

Overview of Price Risk Module 5: How Cash Price and Basis Affect Hedging Outcomes

This presentation provides an introduction to the hedging concept using both futures and options. The focus is on understanding hedging as the process of being involved in two markets simultaneously, so price outcomes are impacted by what happens in both markets. Examples are used to illustrate futures-based hedging outcomes when price increases and decreases with basis unchanged, and when the basis strengthens and weakens. Option-based strategies are illustrated with examples of buying a put for price protection, and buying a call for accessing upside price potential in lieu of holding cash grain. The purpose of the presentation is to provide an understanding of using futures and options as components of alternative grain marketing strategies.

The hedging concept is related to the fundamental idea that being involved in a commodity market as a producer involves price risk. A wheat producer, as an example, is adversely impacted by a declining price when the wheat is growing or in storage. A short futures position provides protection against a declining cash price, because declines in the cash price are offset by gains on the futures position. Conversely, the short futures position can generate losses if the price increases. However, losses on the futures position are offset by gains on the cash market. For the concept to work, the two markets (cash and futures) must be related. Thus, prices in the two markets move up and down together in some reasonably predictable fashion. Basis (defined as the cash price minus the futures price) is what measures the price relationship between the two markets. Basis can get larger (or stronger). A stronger basis implies the cash market price increases relative to the futures price, or the futures price declines relative to the cash price. Basis can also get smaller (or weaker). A weaker basis implies the futures price increases relative to the cash price, or the cash price declines relative to the futures price. Hedging essentially involves a temporary sale in an alternative, but related market (the futures market). How well the temporary market's price behaves relative to the actual cash market price influences hedging effectiveness.

An example with four alternative outcomes is used to illustrate the hedging concept. The example reflects a wheat producer with a growing winter wheat crop in mid-January. The expected sale date is shortly after harvest, or about mid-August. The example initially portrays how the hedging alternative is evaluated. Select the appropriate futures price (discuss both what commodity and which exchange if appropriate, and the idea of the appropriate contract month given the expected sale date); add the basis (recognizing that basis can be negative or positive); and subtract the cost

of hedging (brokerage commission and interest on margin). Compare the expected hedge price to the other pricing alternatives available. Finally, make a decision about whether or not to hedge, and then how much of the growing crop should be forward priced.

A decision is made to hedge two-thirds of the growing crop (20,000 bushels) with a short position on 4 CBT Sep wheat contracts. Situations A through D illustrate impacts of the hedging decision when: A) price increases with no basis change; B) price decreases with no basis change; C) price decreases with a weaker than expected basis; and D) price increases with a stronger than expected basis. The key points are: 1) if basis does not change, the hedging price is as expected whether price increases or decreases; 2) a weaker basis means the actual price is less than expected by exactly the amount of the basis change, and 3) a stronger basis means the actual price is more than the expected price by exactly the amount of the basis change.

The put option example illustrates a minimum price strategy established in mid-January for a wheat producer expected to sell the wheat crop right after harvest. Evaluating the level of protection needs to include: 1) selecting the appropriate futures contract (similar to the hedging example keeping in mind many options expire late in the month before the contract month); 2) selecting a strike price; and 3) the procedure to determine the expected level of price protection (strike price; plus the basis; minus the cost of the put). The final step is to compare this alternative to other marketing strategies available, and selecting the quantity to protect. Two outcomes (A and B) demonstrate how the put strategy works. The producer receives some of the gain when price increases, and still has a minimum level of price protection when price declines. Both outcomes assume no basis change. Basis change impacts for the put strategy are discussed in a general framework, since impacts are similar to the futures-based hedging outcomes discussed earlier.

The call option example is designed to illustrate the difference between owning the physical commodity in storage (30,000 bushels), or owning calls. The purpose of ownership in both cases is to receive a speculative gain from price increases. The situation is a grain producer in mid-January with wheat in storage. If wheat is stored until mid-April to capture a price increase, holding costs (5 cents per bushel per month) total 20 cents per bushel. A slightly out-of-the-money call (300 strike) has a premium of 15 cents plus a 1 cent broker fee (or 16 cents per bushel). These two alternatives should still be compared to other marketing strategies that offer potential gain from holding. However, focusing on holding grain versus calls suggests buying the call may be less expensive. The strategy is initiated by selling the cash wheat and buying 6 CBT May wheat calls. Situation A and B

demonstrate how the strategy works when price increases or decreases assuming basis remains unchanged. If price increases, the value of the calls increase and the producer (owner of the 6 calls) captures the increase by selling the calls for the premium of 60 cents. If price decreases, the calls expire worthless and the 16 cents per bushel paid is forfeited. However, the storage cost savings of 20 cents per bushel more than offset the loss of the 16 cents paid for the calls. Though not well illustrated by the example, it is also important to note that holding the commodity in storage is subject to more than 16 cents of downside price risk. Holding the wheat would have generated a substantial market loss under outcome B. The market loss of 50 cents (or $310 - 260$) was avoided by owning the call rather than the physical commodity.

