

# Price Risk Management for Swine Producers

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## ▪ Price Risk Management Strategies: Packer Forward Contracts

In broadest terms, there are two methods for forward pricing hogs. One form is the futures and options market represented by the lean hog futures contract and the option on the lean hog contract. The distinction of the futures market form of forward pricing is the packer plays no role in the producer's forward price decision. Of course the hogs will eventually be delivered to a plant, but the forward pricing mechanism does not involve the packer per se. The second form is to forward price hogs with the packer to whom the hogs will be delivered in the future. This form has become prominent as producers and packers find it advantageous to secure hogs in advance of slaughter and to assure quality.

In contrast to futures and options contracts, the producer-packer forward price marketing agreements take on many different forms, as they are not standardized across packers. Further, some of the final terms may be negotiated so that even contracts from the same packer may have minor differences. Producer/packer contracts may be short-term (< 1 year) or long term (> 1 year) agreements. Price protection may be a major part of the agreement, or they may only provide quantity/quality assurance. The table on the following page provides a summary of the key types of forward price arrangements possible with packers. Descriptions of the pricing arrangements can be found elsewhere in these proceedings, in the article by DiPietre and Buhr (*How Will We Know the Price of Hogs?*, pg.67). Pricing arrangement options discussed include fixed price, fixed basis, formula price, cost plus, price window and price floor.

Futures Market Forward Pricing		Forward Pricing With Packers	
Futures Hedge	Options Hedge	Short Term	Long Term
Sell Futures Contract	Buy Put Option on Futures	Fixed Price	Formula Price
Provides Price Protection But Not Quality/Quantity Assurance		Fixed Basis	Cost Plus
		< 1-2 years	Price Window
			Price Floor 4-7 years
		Provide Quantity/Quality Assurance May or May Not Provide Price Protection	

***Advantages of Forward Pricing through Packer:***

- Market Access Assured
- Knowledge of Futures Markets Unnecessary
- Time Savings Likely
- Forward Price Program Likely Coordinated with Packer Pricing Schedules

***Disadvantages of Forward Pricing through Packer:***

- Market Flexibility Reduced
- Non-Standardization Requires Evaluation on a Case by Case Basis
- Non-Standardization Makes it Difficult to Compare Pricing Across Packers.
- As More Producers Contract, May Lead to Price Discovery or Determination Problems
- Packer has Superior Negotiating Position and Producer Must be Vigilant in Protecting Interests

## ▪ **Price Risk Management Strategies: Futures Market Based Strategies**

A futures contract is a legal and binding agreement to deliver or accept delivery of a specified commodity on or before a specified date in the future.

### **Lean Hog Contract Specifications**

Traded on the Chicago Mercantile Exchange (CME)

Trading Unit: 40,000 lbs. Carcass basis hogs

Description: Packer base weight, 51-52% lean and .80-.99 inches of backfat at the last rib or equivalent.

Daily Price Limit: \$2.00/cwt.

Contract Months: Feb, Apr, Jun, Jul, Aug, Oct, Dec

Last Day of Trading: Termination on the 10th business day of the spot month

Delivery Days: Cash settled to CME LEAN HOG INDEX (weighted average of three area packers) so may deliver to any participating plant at this index.

### **Miscellaneous Terminology**

- **Long:** Own contract or physical commodity.
- **Short:** Plan to take ownership of physical commodity, or have sold a futures contract (which you will have to buy back in the future to "close" your position)
- **Closed position:** No interest in any physical or futures contract
- **Open interest:** At the end of a trading day, the number of positions either long or short still outstanding.

### **General Points Regarding Futures Markets**

*Two types of Traders:*

- **Speculators** - individuals betting price will move in a favorable direction relative to their position (long - expect price increase; short - expect price

decrease). High risk trading. Speculators serve the important role of providing liquidity to the market.

- ▶ **Hedgers** - individuals already holding a cash position in the market (i.e., own the physical commodity). For example, swine producers are long (own) the lean hog cash market and would short (sell) the lean hog futures market to hedge. Similarly, IBP is short the cash lean hog market and would want to go long the lean hog futures market. These individuals enter the futures market to reduce the risk of adverse price movements.

*Unhedged producers are essentially speculators in the cash market.*

The futures market is a "zero sum game". That is for every winner there is an equal and opposite loser. (e.g., buyer buys lean hogs at \$55/cwt. from a seller of lean hogs at \$55/cwt. Suppose the trade is closed at \$57/cwt. The buyer will sell back contract (not necessarily to same person) and gain \$2/cwt. The seller will have to buy back the same contract (not necessarily from the same person) and will lose \$2/cwt. Because there are commissions associated with trading there is in fact a net loss. This is why futures trading in a speculative position is a no win proposition. In the long run you are expected to lose commissions in the net. (note: individuals do make money and individuals do lose money over the long run)

## **Futures Hedge**

Use of a futures hedge does not require the involvement of a packer. In a simple hedge, a hog producer would simply sell the lean hog futures contract nearest the date the hogs are expected to be delivered. This does not eliminate all future price risk as there is still basis risk. Basis is the difference between the cash price and the futures price. In general, the net price received by the producer will be lower if the basis widens (the difference between the cash and the futures price increases). Using futures hedges does not address market access issues, since it does not involve the packer. In addition, producers must be aware of the potential for margin calls if the futures price moves against their position (in this case if the futures price rises). In such a situation, the hedge is likely also locking the producer out of profitable price increases. Futures hedges should only be undertaken with the aid of a respected broker and with support of your lender.

**Definition of Hedging** - Taking an equal and opposite position in the futures market to the position held in the cash market.

## The Concept of "Basis"

In order to hedge, the concept of basis must be understood.

$$\begin{aligned} \text{Basis} &= \text{Cash Price} - \text{Futures Price} \\ &\text{or} \\ \text{Basis} &= \text{Futures Price} - \text{Cash Price} \end{aligned}$$

However, be careful to know which way basis is calculated when using a reported basis (level will be the same, but sign will be reversed).

Basis may be calculated on a daily, weekly, or monthly standard.

Factors affecting basis:

- location of cash market (transportation difference)
- grade, weight, shrinkage, dressing percentage
- seasonality patterns which may differ between cash markets

So, basis is specific to a particular cash market and commodity.

Because cash and futures market prices respond to and reflect similar underlying supply and demand conditions, they tend to move in the same direction. (i.e., if cash price increases, futures price tends to increase)

They may move in opposite directions over the short term, but will in general reach a stable historical basis relationship as the delivery date approaches. With cash settlement, the futures price will, by definition, be equal to the CME lean hog index (delivery price) at the close of the contract.

**Because the cash price and the futures price move in the same direction, volatility or variance of the basis is less than the volatility of either the cash price or the futures price.**

The above reason is the fundamental reason why hedging reduces risk.

## Intuition of How Basis Relates to Hedging

Remember: hedging is taking an equal and opposite position in futures market to the position in cash market. (e.g. if long market hogs in cash market, go short lean hogs in futures market)

With the above definition of basis, cash and futures prices move together; if cash prices decline, a loss occurs in that market, but futures prices would also

decline so a gain occurs in that market (buy back futures contract at a lower price than it was purchased for). If they both move the same, there is no change and producer does not suffer effects of adverse price movement. Think through this carefully for case of being short in the cash market because this is the situation faced by hog producers on feed purchases.

### **Miscellaneous Risk Considerations in Hedging**

#### ***1. Price risk is not completely eliminated by hedge. There is still basis risk.***

If basis is wider (i.e., Actual Basis is greater than Expected Basis) then there are lower returns from hedge than expected. (this is shown by examples of calculating hedges)

If basis is narrower (i.e., Actual Basis is less than Expected Basis) then there are higher returns from the hedge than expected.

#### **However, in general, basis risk < price risk**

#### ***2. Production risk is still present.***

This is equal portion of the hedge.

One lean hog contract is equal to about 220 head of 180 pound carcass weight barrows and gilts. If you sell two lean hog contracts and have only 220 hogs, one of the contracts is a speculative position.

Similarly if you have 300 head of hogs and sell only one lean hog contract, 80 of the hogs are unhedged. This may be an effective strategy (gradually increasing or rolling into a fully hedged position) if intended.

If hogs die prior to lifting hedge or if they are simply not finished by the futures expiration date, this portion of the contract would also be speculative and would be a form of production risk.

In crops, the production risk includes yield reductions due to weather or pests. Hence, normally less than 100 percent of total expected production is hedged.

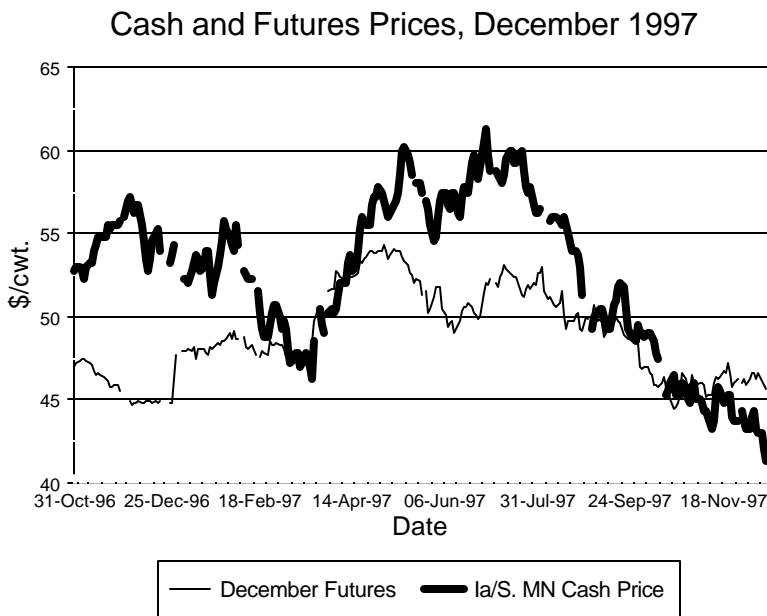
#### ***3. Must factor in commissions and margins***

Commissions obviously detract from the value of a hedge.

**Generally, plan to maintain the hedge until the hogs are sold. Lifting a hedge because of a margin call is just about the worst thing a producer can do. So make sure you can meet margin calls before placing a hedge.**

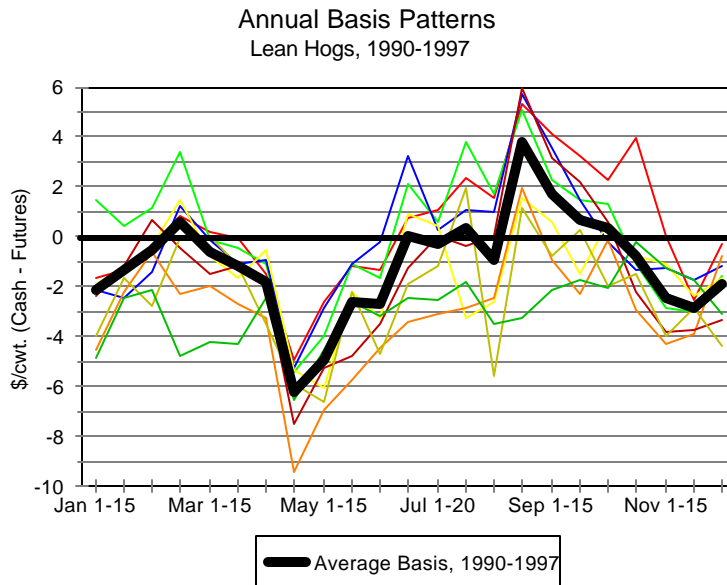
The logic behind this statement is that the hedge was placed because you expected an adverse price movement in the cash market. If you lift the hedge, that means the price must have moved adversely in the futures market and favorably in the cash market. However, if you were right to start with and the cash market eventually declines, you have lost money already in the futures market and now will also lose in the cash market.

The following chart shows the cash price and futures price movements over the life of the December 1997 lean hog futures contract. It should be noted that the lean hog futures price was adjusted to a live hog equivalent by multiplying the futures price by 0.74, a standard yield conversion factor utilized by the CME.



The basis for hogs at the end (December 12, 1997) is negative. If compared to the CME lean hog index the basis is zero. However, the Iowa/S. Minnesota Cash price used is not identical to the terms of the futures contract. Average hogs priced on Iowa/S. MN are 47-49 percent lean, whereas the hogs to be priced on the Lean Hog Futures must be 51-52% lean. Thus, the cash price hogs are a lower value and should be priced at a lower level. The basis for 1997 has been less than zero for every period because of this quality differential.

The following chart provides an illustration of the historical basis for hogs. Each thin line represents a year and the bold line represents the average or expected basis levels. Notice that basis does vary from year to year although it is less variable in some months than in others (the thin lines are more closely aligned). Also note that there is a seasonality component to basis just as to the underlying prices. This is because during the summer months the cash price is moving up to meet the futures price (hence basis is negative) and during the fall months the cash price is moving down to meet the lower futures price (hence, basis is generally positive).

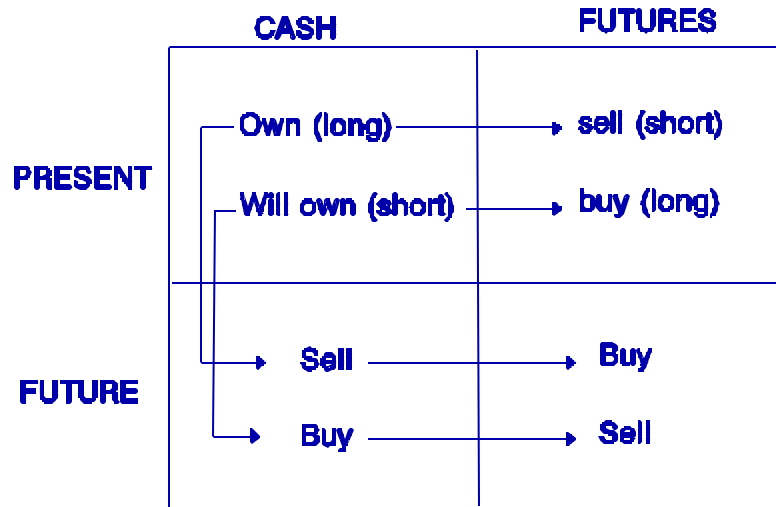


Unlike crops, the basis for livestock is not stable prior to near delivery. This is because of non-storability. In this example, hogs slaughtered in June cannot be carried forward until December if that were warranted.

### Hedging Examples

As mentioned earlier, hedging is the act of taking an equal and opposite position in the futures market to offset price risk in the cash market. The following diagram helps illustrate the appropriate actions to take.

Starting with the present cash position, no matter which direction you move, the appropriate position or action is the opposite. This “hedging square” is a fundamental tool for simulating the hedging alternatives available.



### Forward Contracting vs. Hedging

#### *Advantages of Forward contracting:*

- ▶ Greater range in delivery prices
- ▶ Guaranteed price
- ▶ No margin calls
- ▶ No knowledge of futures necessary
- ▶ Assured of market access
- ▶ Potential for premiums

#### *Disadvantages of forward contracting:*

- ▶ Contracts may not be available at all times
- ▶ Reduced marketing flexibility if warranted
- ▶ Comparisons across packers are difficult due to differing specifications
- ▶ Difficult to cancel contract

***Advantages of hedging:***

- Futures contracts have uniform specification
- Futures Contract is liquid (i.e., generally available for purchase or sale)
- Maintains flexibility in choosing packer offering best price
- Exit strategy is readily available (simply reverse futures position)

***Disadvantages of hedging:***

- Margin calls will result if prices move against position
- Does not ensure plant access at time sought to deliver
- Execution requires greater knowledge
- There is still basis risk so final price is not certain

**Options Hedge**

The options hedge again involves the use of the futures market. However, in this case instead of selling the actual futures contract, the producer would buy the *right* to sell the futures contract (lean hogs) at a certain price. This would be a put option and the purchase price of the put option is the premium. Put options can be expensive, but the main advantage is that they protect against price declines but do not limit the upside potential if prices rise in the future. In addition, the premium (plus brokerage commissions) is all the put option will ever cost - there are no margin calls or other financial requirements.

Both futures hedging and options hedging allow producers highly flexible means of obtaining price protection. However, they do not assure plant access since the packer is not involved. With increasing incentives for coordination of production between producers and packers, the market access issue may outweigh the positive benefits of using the futures market for hedging. Futures and options markets can also be utilized for purchasing feed, such as grains and soymeal.

Options are offered on all livestock futures contracts. Strike prices are typically offered at 2 cents per pound intervals. For example, you could buy a lean hog futures contract option for \$.48, \$.50, \$.52 etc. Note that these strike prices are set by the Chicago Mercantile Exchange to be relevant to the current futures prices.

***Advantages of Using Options for Price Protection:***

- No margin money as with hedging
- Additional Cost = Premium which does vary depending on the market's perceived value of having the option
- Allows for taking advantage of favorable price movements, but limits possibility of unfavorable price movements

***What About Option Premiums?***

Just as with any price, the option premium is determined by the market forces of supply and demand for purchasing a particular option.

***Factors Affecting Option Premiums*****1. Time to expiration**

The longer the time, the greater the chance that the option will acquire value. Hence, the premium is higher the longer the time to maturity of the option.

**2. Futures price volatility**

The greater the variance of the futures price, the higher the probability that the option will acquire value (more risky for option seller or writer) and the premium will be higher.

**3. Strike price**

Call option - lower strike price ==> higher premium  
Put option - higher strike price ==> higher premium

**4. Market expectations**

If the market generally expects the futures price on the contract to move towards the strike price or far beyond the strike price, the option premium will be higher.

**▪ Final Comments on Pricing Strategies**

- No one strategy is best all the time. Each has its place under certain circumstances.
- It is best for producers to use "selective" hedging or option strategies. That is, use tools only in extremely risky times or fairly certain of unfavorable price movements.
- These techniques are primarily risk reducing--not profit enhancing. Less risk is typically associated with lower profits. However, selective strategies can be used to enhance profits.