MGGA INTERMEDIATE MARKETING CLASS NEWSLETTER

Intermediate Marketing Workshop

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Spring wheat futures prices for September delivery moved consistently downward throughout April. The high for the month occurred on April 2 ($6.07/bu), and the low of $5.48/bu occurred on April 30. This price decline has primarily been a response to reports of good moisture conditions in wheat-producing areas. Over this time period, the value of our September $6.00/bu strike price increased from $0.34375/bu to $0.64/bu. The purpose of purchasing the put option was to protect against the price declines that we have experienced over the past several months. The September spring wheat futures contract has declined almost $1.00/bu since December 3, 2014.

The current futures price is $0.52/bu below our MGEX September put option strike price of $6.00/bu, which means that our put option currently has $0.52/bu of *intrinsic* value. This intrinsic value reflects the amount of actual price protection we have from owning this put option. We could exercise the option at this time to capture this gain. Our brokerage account would be credited with $3,200, but we would lose any future downside price protection.

The difference between the current value of our put option and its intrinsic value represents a *time value* of $0.12/bu. We reported that our time value on this option was $0.325/bu a month ago. So, it appears that the time value of this option has started its

expected decline. Recall that the time value will be $0.00/bu when the option expires in September.

We have included a graph that presents the MGEX September 2015 futures price and the value of our $6.00/bu put option since our entry into the market. The correlation between the two price series continues to be almost perfectly negative (a correlation coefficient of -0.98) through the month of April. This means that our put option is a good hedge against changes in spring wheat futures prices -- declines in the futures market have been offset by gains in the value of our put option.

The expected September Great Falls Columbia Grain spring wheat basis has been very stable over the month of April. The *wheatbasis.montana.edu* website forecasted the September 2015 basis for 14% protein spring wheat to be a **plus** $0.03/bu at the beginning of April, and a **plus** $0.05/bu as of April 30.

Following our request in the April newsletter, Paul Kanning from Northeast Montana posed a great question via email. He writes: *"In the class, we purchased a single put option. But in practical applications, farmers also must decide how many options to purchase. For example, one could purchase options to cover a certain level of expected production (such as 80%). Or considering farm cash flow, one might set a limit of $15,000 to be spent on purchasing put options. And, many farmers also have a revenue*

protection safety net through the purchase of crop insurance. Do you have any suggestions as to how one decides on how many options to purchase?"

For the purchase of put options to truly be a hedge against lower prices, you need to consider the number of put options purchased relative to your expected production, as Paul notes. This percentage of expected production is often referred to as a hedge ratio. So, if Paul expected to produce 50,000 bushels of spring wheat this year and he purchased 8 put options representing 40,000 bushels, his hedge ratio would be 80% (note that each put option represents a price position on 5,000 bushels).

The key to understanding the "optimal" hedge ratio is to determine whether the put options you purchase cover existing risks or are, in fact, creating additional risk. Remember that the objective of hedging is to reduce your existing price risk. Determining the best hedge ratio for your operation depends on the relationship between futures prices, your local basis, and your realized crop yields in the coming year. In addition, your preferences for risk and your cash flow requirements, as Paul mentions, also determine how much you should hedge relative to your expected production.

To understand the relationship between futures prices, cash prices, yields, and the hedge ratio, consider the hypothetical example of a "perfect hedge" where profits from the hedging position perfectly offset losses from the cash market position (and vice versa). For this to be true, the futures price and the local cash price must be perfectly correlated (i.e., no basis variability). If the basis varies, then profits (losses) from the futures/options market are not completely offset by losses (profits) in the cash market because the cash price risk is not completely "covered" by the futures market.

In addition, for a hedge to be "perfect", a producer's actual level of production must equal her expected level of production. If actual production is less than expected production, then the size of the hedge in bushels is greater than the size of the physical position. This is called an "uncovered" futures position, because part of the futures position no longer covers price risk in the cash market. For the futures position to be "covered", each bushel of the futures position must have an offsetting bushel in the cash market.

Therefore, basis variability and yield variability imply that the optimal hedge ratio is rarely 100%. If the correlation between futures and cash prices is low (because basis is more variable), the optimal hedge ratio is lower. Similarly, if yield variability is high, the optimal hedge ratio is also lower.

The availability of government programs that cover price risk (e.g., crop insurance revenue protection programs, Agricultural Risk Coverage, Price Loss Coverage) also influences the optimal hedge ratio. Because these programs may cover some portion of existing price risk, one may be completely covered with a lower hedge ratio. However, hedging and crop insurance can also be complementary, since crop insurance reduces yield risk, making it less likely that any hedged position is uncovered.

Generally speaking, because real world hedges will never be perfect hedges, the best hedge ratio is less than 100%.

Determining how much less than 100% depends on the correlation between your local cash price and the futures price, the yield variability on your farm, and your preferences for risk. If there was a simple answer or common rule-of-thumb regarding hedge ratios, everyone would be doing that. Unfortunately, like much of production agriculture, neither exists.

To discuss this further or if you have any questions you would like answered in the next newsletter, please contact Joe Janzen (joseph.janzen@montana.edu, or 406-994-5616) or Gary Brester (gbrester@montana.edu, or 406-994-7883).

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