

The Options Advantage: Options on the MGEX Grain Indices

Minneapolis Grain Exchange (MGEX) index-based grain options offer a direct cost savings of one to four cents per bushel over traditional delivery-settled futures and options contracts. The differences between the MGEX's financially-settled contracts and other delivery-settled options can be categorized into operational and pricing advantages. Operational advantages may offer indirect savings of up to three cents per bushel. Pricing advantages are estimated to yield direct savings of up to four cents per bushel. Actual trade data confirms pricing advantages of roughly three cents per bushel for the HRWI.

Operational Advantages

Other than the obvious advantage of avoiding delivery-related problems, MGEX index-based options differ from delivery-settled futures and options in two distinct ways. First, the MGEX options expire simultaneously with futures during the contract month. In contrast, delivery-settled options expire in the month preceding the delivery month and usually 20-25 days before the futures stop trading. Second, MGEX options have a monthly expiration cycle versus an irregular cycle for most traditional delivery-based options.

Operationally, the MGEX option characteristics allow traders to more closely match the option expiration with cash transaction dates. As a result, firms can avoid purchasing unneeded time value. Plus, better hedges are obtained by using options that expire closer to cash transaction dates. Collectively, these features allow traders to take option positions that more closely match their cash positions; thereby, they provide operational savings.

As an example, assume on April 1st you want to hedge a cash corn transaction expected to occur on September 30th. Using CBOT corn, the hedge would have to be placed in December options. However, with National Corn Index (NCI) options, the September contract is used. Assuming a \$2.50/bu. corn price, the at-the-money CBOT options would cost 15.5 cents while the NCI options would cost only 13.7 cents, for a savings of 1.8 cents. Depending on the timing of the transaction, this upfront cost reduction can range from zero to 2.7 cents. Moreover, because NCI option expiration closely coincides with the cash transaction, the basis and hedging results are more predictable.

Price Advantages

Given equal expiration dates and volatility, the MGEX options also have a pure price advantage over delivery-based options. The price advantages stems from the fact that the MGEX grain indices reflect country or elevator-level prices. In contrast, most delivery-settled contracts represent terminal market pricing. Therefore, delivery-settled contracts include a country-terminal basis component that largely reflects transportation costs. For example, consider the NCI and the CBOT corn.

$CBOT\ Corn\ Price = Illinois\ River\ Price = Country\ Price + Freight > NCI\ Price = Country\ Price$

The CBOT corn price includes a freight or transportation component that is not part of the NCI price. Therefore, options on the CBOT price implicitly include a premium on the transportation

cost. With all other factors equal, this results in CBOT options costing more than comparable NCI options.

As an illustration of this difference, the following table shows the pricing differences for the NCI, National Soybean Index (NSI), Hard Red Winter wheat Index (HRWI), Soft Red Winter wheat Index (SRWI), and Hard Red Spring wheat Index (HRSI) and the corresponding delivery-based contracts from 1999 through May of 2004.

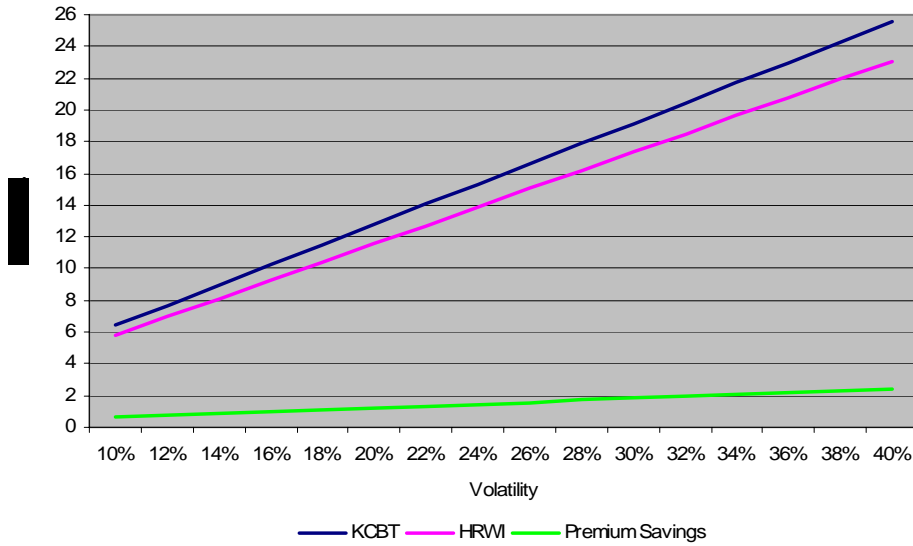
Table 1. Average Futures and Option Prices, Cents per Bushel, 1999-2004.

	CBOT Corn vs. NCI	CBOT Wheat vs. SRWI	CBOT Beans vs. NSI	KCBT Wheat vs. HRWI	MGE Wheat vs. HRSI
Delivery-based Futures Price	222.4	298.9	550.4	325.3	346.7
Delivery-based Options Price*	10.92	14.67	27.02	15.98	17.02
Index-based Futures Price	201.3	268.8	523.4	294.3	322.7
Index-based Options Price	9.88	13.20	25.70	14.45	15.84
Premium Savings	1.04	1.48	1.33	1.53	1.18

*All option prices are at-the-money calculated using Black's model with a time-to-maturity of 0.25 years, a 6% interest rate, and a volatility of 25%.

The average premium savings over the last five years ranges from 1.04 cents for corn to 1.53 cents for hard red winter wheat. The pricing advantage is magnified at higher volatilities and for longer-dated options. This is illustrated for the HRWI and Kansas City futures (KCBT) in Figures 1 and 2.

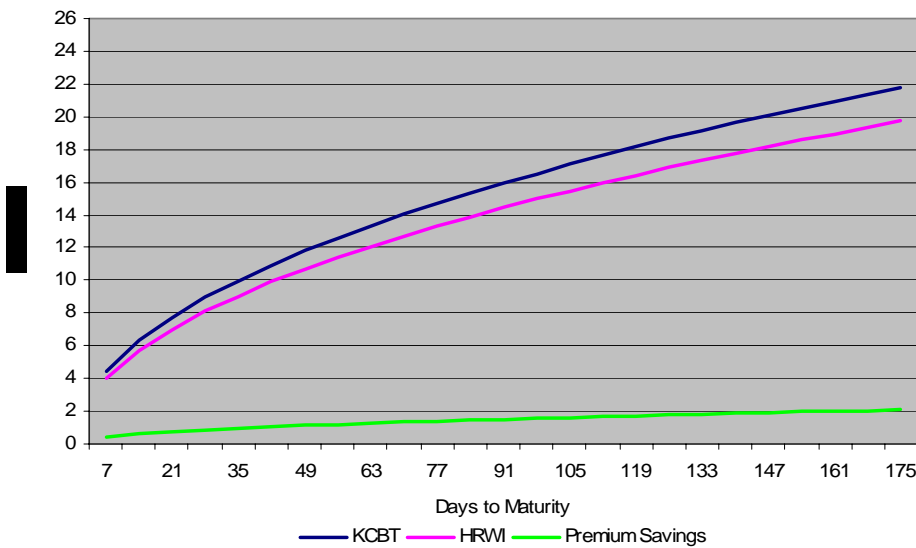
Figure 1. KCBT vs. HRWI Premium Savings at Alternative Volatilities.*



*At-the-money prices calculated using Black’s model with a time-to-maturity of 0.25 years and a 6% interest rate.

As shown in Figure 1 that the premium savings can exceed two cents per bushel at high volatility levels. At a volatility of 34%, the NCI options cost 2.07 cents or nearly 10% less than the comparable CBOT options.

Figure 2. KCBT vs. HRWI, Premium Savings at Alternative Time-to-Maturity.



*At-the-money prices calculated using Black’s model with a volatility of 25% and a 6% interest rate.

Figure 2 indicates that the premium savings increases with the time-to-maturity. Again, the savings can exceed two cents per bushel for options with more than five months of life. For a six month at-the-money option, the premium savings is 10%, or 2.12 cents per bushel.

Based on Figures 1 and 2, there are situations where the index-based options can be substantially less expensive than delivery-based options. For instance, for the HRWI and KCBT options with nine months to maturity, the premium savings approaches four cents per bushel under high volatility scenarios. Under numerous scenarios, the savings equals around 10% of the total cost.

Actual Advantage

The above analysis suggests that MGEX index-based options should cost less than comparable delivery-based options. They offer clear operational advantages, and they should cost less than delivery-based options under equal market conditions (volatility). Fortunately, we can look at actual trades for the HRWI to see if this occurs in actual trades.

Data is collected for comparable HRWI and KCBT option trades on two different dates. The data is shown in Table 2.

Table 2. HRWI vs. KCBT Actual Option Pricing.

Trade Date	HRWI February Futures	HRWI February Options (strike)	KCBT March Futures	KCBT March Options (strike)
Nov. 11, 2003	364.5	19.5 (360C)	389.25	22.625 (390C)
Dec. 3, 2003	389.5	18.5 (390C)	411.50	23.500 (410C)

The February HRWI options expired on February 28th and the March KCBT options expired on February 21st. So, the HRWI options offer an additional seven days of life. Still, they are priced less than the comparable KCBT options.

For instance, on November 11th, the 360 HRWI call cost 19.5 cents. Since it is 4.5 cents in-the-money, the time value is priced at 15 cents. Meanwhile, the KCBT 390C, which is 0.75 cents out-of-the money, has premium of 22.625 cents. In this case, an in-the-money HRWI call costs less than an out-of-the-money KCBT call. Moreover, and the HRWI call has more time until maturity. Here, the savings using the HRWI call is at minimum 3.125 cents (22.625-19.5).

Similarly, on December 3rd, the HRWI 390C which is 0.5 cents out-of-the-money, costs 18.5 cents. The KCBT March 410C, which is 1.5 cents in-the-money, costs 23.5 cents and has a time value of 22.0 cents. Clearly, the time value associated with HRWI call option is less than that of the KCBT call option. In this specific case, the savings on time-value is 3.5 cents (22.0-18.5).

Certainly part of the observed pricing difference could be due to differences in volatility. However, there is no reason to expect that the HRWI should be more or less volatile than the underlying KCBT futures. If there is a systematic difference in volatility, that only strengthens the argument in favor of the HRWI options: Why purchase unneeded volatility?

Conclusions

Actual trade data is consistent with the range of theoretical pricing advantages suggested by Black's pricing model. The data supports the notion that MGEX index-based grain options can provide a savings of one to four cents (or around 10%) over comparable delivery-based options. The pricing advantage coupled with the operational advantages make the MGEX options a preferred hedging vehicle in many instances.