimum sales price relative to its expectation when an option is purchased is a poor basis forecast. If the basis is weaker than expected (cash prices are lower relative to futures than was anticipated), the minimum net selling price will be lower than expected. If basis turns out stronger than anticipated (cash price is higher relative to futures than forecast), the minimum net selling price will be higher than initially calculated.

It is important to note that a put option will never get you the highest selling price the market has to offer. If prices end up rising, you would have been better off simply selling on the cash market at harvest, and not paying the premium for an option that ends up expiring worthless. If prices fall, you would have been better off avoiding the premium and hedging directly in the futures market. However, options are attractive because we

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[2] An option buyer could try to set an even higher price by choosing a put option with a strike price above the current futures price. However, the option premium would reflect the fact that the strike price represents an opportunity to sell futures above the current futures price, and this right would be heavily discounted by the premium. Further, since the premium is so large, the futures market would need a substantial rally before the option owner benefited from a price increase. For example, if futures are $6.50, and a put option with a $6.50 strike price is 30 cents, a put option with a $6.75 strike price will likely be close to 55 cents (this reflects the 25 cent difference between the $6.75 strike price and the current futures price (i.e. the intrinsic value), as well as a time value of 25 cents). The $6.75 put option would provide an expected minimum net selling price of $5.84 (strike price of $6.75 + basis of -$0.40 - premium of $0.50 - Broker's comm. of $0.01). This option provides 5 cents more protection than the $6.50 strike price, but costs 20 more cents. The additional 5 cents of protection is probably not worth an additional 20 cent premium. Further, the futures market must now rally at least 50 cents (to cover the option premium) before the market producer is better off than he/she would have been with a straight hedge.

never know with certainty whether futures prices will rise or fall during the production or storage seasons, and an option provides protection against price declines while still providing the opportunity for cash price improvement.

Call Options for Protecting Purchase Prices

A call option gives the owner the right to hedge by buying futures contracts if prices rise over the life of the option, but avoid hedging if prices fall. A call option provides the owner a maximum buying price, with the right to buy at a lower price in the cash market should prices fall. This may be more attractive than a direct hedge if the buyer is unsure about future price direction.

Assume it is November 1 and a cattle feeder would like to lock in a purchase price for 15,000 bushels of corn to be bought in February and used as feed. By buying call options on the March corn futures contract, a cattle feeder establishes an expected maximum purchase price for the corn to be purchased in February. In the example here, the farmer can hedge 15,000 bushels of corn to be bought in the cash market in February by buying 3 March corn options contracts. The important information for the farmer is the current option premium for the desired strike price, and the expected basis in February (i.e., the difference between the February cash corn price and the March futures price in February).

Example 2 illustrates the use of a call option to protect a purchase price. Note the calculation of the maximum purchase price established with a call option is different than calculating the minimum net selling price from a put option. Any costs of doing business increases the net purchase price of an underlying commodity for a buyer. Therefore, the option premium and the broker's commission are <u>added</u> to the call option strike price to calculate the maximum expected purchase price. A template for calculating the maximum expected purchase price from a call option is provided in table 3.

A call option buyer faces the same challenge of evaluating the tradeoffs between levels of price protection and opportunity to benefit from favorable price movements as a put option buyer. The difference, of course, is that premiums for call options increase as strike prices decrease. The lower an option owner can buy into the futures market, the more valuable the option.

Unlike the case of a cash seller using a put option to establish a minimum sales price, a stronger then expected basis results in a less favorable outcome than anticipated by the corn buyer, while a weaker basis improves the buyer's market position. A stronger than expected basis means that the cash price paid by the cattle feeder is higher relative to futures than had been expected. A weaker basis means the buyer's price is less relative to the corn futures price than had been initially expected.

Table 3. Template for Calculating Expected Maximum Net Purchase Price from a Call Option.

Strike Price	_____
+ Expected Basis	_____
+ Option Premium	_____
+ Brokers Commission	_____
_____	
= Expected Maximum Net Purchase Price	

Example 2. Establishing a Maximum Purchase Price with a Call Option.

Assume it is November 1, and cattle feeder wants to establish a maximum purchase price for 15,000 bushels of corn needed in February. March corn futures contracts are trading at $2.50 per bushel. A March call option with a strike price of $2.50 per bushel is selling for 20 cents per bushel ($0.20 * 5000 bushels results in a total option cost of $2000).

Date	Futures Market	Cash Market	Basis
Nov 1	Cattle feeder buys 3 March corn options contracts for 20 cents per bushel each. Strike Price = $2.50	Establishes an expected maximum February purchase price of $2.50 + (-$0.15) + $.20 + .01 (Futures + Basis + Prem + Comm.) $2.56	Expected to be -$0.15

Scenario 1. Assume the March corn futures contract is $3.50 per bushel when corn is purchased in February. The producer buys cash corn for $3.35 per bushel (futures is $3.50 and the basis is -$0.15). He then buys 3 March corn futures contracts for $2.50 per bushel (exercises his call options), and immediately sells them back at the current market price of $3.50 per bushel. The basis was accurately forecast, and he pays the expected maximum purchase price.

Date	Futures Market	Cash Market	Basis
February	Cattle feeder exercises corn option contracts, and buys corn futures at $2.50, selling them back at $3.50 buy futures at $2.50 sell futures at $3.10 futures profit $1.00 option premium -$0.20 brokers comm.. -$0.01 ------- Net Futures Profit $0.79	Buys 15,000 bushels of corn from the local coop cash price $3.35 futures profit -$0.79 ------ **Net Purchase Price $2.56**	 -$0.15

Note that the net futures profit is subtracted from the cash corn price to determine the net purchase price. A futures profit offsets the purchase price in the cash market, a lowers the producers overall costs.

Scenario 2. Assume the March corn futures price is $1.50 per bushel when cash corn is purchased in February, and the basis turns out as expected. The producer buys cash corn for $1.35 per bushel (futures is $1.50 and the basis is -$0.15). Since the corn futures price is below the strike price of options purchased in November, he does not exercise the options, but simply throws them away (they will have no value at expiration if the strike price is above the current futures price)

Date	Futures Market	Cash Market	Basis
February	Cattle feeder allows corn options to expire. The option premium is lost. Option premium -$0.20 Broker's comm. -$0.01 -------- Net Futures Loss -$0.21	Buys 15,000 bushels of corn from the local coop cash price $1.35 futures profit +$ 0.21 ------- **Net Purchase Price $1.56**	-$0.15

In this case, the futures loss is added to the cash price of corn to determine the net purchase price. The futures loss increased the producer's overall cost of doing business.

Scenario 3. This is the same as scenario 1, except in this case the basis turns out to be weaker than expected by $0.10/bu. A weaker basis means that the cash price is lower relative to futures than had been expected. If the basis is weaker by 10 cents, the cash price is 10 cents lower than would have been the case if the basis forecast had been accurately.

Date	Futures Market	Cash Market	Basis
February	Cattle feeder exercises corn option contracts, and buys corn futures at $2.50, selling them back at $3.50 buy futures at $2.50 sell futures at $3.10 futures profit $1.00 option premium -$0.20 brokers comm.. -$0.01 ------- Net Futures Profit $0.79	Buys 15,000 bushels of corn from the local coop cash price $3.25 futures profit -$0.79 ------ **Net Purchase Price $2.46**	-$0.25

While the call options were used to offset the increase in prices, the unexpected weakening of the basis did result in a lower net purchase price than otherwise would have been realized. Buyers are better off when the basis weakens

Scenario 4. This is similar to scenario 3, except that the basis ends up stronger than expected. A stronger than expected basis means that the cash price is higher relative to the corn futures price than had been originally anticipated.

Date	Futures Market	Cash Market	Basis
February	Cattle feeder exercises corn option contracts, and buys corn futures at $2.50, selling them back at $3.50 buy futures at $2.50 sell futures at $3.10 futures profit $1.00 option premium -$0.20 brokers comm.. -$0.01 ------- Net Futures Profit $0.79	Buys 15,000 bushels of corn from the local coop cash price $3.45 futures profit -$0.79 ------ **Net Purchase Price $2.66**	-$0.05

This time the cattle feeder ends up worse off then expected as the result of a stronger basis. Futures prices over the hedge period rose by less than cash prices resulting in a stronger than expected cash market. This leads to a higher net purchase price than originally anticipated. The stronger the basis, the worse off a buyer is.

Conclusion

The net maximum purchase price established with a call option will not change if prices rise over the hedge period as long as the basis is accurately forecast. The net purchase price will go down if prices fall, but the option premium will be forfeited because the option will expire worthless. Prices must fall by more than the option premium before a call option will yield a lower net purchase price than a futures market hedge. Options on futures contracts do contain basis risk and therefore it is critical to have as accurate an expectation of basis as possible in order to minimize the possibility of incurring a net purchase price that is greater than the expected purchase price.