

Introduction to Calendar Spread Options on Grains and Oilseed Products

Calendar Spread Options (CSOs) are options on the price relationship between two futures contract months, rather than on the underlying commodity itself. Therefore, they offer different hedging capabilities compared to standard options. The spread a CSO references is defined as the specified nearby futures month price minus the specified deferred futures month price. An option on a futures calendar spread is not the same as combining options on 2 different months in an effort to replicate the spread. The CSO is sensitive only to the value and volatility of the spread itself, rather than the price of the underlying commodity. Combining two or more standard options on different months in an attempt to replicate the spread is a strategy that is sensitive not only to the value and volatility of the spread, but also to the value of the underlying commodity. For example, if the prices of Corn futures decline by \$1 a bushel the option premiums are significantly affected due to their exposure to the underlying price. However, in the same situation, CSO option premiums would not be significantly affected if all Corn futures contract months declined by \$1 per bushel, since the price relationship between Corn futures months did not change.

Calendar Spread Options Mechanics

At exercise, the buyer of a Calendar Spread call option receives a long position in the nearby futures month at the daily settlement price, and a short position in the deferred futures month at the price determined by the settlement price of the nearby contract minus the option's strike price. The buyer of a Calendar Spread put option at exercise receives the opposite of the above, which is a short position in the nearby futures month at the daily settlement price and a long position in the deferred month at the settlement price for the nearby futures month minus the option's strike price. The CSO contracts will be listed initially for the nearest three calendar spreads and an old crop/new crop spread, as these are the months with typically the most liquidity and open interest.

Hedging Calendar Spread Risk with Greater Precision

Calendar Spread Options can provide a more precise hedge against adverse movements in the temporal value of grain and oilseed products. For example, Calendar Spread Options on Wheat futures list strike prices in one cent increments rather than the five cent increments available in standard options on Wheat futures. Therefore, it is easier to establish exposure to the calendar spread with one cent granularity when using the Calendar Spread Options. For participants in the physical commodity markets such granularity is important when managing their inventory and subsequent cost of carry or liquidation risk decisions. Grain and oilseed businesses are forced to make decisions of storing versus consuming inventories based not only on the current nature of the domestic and global agricultural crop year, but also while keeping an eye on the expectations of the following year's crop. For a business forced into an unwanted inventory liquidation or storage decision a CSO can help hedge the risk of rolling that inventory (or lack thereof) over an adverse pricing environment.

Examples of Using Calendar Spread Options

Country Elevator Using CSOs:

Assume that a grain elevator can profit by carrying grain forward at the current market rate versus liquidating its inventory in the cash market. However, the elevator is concerned that the spread could weaken, resulting in a negative return to storage. The elevator currently holds short futures positions in the nearby month to hedge the flat price risk of its inventory. To protect against a narrowing of the spread, the elevator could buy a Calendar Spread call option as insurance. The call option would protect the elevator from the spread narrowing or inverting while allowing the elevator to profit from any widening of the carry in the spread, less the fixed cost of buying the option.

1. The elevator buys a Calendar Spread call option and delays spreading the futures, expecting a widening of the carry. The elevator either holds the Call to expiry or sells (offsets) the same call Option prior to expiry.
2. If held to expiry the option may expire worthless due to a widening of the spread. If this happens the elevator loses the premium it paid for the insurance the option provided, but it has profited from the wider spread, as was the elevator's initial intent.
3. If the spread widens to meet the elevator's initial objective with a significant amount of time remaining until the option expires, the elevator could lock in the improved futures spread and immediately sell (offset) the call Option to capture the remaining time value, as the elevator no longer needs the spread insurance offered by the CSO.
4. If the option is in-the-money at expiration this means the spread narrowed or inverted compared to the strike price at which the elevator owns the option. The elevator exercises the option, which results in an assigned long futures position in the nearby futures month and an assigned short futures position in the deferred futures month at the spread of the strike price on the call option. The assigned short position in the deferred futures contract will have an inherent gain relative to the current market that offsets the narrowing of the spread relative to the strike price. As a result, the elevator has protected itself from a narrowing of the spread by purchasing insurance in the form of a call option.

Ethanol Facility Using CSOs

An ethanol plant needs to buy Corn to perpetuate its operations. The facility has contracted cash corn basis with nearby farmers, but has not priced the futures component with those counterparties. To offset this inherent short futures position the ethanol facility buys Corn futures. When the farmers price the futures component and deliver the grain, the facility will need to sell its long futures position. This situation is not uncommon for processing operations such as an ethanol facility. Such operations frequently roll long hedges forward across time and are consequently subjected to calendar spread risk. The risk the facility holds in this situation is that nearby futures become cheaper relative to deferred futures. If this were to happen the facility would sell nearby futures at one price and buy the deferred futures at a higher price than the current market rate, effectively locking in a less advantageous deferred futures position. For example, assume that the current spread between July Corn and September Corn is a five cent carry. The facility can roll its long hedges from July to September today at five cents, but it then misses out on any potential to roll them over at a more favorable spread such as an inverse. However, if the facility takes no action and the September

futures appreciate relative to the July futures the facility will need to sell July futures and buy September futures for a higher cost than it can today. 3

The facility could instead hedge itself by purchasing a Calendar Spread put option. A Calendar Spread put option enables its owner to sell the nearby futures month and buy the deferred futures month at a difference equal to the strike price of the option. By purchasing a put on the spread, the facility could ensure that it has the right to roll its long hedges forward at today's five cent carry, but it is not obligated to do so. In this situation the ethanol plant can capture any potential profit for its business if the July-September Corn futures spread moves to a narrower carry or an inverse, while ownership of the put option protects the firm from the spread widening beyond the current five cent carry.

Pricing Calendar Spread Options

The theoretical pricing of Calendar Spread Options will differ from conventional models used to value standard options. This is largely due to the fact that the spread between two futures months can take on a positive or negative value, depending on the supply and demand characteristics of the underlying commodity over time. Another consideration in the grain and oilseed markets is the concept of "financial full carry". Full carry fluctuates to some degree with the convenience yield the market equates to holding physical positions in the underlying commodity, as well as with the time value of money (interest rates); however, the calculation of full carry is mostly standardized based on the storage (premium) charges specified in the grain and oilseed futures contracts. For example, the storage charge specified in the CBOT Corn futures contract is approximately five cents per bushel per month. Therefore, "financial full carry" for the July/Sep Corn spread is ten cents plus the opportunity cost of the capital required to "own the grain" (calculated as short term interest rate times the contract value). Therefore, financial full carry essentially places a limit on one level of carry (contango) in grain and oilseed spreads while the level of inverses (backwardation) is theoretically limitless.

Benefit to Hedgers In effect, options on calendar spreads provide a more efficient risk management device for hedgers and market participants who are exposed to calendar spread risks compared with combining options on two different calendar months. Calendar Spread Options on futures provide agricultural industry participants with the transparency and financial integrity of exchange-traded and cleared instruments for managing their risk.

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