

## **12. Commodity Swaps**

**Orlen Grunewald**

**<ogrunewa@agecon.ksu.edu>**

*Orlen Grunewald is a professor in the Department of Agricultural Economics at Kansas State University. He teaches undergraduate courses in food and agribusiness management and in commodity futures and options markets. He teaches a graduate course on computer decision tools in agribusiness in the Masters of Agribusiness program. His current research focuses on evaluating farm efficiency of Kansas farms to determine factors which influence efficiency in grain, cattle and dairy enterprises.*

### **Abstract/Summary**

*Commodity markets have experienced unprecedented volatility in recent years, exposing grain producers, elevators and agribusinesses to large swings in grain prices. Swaps are widely used as over-the-counter agreements between buyers and sellers of corn, wheat and soybeans. Grain swaps are popular because the terms of trade can be tailored to meet the needs of buyers for fixed pricing of grain supplies by establishing a forward price on a cash-settled basis. This means that buyers and sellers can settle the difference between the swap price and the market price at delivery through the CME Group Commodity Exchange and then sell or buy grain through the local cash market. Swaps act as a hedge for the risks of sharp price swings. The CME Group Commodity Exchange acts as a clearing house for the transaction to eliminate counter-party risk of default on the contract. Swaps extend the application of fixed forward pricing to the grain markets while permitting the parties in the transaction to determine the price, quality, quantity and delivery specifications in a private contract.*

## Grain Swaps

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## Introduction

- Futures markets provide price discovery, price risk management and price transparency in agricultural markets.
- Standardized futures and options markets provide price risk management throughout the crop year and into the next crop year.
- Higher market volatility has resulted in customers looking for price protection beyond the typical two-year price cycles.

## The Problem

- These hedging needs can't easily be satisfied with a traditional futures contract, where contract terms do not vary and liquidity is concentrated within the nearby crop year.
  - As a result, specialized swap dealers in the over-the-counter (OTC) market draw up customized swap contracts and find parties to take the opposite sides of these contracts.
  - This introduces the problem of counterparty default risk.
  - On April 6, 2009, the CME Group entered this market to provide a market clearing house to ensure the financial integrity of swap transactions.

## Swaps

- Swaps are used as risk management tools to hedge price risk over a period of time.
- Three major types of swaps:
  - Commodity (especially energy)
  - Interest rates
  - Currency
- This presentation focuses on commodity swaps in the grain markets

## Swap Basics

- Swaps are the exchange between two or more parties of certain types of cash flows
- Swaps have a principal or core value negotiated between the parties
- The contracting parties are called counterparties
- A swap dealer or commodity broker negotiates the agreement between the counterparties

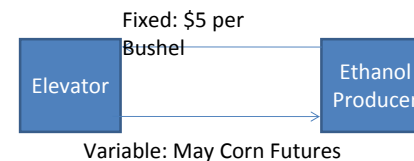
## Swap Basics (Continued)

- Swap contracts are private contracts
- The contract price, quantity, grain quality, starting and ending date, and maturity are all negotiated
- The CME Group's only role in the transaction is to clear the trade

## Commodity Swaps

- A commodity swap is an agreement between counterparties to exchange a fixed price for a commodity with a floating or variable price for the commodity.
- Example
  - Assume that an elevator and ethanol producer enter the OTC (over-the-counter) swap market
  - The ethanol producer agrees to pay the a fixed price of \$5 per bushel for corn purchased from the elevator.
  - The elevator agrees to pay the ethanol producer a variable price for corn, such as the settlement price of the May Corn futures.

## Corn Swap Example



- Assuming this May swap expires on April 30, the ethanol producer will pay the elevator \$5 per bushel for corn and the elevator will pay the ethanol producer the May Corn futures settlement price on that day.

## Corn Swap Example

- Commodity swaps, which are financially settled products, can be used to hedge the eventual physical (cash market) transactions.
- The elevator in this example would still need to sell the physical corn to a local buyer (grain elevator) and the ethanol plant would still need to purchase physical corn from a local supplier.

## Corn Swap Example

Cash Market	Elevator's Short Swap Position	Ethanol Producer's Long Swap Position
On January 1 Expected cash price: \$5.00	Agrees to pay May Corn Futures Settlement price on April 30	Agrees to pay \$5.00 on April 3
On April 30 Local Corn price: \$6.00	Pays ethanol producer \$6.00 May Futures Settlement Price	Pays elevator \$5.00
Result: Gain \$1.00	Result: Loss \$1.00	Result: Gain \$1.00
	Cash price: \$6.00 - Loss on Swap: <u>\$1.00</u> = Net Price \$5.00	Cash price: \$6.00 - Gain on Swap: <u>\$1.00</u> = Net price \$5.00
This swap would be settled with the elevator paying the ethanol producer the difference in obligations or \$1/bu. (\$6 - \$5 = \$1) on April 30.		
Note: The local basis will impact the final purchase and selling price.		

## Corn Swap Example

- In this example, the price of corn may have been more efficiently hedged by both the elevator and ethanol producer by trading May Corn futures.
  - An ethanol producer who must continually purchase corn would probably be more interested in a long-term swap arrangement that prices corn monthly.
  - A grain merchandiser might be interested in selling corn at a fixed price every month.
  - The two parties could enter into a series of monthly swaps (a strip) that expire each month for the next year or two.

## Corn Swap Positions

- As the seller of the physical commodity, the elevator in this example, is the seller (short position) of the OTC swap.
- As the buyer of the physical commodity, the ethanol producer is the buyer (long position) of the OTC swap.
  - In other words, the position you plan to take in the physical market at a later date is the current position you take in the OTC swap market.
  - This is similar to the futures positions you would take if you were hedging in the futures market.

## ClearPort

- ClearPort is a clearing service open to all qualified OTC market participants.
- Swaps trade as OTC products with private negotiations between two counterparties or via a swap dealer (broker) or Futures Commission Merchant (broker) acting as an intermediary.
- Once the OTC swap agreement is reached, the broker submits the OTC swaps transactions for clearing through ClearPort.
- Margin requirements are calculated and marked-to-market daily by CME clearing.

## Calendar Swaps

- Corn, wheat and soybean calendar swaps contain features similar to corn, wheat and soybean futures listed at the CBOT exchange.
- The primary difference is the settlement process.
- Corn, wheat and soybean futures contracts have a physical delivery settlement process while the calendar swaps are cash-settled to an underlying futures contract settlement price.

## Establishing an OTC Swap

- The initial step in a swap transaction is establishing a privately negotiated OTC swap.
- Two parties will agree on the specific fixed price component and the calendar month.
- The daily and final settlement process is based on the futures contract month closest to (but not before) the negotiated swap month.
- The variable price (floating price) component will be based on the underlying futures contract.

## Listed and Expiration Schedule

Calendar Swap Month	Jan	Feb	Mar	Apr	May	Jun
Corn Futures	Mar	Mar	Mar	May	May	Jul
Soybean Futures	Jan	Mar	Mar	May	May	Jul
Wheat Futures	Mar	Mar	Mar	May	May	Jul
Calendar Swap Month	Jul	Aug	Sep	Oct	Nov	Dec
Corn Futures	Jul	Sep	Sep	Dec	Dec	Dec
Soybean Futures	Jul	Aug	Sep	Nov	Nov	Jan
Wheat Futures	Jul	Sep	Sep	Dec	Dec	Dec

Listed futures are for clearing purposes only.

Expiration dates are the last business day of the month preceding the calendar swap month.

## Daily Settlement Process

- Calendar swaps are settled each day based on the underlying futures contract settlement price.
- On the first day that a calendar swap is cleared, the credits and debits are equal to the difference between the privately negotiated fixed component of the swap and the underlying futures contract settlement price on that day.

## Final Month Settlement Price

- During the final month of clearing, the daily settlement price is calculated differently.
- The final month settlement price is the cumulative average of the daily settlement prices for the underlying futures contracts.
  - For example, the final settlement price on an April Corn Swap will be the average of the settlement prices for May 09 Corn Futures for every trading day in April.

## Application

- A grain elevator would like to sell 50,000 bushels per month for the next three months.
  - The elevator manager enters into a three-month OTC Calendar Swap with a swap dealer (on behalf of a flour mill) to hedge these wheat sales at a fixed price of \$7.00 per bushel.
  - Note: this is equivalent to a forward cash contract at \$7.00.
  - The elevator enters into the three-month OTC Calendar Swap transaction (May, June and July swaps) in early April with the swap settlements due on the last business day in April, May and June, respectively.

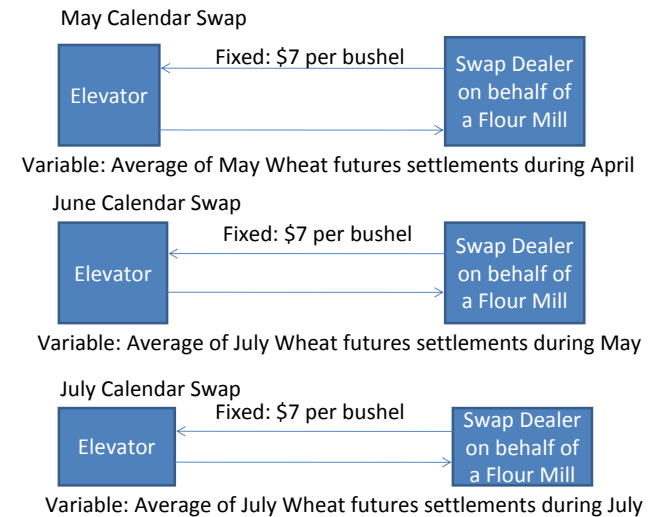
## Application

- The elevator is assigned short positions in May, June and July Wheat Calendar swaps at \$7.00 per bushel.
- The flour mill is assigned long positions opposite to the elevator at \$7.00 per bushel.
- Each party would receive 10 swap positions in each of the May, June and July Wheat Calendar Swaps.
- The fixed price in the swap, \$7.00 per bushel, is privately negotiated between the grain elevator and swap dealer on behalf of the flour mill and is not published by the exchange.

## First Day of Clearing

Elevator		Flour Miller	
Short May Swap at \$7.00	May 09 Wheat futures at \$6.85	Long May Swap at \$7.00	May 09 Wheat futures at \$6.85
Margin	Credit \$0.15	Margin	Debit \$0.15
Short June Swap at \$7.00	July 09 Wheat futures at \$6.95	Long June Swap at \$7.00	July 09 Wheat futures at \$6.95
Margin	Credit \$0.05	Margin	Debit \$0.05
Short July Swap at \$7.00	July 09 Wheat futures at \$6.95	Long July Swap at \$7.00	July 09 Wheat futures at \$6.95
Margin	Credit \$0.05	Margin	Debit \$0.95
Note: After the first day the accounts will be marked-to-market.			

## Settlement



## Final Results

	May Swap	June Swap	July Swap
Fixed Payment Paid by Flour Mill and Received by Elevator	\$7.00/bu. based on contract	\$7.00/bu. based on contract	\$7.00/bu. based on contract
Floating Payment Paid by Elevator and Received by Flour Mill	\$7.86/bu. based on average May futures settlements	\$7.05/bu. based on average July futures settlements	\$6.82/bu. based on average July futures settlements
Swap Result	\$0.86/bu. payment by Elevator to Flour Mill	\$0.05/bu. payment by Elevator to Flour Mill	\$0.18/bu. payment by Flour Mill to Elevator

## DTN Basis Swaps

- A Corn Basis Swap provides producers with an alternative method to hedge their basis risk.
- Cleared-only Basis Swaps allow market participants to bring their OTC Basis Swap positions to ClearPort for central clearing.
- The initial step in a cleared-only Basis Swap transaction is establishing the privately negotiated OTC Basis Swap.

## OTC Basis Swap

- Two parties of the swap agree on:
  - Cash market region
  - Specific fixed basis component, and the
  - Specific swap month
- The variable (floating) basis component of the cleared-only Basis Swap is the DTN Regional Cash Price Index minus the underlying corn futures contract month.
- Both parties of the OTC Basis Swap must establish an account with a clearing firm.

## Listed and Expiration Schedule

Corn Basis Swap Contract Month	Jan	Feb	Mar	Apr	May	Jun
Underlying Corn Futures Month	Mar	Mar	Mar	May	May	Jul
Corn Basis Swap Contract Month	Jul	Aug	Sep	Oct	Nov	Dec
Underlying Corn Futures Month	Jul	Sep	Sep	Dec	Dec	Dec

Expiration dates are the last business day of the month preceding the basis swap month.

## Daily Settlement Process

- On the first day a basis swap is cleared, the credits and debits are equal to the difference between the fixed basis component and variable basis component.
- Example of a December Corn Basis Swap
  - Fixed component is \$0.25/bu. under December
  - Variable basis component is \$0.35/bu. under December
  - Seller will receive a \$0.10/bu. credit
  - Buyer will receive a \$0.10/bu. debit
  - In their respective margin accounts.
- From then on, the change in the variable basis component will determine net credits and debits.

## Daily Settlement Process

- If the variable basis component weakens
  - The seller will receive a credit (a weakening basis is detrimental to the short hedger)
  - The buyer will receive a debit (a weakening basis is beneficial to the long hedger)
- If the variable basis component strengthens
  - The buyer will receive a credit (a strengthening basis is detrimental to the long hedger)
  - The seller will receive a debit (a strengthening basis is beneficial to the short hedger)

## Daily Settlement Process Last Five Days

- During the last five business day in the month prior to the Basis swap month the daily settlement price is the cumulative average of the variable basis component.
- This five-day average is the final settlement price.
- Final settlement is completed by a cash settlement.

## Final Results

- At expiration, if the variable basis component is stronger than the agreed upon fixed basis component
  - The buyer of the Basis Swap receives payment for the difference from the Basis Swap seller.
- At expiration, if the variable basis component is weaker than the agreed upon fixed basis component
  - The seller of the Basis Swap receives payment for the difference from the Basis Swap buyer.
- In actuality, the final results will be the final credit or debit amount in each parties' respective margin accounts.

## Application

### July Corn Basis Swap

Fixed: -\$0.30 July per bushel



Variable: Difference between DTN Regional Cash Price Index and July Corn futures

- An elevator is concerned about basis volatility and would like to assure sufficient basis appreciation to provide a return on storage of 100,000 bushels of corn.
- An ethanol plant would like to establish a reasonable basis level for upcoming corn purchases.
- A swap dealer, negotiating on behalf of both the elevator and the ethanol plant establishes an OTC Basis Swap between the counterparties of \$03.0 under July Corn futures.
- In early April, the grain elevator and the ethanol plant both agree to a basis swap with expiration the last business day in June.

## Results

Results of July Corn Basis Swap at Expiration	
	Last Business Day in June
Fixed Payment (Paid by Ethanol Plant and Received by Elevator)	\$0.30/bu. Under
Floating Payment Paid by Elevator and Received by Ethanol Plant.	\$0.50/bu. Under
Swap Result	\$0.20/bu. Paid by the Ethanol plant to the Elevator

- Assume the average difference (basis) over the last five business days in June between DTN Eastern Nebraska Corn Cash Price Index and the July Corn futures contract was \$0.50/bu. under.
- The final variable basis settlement (-\$0.50/bu.) was \$0.20/bu. weaker than the fixed basis component (-\$0.30/bu.)

## Summary

- The OTC agricultural swaps are products that allow market participants the ability to customize their risk management programs.
- OTC swaps do not typically have counterparty guarantees and as such, may have significant counterparty risk exposure.
- CME Group will offer clearing services for
  - Corn, Soybean and Wheat Calendar Swaps, and
  - Northeastern Iowa, Northwest Iowa, Eastern Nebraska, Eastern South Dakota and Southern Minnesota Corn Basis Swaps.
- This will provide market participants the ability to eliminate counterparty default risk.