COMMODITY MARKETING: USING FUTURES AND OPTIONS AS A RISK MANAGEMENT TOOL

By: Brett Wilder, Hernan Tejeda & Norm Ruhoff University of Idaho



#### WORKSHOP OUTLINE

- Session 1: Overview of risk and market analysis
- Session 2: Introduction to futures, basis and hedging
- Session 3: Introduction to options and market scenarios





#### **TODAY'S AGENDA**

- Session 1: Overview of risk and market analysis
  - Session 1.1: Understanding risk in agriculture
  - Session 1.2: Introduction to fundamental analysis
  - Session 1.3: Introduction to technical analysis





#### SESSION 1.1

#### **UNDERSTANDING RISK IN AGRICULTURE**





# Session 1.1: Understanding Risk in Agriculture **RISK IN AGRICULTURE**

- 1. Production risk
- 2. Price or market risk
- 3. Financial risk
- 4. Institutional risk
- 5. Human or personal risk



Topics from USDA ERS: https://www.ers.usda.gov/topics/farm-practices-management/risk-management/risk-in-agriculture.aspx



#### Session 1.1: Understanding Risk in Agriculture **PRODUCTION RISK**

Derives from the uncertain natural growth processes of crops and livestock. Weather, disease, pests, and other factors affect both the quantity and quality of commodities produced.





### Session 1.1: Understanding Risk in Agriculture **PRICE OR MARKET RISK**

Refers to uncertainty about the prices producers will receive for commodities or the prices they must pay for inputs. The nature of price risk varies significantly from commodity to commodity.



### Session 1.1: Understanding Risk in Agriculture FINANCIAL RISK

Results when the farm business borrows money and creates an obligation to repay debt. Rising interest rates, the prospect of loans being called by lenders, and restricted credit availability are also aspects of financial risk.





## Session 1.1: Understanding Risk in Agriculture INSTITUTIONAL RISK

Results from uncertainties surrounding Government actions. Tax laws, regulations for chemical use, rules for animal waste disposal, and the level of price or income support payments are examples of government decisions that can have a major impact on the farm business.







### Session 1.1: Understanding Risk in Agriculture HUMAN OR PERSONAL RISK

Refers to factors such as problems with human health or personal relationships that can affect the farm business. Accidents, illness, death, and divorce are examples of personal crises that can threaten a farm business.





# Session 1.1: Understanding Risk in Agriculture WHY FOCUS ON PRICE RISK?

- Tools are available which allow us to manage this type of risk and guarantee that an "insured or protected" portion of our crop will meet a minimum price
- Managing price risk can provide more stability to your bottom line
- Price risk management protects us from price volatility





#### Session 1.1: Understanding Risk in Agriculture PRICE VOLATILITY: GRAINS EXAMPLE

- Aug 2007 \$7.21
- Feb 2008 \$11.70
- Storage cost ~ \$0.20/bu
- Potential Gain = \$4.29
- Aug 2008 \$8.19
- Feb 2009 \$5.52
- Storage cost ~ \$0.20/bu
- Potential Loss = (\$2.87)



# Session 1.1: Understanding Risk in Agriculture **PRICE VOLATILITY: CATTLE EXAMPLE**

- Nov 2013
  - Fed Steers worth \$165/cwt
- Nov 2014
  - Fed Steers worth \$231/cwt
- Nov 2015
  - Fed Steers worth \$162/cwt
- At 800 lbs, that's more than a \$500 per head annual change



#### Session 1.1: Understanding Risk in Agriculture **PRICE VOLATILITY: MILK EXAMPLE**

- Nov 2014
  - \$21.93/cwt
- Dec 2014
  - \$15.91/cwt
- \$6.02 per cwt change in one month



### Session 1.1: Understanding Risk in Agriculture PRICE RISK MANAGEMENT STRATEGIES

- 1. Enterprise diversification
- 2. Vertical integration
- 3. Government programs
- 4. Forward contracting
- 5. Hedge to Arrive (HTA) contracts
- 6. Hedging

Some topics from USDA ERS: https://www.ers.usda.gov/topics/farm-practices-management/risk-management/risk-management-strategies/



#### Session 1.1: Understanding Risk in Agriculture ENTERPRISE DIVERSIFICATION

 Assumes incomes from different crops and livestock activities do not move up and down in perfect correlation, so that low income from some activities would likely be offset by higher income from others.





# Session 1.1: Understanding Risk in Agriculture VERTICAL INTEGRATION

 Generally decreases risk associated with the quantity and quality of inputs or outputs because the vertically integrated firm retains ownership or control of a commodity across two or more phases of production and/or marketing.





#### Session 1.1: Understanding Risk in Agriculture **GOVERNMENT PROGRAMS**

- 2014 Farm Bill
  - Title I : Commodities
    - New crop programs ARC (Agricultural Risk Coverage) and PLC (Price Loss Coverage)
    - Changes to Dairy Program Price support was replaced with a Margin Protection Program
  - Title XI: Crop Insurance
    - Increased funding from \$84.1 to \$89.8 billion (6.8% increase) over FY2014-2023
    - Added the Supplemental Coverage Option (SCO) to be used in cooperation with PLC
- Farm Service Agency provides an Agricultural Policy Analysis System
  - Link: http://fsa.usapas.com/

Information from University of Idaho course AGEC 356 Agricultural and Rural Policy, Taught by Dr. Philip Watson

# Session 1.1: Understanding Risk in Agriculture FORWARD CONTRACTING

- Obtaining a fixed cash price for future production through a private contract between the producer and buyer
- Terms of a forward contract are not standardized
- Forward contracts specify:
  - Price
  - Quality
  - Amount of product





## Session 1.1: Understanding Risk in Agriculture **HEDGING**

- Uses futures or options contracts to reduce the risk of adverse price changes prior to an anticipated cash sale or purchase of a commodity
- The remaining sessions will be primarily focused on this form of price risk management





# Session 1.1: Understanding Risk in Agriculture HEDGE TO ARRIVE (HTA) CONTRACTS

- A contract through an intermediary, that permits the seller to fix a futures price for a specified delivery date.
- Similar to hedging, except...
  - Futures risk and margin management is transferred to the intermediary in exchange for a transaction fee





#### Session 1.1: Understanding Risk in Agriculture **SUMMARY**

- Price risk management can provide a more stable income
- All of these risk management tools may be used together! There's no need to pick just one.

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- Moving forward
  - How do we know what's going on with the market?
  - How can we determine future price direction?



#### SESSION 1.2

#### **INTRODUCTION TO FUNDAMENTAL ANALYSIS**





#### Session 1.2: Introduction to Fundamental Analysis FUNDAMENTAL ANALYSIS

- Fundamental analysis involves the use of economic data to determine future price direction
- What happens when there is a "Fundamental Shift" in the marketplace?
  - Supply and demand factors can make a structural change





# Session 1.2: Introduction to Fundamental Analysis FORCES OF SUPPLY AND DEMAND

 Supply curves slope upward – implying producers will offer more at higher prices

 Demand curves slope downward – implying consumers are willing to buy more at lower prices





## Session 1.2: Introduction to Fundamental Analysis FORCES OF SUPPLY AND DEMAND

Agricultural Supply Factors

- USDA crop reports
- Cattle inventory
- Cattle on feed
- Milk production

Agricultural Demand Factors

- Export markets
- Consumer information





### Session 1.2: Introduction to Fundamental Analysis EFFECTS OF SUPPLY CHANGES

- A structural increase in supply generally leads to lower prices
- A structural decrease in supply generally leads to higher prices



#### Session 1.2: Introduction to Fundamental Analysis EFFECTS OF DEMAND CHANGES

- A structural increase in demand generally leads to higher prices
- A structural decrease in demand generally leads to lower prices



#### Session 1.1: Understanding Risk in Agriculture PRICE DETERMINATION & DISCOVERY







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# Session 1.1: Understanding Risk in Agriculture **PRICE DETERMINATION**

- The interaction of broad supply and demand factors that determine the market price level
- Generally, an equilibrium cannot be fully identified until information is published
- The equilibrium is constantly adjusting to new market information





#### Session 1.1: Understanding Risk in Agriculture **PRICE DISCOVERY**

- The process of buyers and sellers arriving at a transaction price for a given quality and quantity of a product at a given time and place
- True supply and demand is uncertain when negotiations occur
- Transaction prices vary by:
  - Quality, Quantity, Location and Market Structure





#### Session 1.1: Understanding Risk in Agriculture KANSAS CITY HRW FUTURES PRICES

#### Price Determination

- July 2008 End price
  - \$8.15 per bushel
- July 2009 End price
  - \$5.59 per bushel
- Supply didn't change dramatically
- Demand did
  - Financial crisis
  - Value of US Dollar increased

#### Price Discovery

- July 2008 Weekly Prices: \$9.05 per bushel
  - \$8.53 per bushel
  - \$8.38 per bushel
  - 8.32 per bushel
- July 2009 Weekly Prices:
  - \$5.55 per bushel
  - \$5.40 per bushel
  - \$5.67 per bushel
  - 5.49 per bushel

#### Session 1.2: Introduction to Fundamental Analysis **SEASONALITY**

- Historical tendency for price movements of a particular commodity over the course of a calendar or marketing year
- Reflects market response to different growing conditions over the year (Summer, winter)
- Seasonality is usually stated as a percentage of the average price movement in a given time period
- Examples
  - Chicago SRW Futures
  - Live Cattle Futures

#### Session 1.2: Introduction to Fundamental Analysis EXAMPLES OF SEASONALITY



#### Session 1.2: Introduction to Fundamental Analysis MARKET PRICE STRUCTURE

Price differences between current and future delivery months for a commodity can serve as an indicator of general market conditions

Contango (Positive carry market)

- When deferred prices are higher than the nearby delivery price
- Generally "bearish"

Backwardation (Inverted carry market)

• When nearby prices are higher than the deferred delivery price

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• Generally "bullish"

#### Session 1.2: Introduction to Fundamental Analysis CONTANGO EXAMPLE



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#### Session 1.2: Introduction to Fundamental Analysis BACKWARDATION EXAMPLE



# Session 1.2: Introduction to Fundamental Analysis SOURCES OF INFORMATION

- Idaho AgBiz Website (<u>www.uidaho.edu/cals/idaho-agbiz</u>)
- United States Department of Agriculture (USDA)
  - National Agriculture Statistics Service (NASS)
  - Economic Research Service (ERS)
  - USDA Reports at the Mann Library
- Reputable (business pertinent) news sources
  - E-Newsletters, Main-stream newspapers, etc
    - Be cautious: this information may be outdated, irrelevant, and/or based on opinion



# Session 1.2: Introduction to Fundamental Analysis MAJOR REPORTS

- World Agriculture Supply and Demand Estimates (WASDE)
- Crop Production
- Crop Progress
- Cattle on Feed & Livestock Slaughter
- Cattle Inventory
- Cold Storage
- Milk Production

Monthly Monthly Weekly (Apr-Dec) Monthly Annual Monthly Monthly

## Session 1.2: Introduction to Fundamental Analysis FALLACIES OF FUNDAMENTAL ANALYSIS

- 1. Viewing fundamentals in a vacuum
- 2. Viewing old information as new
- 3. One-year comparisons
- 4. Using fundamentals for timing
- 5. Lack of perspective
- 6. Ignoring relevant time considerations



7. Assuming that prices cannot decline significantly below the cost of production

From "Futures: Fundamental Analysis" by Jack D. Schwager

#### Session 1.2: Introduction to Fundamental Analysis FALLACIES OF FUNDAMENTAL ANALYSIS

- 8. Improper inferences
- 9. Comparing nominal price levels
- 10. Ignoring expectations
- 11. Ignoring seasonal considerations
- 12. Expecting prices to conform to target levels in world trade agreements
- 13. Assuming that you have perfect information

14. Confusing the concepts of demand and consumption

From "Futures: Fundamental Analysis" by Jack D. Schwager

#### Session 1.2: Introduction to Fundamental Analysis **SUMMARY**

- Fundamental analysis can help us determine future price direction
- Seasonality and futures curves help us put information in context
- Don't fall prey to common mistakes!
- Next
  - If supply and demand drives they market, why do we care about charts?

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#### SESSION 1.3 INTRODUCTION TO TECHNICAL ANALYSIS





## Session 1.3: Introduction to Technical Analysis WHAT IS TECHNICAL ANALYSIS?

- Technical analysis uses historical prices to determine future price direction
- Traders who ignore fundamentals and focus solely on technical analysis are referred to as "chartists"
- While fundamental analysis is important technical analysis may be a much better short-term tool and should be used to choose trade entry points





### Session 1.3: Introduction to Technical Analysis WHY DOES IT WORK?

- Remember Schwager's 13<sup>th</sup> Fundamental Fallacy?
  - Assuming that you have perfect information
- It is impossible for any individual to have all information about a market
  - BUT Historical price action shows us what all traders in the market are thinking
- Patterns in historical prices are statistically proven to add value!
  - Most research is done on stocks, but if you need proof go to "The Pattern Site"

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• <u>http://thepatternsite.com/chartpatterns.html</u>

#### Session 1.3: Introduction to Technical Analysis **OMMON CHART TYPES**







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#### Session 1.3: Introduction to Technical Analysis WHAT DO THEY MEAN?



#### Session 1.3: Introduction to Technical Analysis

#### **READING THE WHOLE CHART**



#### Session 1.3: Introduction to Technical Analysis CHART FUNCTIONS



## Session 1.3: Introduction to Technical Analysis SUPPORT AND RESISTANCE

- In most cases, commodity prices tend to rise and fall to predictable levels
- A "Support Level" refers to a point on the chart that represents the bottom of a trading range
  - If prices trade below a support level, it is a sign they will likely continue lower
- A "**Resistance Level**" refers to a point on the chart that represents the top of a trading range
  - If prices trade above a resistance level, it is a sign they will likely continue higher

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#### Session 1.3: Introduction to Technical Analysis

#### SUPPORT AND RESISTANCE



#### Session 1.3: Introduction to Technical Analysis **TRENDS**

- Uptrend
  - Commodity prices make higher highs and higher lows
- Downtrend
  - Commodity prices make lower highs and lower lows
- Sideways Range
  - Commodity prices are not in a downtrend or and uptrend The top and bottom of the range are generally resistance and support levels





#### Session 1.3: Introduction to Technical Analysis

#### TRENDS



# Session 1.3: Introduction to Technical Analysis **TRENDS**



#### Session 1.3: Introduction to Technical Analysis

#### TRENDS



## Session 1.3: Introduction to Technical Analysis TECHNICAL INDICATORS

- Volume
  - The number of contracts traded over a given time interval
- Price Action
  - Reversal Candlestick Patterns
  - Pivot points
- Simple Moving Averages





#### Session 1.3: Introduction to Technical Analysis **VOLUME & OPEN INTEREST**



#### Session 1.3: Introduction to Technical Analysis REVERSAL CANDLESTICK PATTERNS

- Most powerful reversal patterns
  - "Long shadow" patterns
    - Hammer and shooting star candles
  - "Engulfing" patterns
  - Bullish/Bearish Engulfing candles



### Session 1.3: Introduction to Technical Analysis **HAMMER CANDLE**

- Small body with a long lower shadow
- Follows a multi-day selloff as buyers regain control
- Points to a bullish near-term future







## Session 1.3: Introduction to Technical Analysis SHOOTING STAR CANDLES

- Small body with a long upper shadow
- Follows a multi-day rally as sellers regain control
- Points to a bearish near-term future







## Session 1.3: Introduction to Technical Analysis **ENGULFING CANDLES**

#### **Bullish Engulfing**

• Formed when the body of a bullish candle completely engulfs the body of the previous day's bearish candle

#### **Bearish Engulfing**

• Formed when the body of a bearish candle completely engulfs the body of the previous day's bullish candle





# Session 1.3: Introduction to Technical Analysis **PIVOT POINTS**

- When a stock changes direction, it forms what is called a "pivot point"
- The pivot point is the highest candle of the pivot high or the lowest candle of the pivot low
- It takes three candles to create a pivot





# Session 1.3: Introduction to Technical Analysis **PIVOT HIGH**

- Also called a "swing high"
- Forms when a commodity has been trading upward, then pivots to trade downward
- Takes three candles
  - Must be a candle to the lower left and lower right







## Session 1.3: Introduction to Technical Analysis **PIVOT LOW**

- Also called a "swing low"
- Forms when a commodity has been trading downward, then pivots to trade upward
- Takes three candles
  - Must be a candle to the upper left and upper right







### Session 1.3: Introduction to Technical Analysis SIMPLE MOVING AVERAGES

- Calculates an average of the closing price for a specified number of days
- Can be used to help interpret trader sentiment
- If prices stray too far from moving averages, than can be overextended
- Moving averages can also be used as support and resistance levels



# Session 1.3: Introduction to Technical Analysis SIMPLE MOVING AVERAGES

#### Commonly Used Timeframes

- 20-day Simple moving average (Short-Term)
  - Tracks short term swing traders
- 50-day Simple moving average (Intermediate-Term)
  - Tracks intermediate term position traders
- 200-day Simple moving average (Long-Term)
  - Tracks investors and fund positions



## Session 1.3: Introduction to Technical Analysis SIMPLE MOVING AVERAGES



### Session 1.3: Introduction to Technical Analysis **SUMMARY**

- Technical analysis, if done correctly, is a powerful tool for determining price trends
- Charts and price action should be used for deciding when to enter a futures or option position
- Simple is better
  - There are COUNTLESS technical studies to look at the most powerful are the simple ones
  - If you don't understand an indicator DON'T USE IT!



#### SESSION 1 WRAP-UP AND CONCLUSIONS





## Session 1: Overview of Risk in Agriculture **CONCLUSIONS**

- Agriculture is be a risky business, but with if we use the right tools at the right time we can protect ourselves
- Market fundamentals are the *foundation* for predicting what the market will do in the long run
  - Take time to get to know reports and situations that affect your commodity!
- Technical analysis and historic prices help us identify *targets* in the short run
  - Knowing how to read charts can dramatically increase your bottom line when it comes time to implement a hedge!



#### Session 1: Overview of Risk in Agriculture **NEXT SESSION**

- Session 2: Introduction to futures, basis and hedging
  - Session 2.1: Introduction to futures
  - Session 2.2: Introduction to basis
  - Session 2.3: Introduction to hedging





#### Session 1: Overview of Risk in Agriculture **REFERENCES**

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Schwager, J. D. (1995). Futures Fundamental Analysis. United States: John Wiley & Sons.

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#### COMMODITY MARKETING: USING FUTURES AND OPTIONS AS A RISK MANAGEMENT TOOL

#### By: Brett Wilder, Hernan Tejeda & Norm Ruhoff University of Idaho





#### WORKSHOP OUTLINE

- Session 1: Overview of risk and market analysis
- Session 2: Introduction to futures, basis and hedging
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#### **TODAY'S AGENDA**

- Session 2: Introduction to futures, basis and hedging
  - Session 2.1: Introduction to futures
  - Session 2.2: Introduction to basis
  - Session 2.3: Introduction to hedging





### SESSION 2.1 INTRODUCTION TO FUTURES





# Session 2.1: Introduction to Futures HISTORY OF COMMODITY MARKETS

- Cash grain forward contracts in mid 1800's
  - When prices at harvest were higher, farmers failed to honor forward contracts
  - When prices were lower at harvest, contract writers bought from the cash market rather than honor contracts
- The Chicago Board of Trade organized in 1848
  - Established to bring integrity to commodity markets
  - This was the world's first futures commodity exchange; First "futures" contract traded in 1865

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• Kansas City Board of Trade and Chicago Mercantile Exchange formed in 1870's

# Session 2.1: Introduction to Futures HISTORY OF COMMODITY MARKETS

- Current growth in trade and high liquidity in futures markets began in 1970's
  - Most of the capital inflow has come from an increase in speculators and managed money
- This growth has been fueled by
  - Price variability in cash ("spot") markets
  - Price instability and increased general uncertainty





# Session 2.1: Introduction to Futures HISTORY OF COMMODITY MARKETS

- Most U.S. agricultural commodities are now cleared through CME Group Inc.
  - 2006 The Chicago Mercantile Exchange and the Chicago Board of Trade (CBOT) merged to form CME Group Inc.
  - 2008 CME Group acquired the New York Mercantile Exchange, adding energy and metal futures to its product offerings
  - 2012 CME acquired the Kansas City Board of Trade (KCBT)
- Most commodities are now traded electronically (rather than open outcry)

Information from CME Group: http://www.cmegroup.com/company/history/timeline-of-achievements.html

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# Session 2.1: Introduction to Futures WHAT IS A FUTURES CONTRACT?

- A futures contract is a standardized contract that specifies:
  - Commodity
  - Quality
  - Place of Delivery
  - Time of Delivery
- The only thing NOT specified is price!





# Session 2.1: Introduction to Futures WHAT IS A FUTURES CONTRACT?

- A trader who sells (goes short) a futures contract is obligated to deliver against the contract
- A trader who buys (goes long) a futures contract is obligated to take delivery on the contract
- A trader can offset their sale at any time between the original transaction date and the final trading day of the contract

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• All contracts are financially guaranteed by a "Clearinghouse"



# Session 2.1: Introduction to Futures CONTRACT SPECIFICATIONS

- 1. Exchange
- 2. Contract unit
- 3. Price quotation
- 4. Minimum price fluctuation
- 5. Trading hours
- 6. Listed contracts (months traded)

- 7. Settlement method
- 8. First notice day
- 9. Termination of trading (Last trading day)
- 10. Last delivery date
- 11. Maximum daily limit
- 12. Grade and quality



Chicago	SRW Wheat F	utures	View Another	Product	-	Trade At	Trading at settlement is available for	first 3 listed futures contracts, nearby new-co	rop July contract (if		
Quotes Settlements Volume Time & Sales			Contract Specs Margins Calendar			Marker Or Trade At Settlement Rules	spread, and nearest Jul-Dec OR Der subject to the existing TAS rules. The be the First Position Day (FPD) of the the month prior to the nearby contract	r is listed); and are ed TAS products will last business day in			
Futures	Options					Trading in all CBOT Grain TAS produces resting TAS orders at 07:45 will remain	cago time. All cancelled.				
Contract Unit	5,000 bushels (~ 136 Metric	Tons)					TAS products will trade a total of four corresponding futures contract (0.00 minus 4 ticks) versus settlement in th	r ticks above and below the settlement price 25), off of a "Base Price" of 0 to create a diffe ne underlying product on a 1 to 1 basis. A tra	in ticks of the erential (plus or de done at the Base		
Price Quotation	Cents per bushel						Price of 0 will correspond to a "traditi price of the day.	ional" TAS trade which will clear exactly at th	e final settlement		
Trading Hours	Sunday – Friday, 7:00 p.m Monday – Friday, 8:30 a.m.	– 7:45 a.m. CT and – 1:20 p.m. CT				Settlement Procedures	Wheat Settlement Procedures				
Minimum	1/4 of one cent per bushel (	\$12.50 per contract)				Position Limits	CBOT Position Limits				
Fluctuation						Exchange Rulebook	CBOT 14				
Product Code	CME Globex: ZW CME ClearPort: W Clearing: W TAS: ZWT					Price Limit Or Circuit	Price Limits				
Listed Contracts	March (H), May (K), July (N	), September (U) & D	lecember (Z)			Vendor Codes	Quote Vendor Symbols Listing				
Settlement Method	Deliverable					Last Delivery Date	Second business day following the la	ast trading day of the delivery month.			
Termination Of Trading	The business day prior to th	e 15th calendar day	of the contract month.			Grade And Quality	#2 Soft Red Winter at contract price, #1 Soft Red Winter at a 3 cent premium, other delive grades listed in Rule 14104.				

# Session 2.1: Introduction to Futures GRAINS & OILSEEDS CONTRACTS

Contract (Symbol)	Exchange	Contract Size	Pounds/bu
Corn (ZC)	CBOT	5,000 bushels	56
Chicago Soft Red Wheat (ZW)	CBOT	5,000 bushels	60
Kansas City Hard Red Wheat (KE)	CBOT	5,000 bushels	60
Minneapolis Hard Red Spring Wheat (MWE)	MGEX	5,000 bushels	60
Soybeans (ZS)	CBOT	5,000 bushels	60
Soybean Meal (ZM)	CBOT	100 short tons	N/A
Soybean Oil (ZL)	CBOT	60,000 pounds	N/A
Oats (ZO)	CBOT	5,000 bushels	32

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# Session 2.1: Introduction to Futures MONTHS TRADED

Contract (Symbol)	Months Traded
Corn (ZC)	H, K, N, U, Z
Chicago Soft Red Wheat (ZW)	H, K, N, U, Z
Kansas City Hard Red Wheat (KE)	H, K, N, U, Z
Minneapolis Hard Red Spring Wheat (MWE)	H, K, N, U, Z
Soybeans (ZS)	F, H, K, N, U, X
Soybean Meal (ZM)	F, H, K, N, Q, U, V, Z
Soybean Oil (ZL)	F, H, K, N, Q, U, V, Z
Oats (ZO)	H, K, N, U, Z

Month	Code
January	F
February	G
March	Н
April	J
May	К
June	М
July	Ν
August	Q
September	U
October	V
November	Х
December	Z

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# Session 2.1: Introduction to Futures

- For a futures contract to be made available, there must be enough interest in trading futures with a particular delivery (maturity) month
- Poor liquidity creates a "Thin Market" situation
  - This is when there are few transactions per unit of time and price fluctuations are high relative to the volume of trade
- Based on Volume and Open Interest
  - Volume: The number of contracts traded over a given time interval
  - Open Interest: The number of futures contracts which remain obligated to the clearinghouse. Can be counted as either the number of longs or number of shorts







## Session 2.1: Introduction to Futures WHO TRADES?

- Hedging: utilizing the futures or options markets to neutralize the effects of a commodity price risk
  - Individuals (Usually producers) who hedge are referred to as "Hedgers"
- Speculating: participating in the futures market with the sole intention of making a profit
  - Individuals who participate in speculating are referred to as "Speculators"
- There are many more speculators than hedgers
  - Speculators help with liquidity by taking to other side of the transaction futures trading would not be possible without them





# Session 2.1: Introduction to Futures TRADING TRANSACTIONS

- Traders are given the following information following a filled order
  - Date
  - Description
  - Price
  - Profit or Loss (If offsetting and existing position)
  - Commission charges
  - Account balance prior to the transaction
    - Account balance after the transaction



## Session 2.1: Introduction to Futures TRADING TRANSACTIONS

Order Entry	Saved Oro	ders P	M This is a simula	tion, not a	real trade									
Spread	Side			Qty Sy	mbol		Exp	Strike Type	Link		Price	Or	der 🔅	TIFExchange
FUTURE	∠ SELL	. A	-1	22	/ZWN7	JUL 17		FUTURE			470.50 📇 LN	ит 🍗 ЦІМ	MIT 🖌 DAY	BEST
			Sector Cor	nfirmatio	on Dialog							×		
			M order cor		Shi Bhalog							~		
			PM This is	a simulat	tion, not a real tra	ide				··· Auto se	end with shift click	-		
			Order Descript	tion			SELL -1 /ZWI	N7 @470.50 LMT [TO	OPEN]					
			Cost of Trade i	ncluding	commissions + fe	es	\$0.00 + \$1.75	5 +\$1.96 🔞 = \$3.71						
			Buying Power	Effect			(\$1,320.00)							
			Resulting Buyi	ng Powe	r for Stock		\$188,730.28							
			Resulting Buyi	ng Powe	r for Options		\$94,365.14							
			Single Accour	nt 🔻	Account: D-	13688780 (m	argin) 🔻	Save last used n	node					
			Note for this	order										
			Delete	Edit						Sa	ave Sen	d		
✓ Filled Order	s: 1 order, 1	fill												Show average fill prices
Exec	Time	Spread	Side		Qty Pos Effect	symbo	I	Exp	Stril	ike Type		Pri	ce	Net Price Order Type
6/20/17	11:07:52	FUTURE	SELL		-1 OPENING	i	/ZWN7	JUL 17		FUTURE		470.5	50	470.50 LMT
	L										U	<b>Inive</b>	ersity of	ldaho

* * * * * * * * * * CONFIRMATION * * * * * * * *	* * *
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THE FOLLOWING TRADES HAVE BEEN MADE AS OF THE DATE INDICATED FOR YOUR ACCOUNT

1	TRADE	C/	RD	AT		B	UY		 S	ELL			CON	TRAC	T D	ESC	RIP	TIC	NN				ST		PR	ICE		cc		EBI	T/C	RE	DIT			•
	4/05/7	J		01 01 01 01								1*	LTD- AVG	- 5/ SHO	RCB 12/ RT:	T W	HEA	T	4.2	425	0 GRC	TF	CI	CON LEAD	MMI RIN NF	SSI GF AF NF	ON EE EE EE OSS	US US US					20 1 3	.0	ODF 5DF 1DF 0DF	~ ~ ~ ~
•	•	•	•	*	٠	•	٠	•	0	P	E	N		P	0	s	I	т	I	0	N	S	•	٠	٠	•	٠	٠	• •	i		•	٠	•	•	
	TRADE	C	RD	AT		L	ONG		SH	ORT	1		CON	TRAC	TD	ESC	RIP	TIC	N-C	PEN	n l		ST		PR	ICE	ę –	cc	E	EB	T/C	CRE	DIT			
	4/05/7			01					 			1 1*	MAY	17 SHO	KCB	TW	HEAL	TD-	5/	12/	17	CLO	E		4.	24 20	1/4	US					212	.5	0CF	1

E=ELECTRONIC TRADE

*USI	SEGREGATED (U1) *	*CONV SEG TOTAL*	**TOTAL CONVERTED**
BEGINNING BALANCE	15,000.00CR	15,000.00CR	15,000.00CR
COMMISSION	20.00DR	20.00DR	20.00DR
CLEARING FEE	1.95DR	1.95DR	1.95DR
NFA FEE	.01DR	.01DR	.01DR
TRANSACTION FEE	3.00DR	3.00DR	3.00DR
TOTAL COMMISSION AND FEES	24.96DR	24.96DR	24.96DR
ENDING BALANCE	14,975.04CR	14,975.04CR	14,975.04CR
OPEN TRADE EQUITY	212.50CR	212.50CR	212.50CR
TOTAL EQUITY	15,187.54CR	15,187.54CR	15,187.54CR
CURRENT NET LIQUIDATING VALUE	15,187.54CR	15,187.54CR	15,187.54CR
PRIOR NET LIQUIDATING VALUE	15,000.00CR	15,000.00CR	15,000.00CR
MARKET VARIANCE	187.54CR	187.54CR	187.54CR
INITIAL MARGIN REQUIREMENT	1,050.00CR	1,050.00CR	1,050.00CR
MAINTENANCE MARGIN REQUIREMENT	1,050.00CR	1,050.00CR	1,050.00CR
EXCESS EQUITY	14,137.54CR	14,137.54CR	14,137.54CR

## Session 2.1: Introduction to Futures

- To trade in the futures market, participants need to have a minimum percentage of the value of each contract deposited into their trading account.
- This initial deposit is better defined as a "Margin Deposit"
  - A "good-faith" deposit an investor must deposit into their account when buying or selling.
  - If futures prices move adversely, the investor must deposit more money into the account to meet increasing margin requirements





# Session 2.1: Introduction to Futures MARGIN TERMINOLOGY

- Brokerage firms will often will require a slightly higher amount of money that must be in put down as an initial deposit. This is called your "Initial Margin"
  - This is usually around 5-10% of the future contract value
- Commodity exchanges will set minimum margin requirements for each of their contracts. This is called the "Maintenance Margin"
- If the market moves unfavorably against the trader and their account value drops below the maintenance margin, they will be required to deposit more funds into their account. This is a **"Margin Call"**



### Session 2.1: Introduction to Futures MARGIN ACCOUNTING EXAMPLE

Date	Price \$/bu	Notes	Margin Action	Daily Change	Account Balance
10/19/2015	\$4.72	Sold 1 December KE. Initial Margin is \$1,500	\$1,500.00		\$1,500.00
10/20/2015	\$4.77	Maitenance margin is \$1,250		\$(212.50)	\$1,287.50
10/21/2015	\$4.81	Margin Cal	\$412.50	\$(200.00)	\$1,500.00
10/22/2015	\$4.76			\$ 250.00	\$1,750.00
10/23/2015	\$4.76			\$ -	\$1,750.00
10/26/2015	\$4.92	Margin Cal	\$ 587.50	\$(837.50)	\$1,500.00
10/27/2015	\$4.88			\$ 212.50	\$1,712.50
10/28/2015	\$4.86			\$ 125.00	\$1,837.50
10/29/2015	\$4.88			\$(137.50)	\$1,700.00
10/30/2015	\$4.94			\$(275.00)	\$1,425.00
11/2/2015	\$4.83			\$ 550.00	\$1,975.00
11/3/2015	\$4.88			\$(237.50)	\$1,737.50
11/4/2015	\$4.93			\$(262.50)	\$1,475.00
11/5/2015	\$4.86			\$ 337.50	\$1,812.50
11/6/2015	\$4.90			\$(212.50)	\$1,600.00
11/9/2015	\$4.74			\$ 812.50	\$2,412.50
11/10/2015	\$4.61			\$ 662.50	\$3,075.00
11/11/2015	\$4.64			\$(175.00)	\$2,900.00
11/12/2015	\$4.64			\$ 25.00	\$2,925.00
11/13/2015	\$4.66	Bot 1 December KE (Offset Contract)		\$ (87.50)	\$2,837.50
		Receive	\$2,837.50		
		Net Profit = (2,837.50-1500-412.50-587.50)	\$ 337.50		
		Net Profit ALSO = ((4.72-4.66)*5000)	\$ 337.50		

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# Session 2.1: Introduction to Futures FUTURES ROLE IN PRICE DISCOVERY

- Futures markets bring together thousands of people with different information about what commodities are actually worth
- People negotiate for what they believe are "fair" or acceptable prices
- The result is an ever changing price that is the "consensus" of people trading based on all available information and expectations at any particular moment

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# Session 2.1: Introduction to Futures PRICE DISCOVERY EXAMPLE

- Prices changed because of actual and expected supply and demand changes
  - Changing crop conditions
  - Economic numbers
  - Future expectations
  - Other related issues



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# Session 2.1: Introduction to Futures FUTURES AND PRICE DISCOVERY

- Futures prices are easily and quickly accessible worldwide
- They represent an "efficient" forecast for future prices
- Futures are used extensively to discover prices in cash markets





# Session 2.1: Introduction to Futures SOURCES OF FUTURES QUOTES

Delayed quotes are available from the following Exchanges:

http://www.cmegroup.com



CME Group

http://www.mgex.com

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Most trading platforms will have real-time or delayed futures quotes



# Session 2.1: Introduction to Futures EXAMPLE FUTURES QUOTE

Wheat (C	hi)				
Month	High	Low	Last	Chg	Time
Jul 17	4.5575	4.4600	4.5225	+0.0750	12:10:34
Sep 17	4.7000	4.6050	4.6625	+0.0700	12:10:35
Dec 17	4.9050	4.8150	4.8750	+0.0750	12:10:35
Mar 18	5.0800	4.9975	5.0450	+0.0675	12:10:35
May 18	5.1975	5.1200	5.1650	+0.0750	12:10:35
Jul 18	5.2750	5.1825	5.2650	+0.0875	12:10:25

Quotes from grains.com - Taken on 6/8/2017

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## Session 2.1: Introduction to Futures **SUMMARY**

- Futures contracts exist to facilitate trade and transfer risk
- Margin allows us to leverage our finances and take advantage of price moves
- Futures contracts provide the most accurate representation of current prices
  - Basis is necessary to make those prices applicable to individual locations

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### SESSION 2.2 INTRODUCTION TO BASIS





# Session 2.2: Introduction to Basis WHAT IS BASIS?

Basis is the difference between your local cash price and a futures contract price

#### Basis = Cash price – Futures price

• Basis is USUALLY calculated using the nearby futures contract (closest following month)





## Session 2.2: Introduction to Basis WHAT IS BASIS?

- A futures contract price represents the consensus opinion of the value of the commodity at the time the futures contract expires
  - It is specific to a certain grade
  - It is specific to a location (delivery point)
- A local cash price represents the value of a specific quality of a commodity, at a specific location, and at a specific point in time
- Cash and futures prices differ because of
  - Location (transportation costs), Quality and Time of Delivery



# Session 2.2: Introduction to Basis EXAMPLE: WHITGRO CASH BIDS (6/7/17)

#### WHEAT, SWW

		Whitgro Inc.										
	Basis	Cash Price	Futures Price	Futures Month								
June	0.53	4.97	444'6s	@W7N								
July	0.53	4.97	444'6s	@W7N								
August 2017	0.38	4.97	459'2s	@W7U								
September	0.41	5.00	459'2s	@W7U								
October	0.20	5.00	480'0s	@W7Z								
November	0.20	5.00	480'0s	@W7Z								

#### Basis = Cash price – Futures price



# Session 2.2: Introduction to Basis WHY IS BASIS IMPORTANT?

- Basis can be used as a barometer of market strength or weakness
- Basis can be used to determine future cash prices
- Basis can be used to evaluate forward contract prices
- Basis is the key to determining expected net prices from hedging

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# Session 2.2: Introduction to Basis BASIS TERMINOLOGY

- Strong Basis: Basis is more positive or less negative than is typical
  - As basis becomes more positive or less negative, we say that basis is "Strengthening"
- Weak Basis: Basis is less positive or more negative than is typical
  - As basis becomes less positive or more negative, we say that basis is "Weakening"

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- "Over" Cash price is greater than the futures price
- "Under" Cash price is less than the futures price






Market is Strengthening

Market is Weakening









Market is Strengthening

Market is Weakening





**Strengthening Basis:** 

- Your local elevator initiates export sales, local demand increases
- The elevator raises its local cash bids to encourage farmers to sell grain
- Local basis strengthens





Weakening Basis:

- Your local elevator receives more grain than it can handle on-site
- The elevator lowers its local cash bids to encourage farmers to store grain

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Local basis weakens



# Session 2.2: Introduction to Basis DRIVING FACTORS OF BASIS

- Transportation costs are a major component of price differences between geographic regions
- "Weak" basis is driven by market events that force producers to sell their products in the near term
  - Surplus grain stocks, lack of on-farm grain storage, poor cash-flow of producers, etc.

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- "Strong" basis is driven by forces that create a seller's market
  - Shortage of grain, crop failures in competing markets, etc.



# Session 2.2: Introduction to Basis FORECASTING CASH PRICES

- If Basis = Cash price Futures prices
- Then...

#### Cash price = Basis + Futures price

- Futures contract prices are considered the market's consensus for what prices will be in the future, given current information
- Cash and futures prices tend to respond to similar market information
- Basis tends to be more stable than either cash or futures prices



# Session 2.2: Introduction to Basis FORECASTING CASH PRICES

- Futures prices can be observed for several months into the future
- If we know historical (expected) basis for a particular month...
- We can forecast prices many months into the future
- With this information, our formula becomes...

#### Expected Cash price = Expected Basis + Futures price

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# Session 2.2: Introduction to Basis SOURCES OF BASIS DATA

- Currently, there are no known sources of historical Idaho grain basis data
- USDA AMS Daily Grain Report
  - <u>https://www.ams.usda.gov/mnreports/lsddgr.pdf</u>
- USDA AMS Stata Grain Reports
  - <u>https://www.ams.usda.gov/market-news/state-grain-reports</u>
- http://www.agmanager.info/grain-marketing
- https://grains.com/us



### Session 2.2: Introduction to Basis RECORDING HISTORICAL BASIS DATA

- Record your local cash price
- Record current futures market price
- Calculate basis

Hard Red Wheat Example, using Portland as local location

Date	Portland HRW Cash Price	Kansas City HRW Futures	Basis
06/01/09	7.49	7.26	0.23
06/08/09	6.96	6.53	0.43
06/15/09	6.58	6.32	0.26
06/22/09	6.50	6.14	0.36
06/29/09	6.30	5.92	0.38



#### Session 2.2: Introduction to Basis BASIS OVER TIME

#### Portland Cash HRW-KC HRW Futures Weekly Basis '09-'14



#### Session 2.2: Introduction to Basis TRENDS IN BASIS

#### Portland - KC HRW Basis, Seasonal Index '09 - '14



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# Session 2.2: Introduction to Basis **GRAIN MARKETING EXAMPLES**

- It is mid June
- September Kansas City Hard Red Wheat is trading at \$4.90 per bushel
- Average historical Portland basis is +\$0.60 for the third week of August
- Therefore, Forecasted Harvest Price is \$5.50 per bushel

Expected Cash price = Expected Basis + Futures price \$5.50 = \$0.60 + \$4.90

# Session 2.2: Introduction to Basis EVALUATING FORWARD CONTRACTS

- A Portland grain elevator offers a farmer \$5.55 for Hard Red Wheat to be delivered November 1<sup>st</sup>
- Dec KC HRW Futures are trading at \$5.00
- Historical (expected) basis for Nov 1 is \$0.75
- Should the farmer accept the contract?
  - The elevator is essential offering a contract at \$0.55 basis
  - This is weaker than the \$0.75 that is expected however, the elevator will bear the basis risk and the farmer will have no price or basis risk if they take the contract



#### Session 2.2: Introduction to Basis **SUMMARY**

- Basis is the key to applying futures prices to your local location
- Local basis data is not always easy to find
  - Sometimes, the best way to get this data is to record it yourself
- Understanding basis is also key to deciding when to take a forward contract and when to hedge
  - Hedging removes price risk, but we still have basis risk





#### SESSION 2.3 INTRODUCTION TO HEDGING





## Session 2.3: Introduction to Hedging WHAT IS HEDGING?

- Hedging is simultaneously participating in the cash market and futures or options markets to neutralize the effects of commodity price risk.
  - Individuals who hedge are referred to as "Hedgers"
- Purpose is to take advantage of "favorable" pricing opportunities before liquidating or acquiring the physical commodity





## Session 2.3: Introduction to Hedging WHAT IS HEDGING?

- Members of the value chain can hedge both the purchase and sale of a commodity
- A person who owns the physically commodity and sells futures to protect downside risk is called a "Short Hedger"
- A person who is planning to purchase the physical commodity and buys futures to protect upside price risk is called a "Long Hedger"





# Session 2.3: Introduction to Hedging REQUIREMENTS FOR HEDGING

- Prices in both the cash and futures markets will respond to underlying forces of supply and demand in such a way that they will tend to move together and in the same direction
- Cash and futures prices will tend to converge as maturity of the futures contract approaches
- In most cash markets, cash and futures will **converge** to predictable basis levels





# Session 2.3: Introduction to Hedging CONVERGENCE AND DELIVERY

- Sellers can choose to deliver on a futures contract
- Buyers can choose to demand that the commodity is delivered
- Obligation of delivery at contract expiration forces the cash market and futures market to converge

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• Basis can be thought of as the cost of delivery



### Session 2.3: Introduction to Hedging CONVERGENCE

**Omaha Corn Example: Typical Basis is -\$0.30** 

Example from www.cattlemarketanalysis.org



# Session 2.3: Introduction to Hedging CONVERGENCE AND DELIVERY

- A producer has sold 10 Dec Corn Futures contracts for \$3.50 per bushel
  - Basis in his area is -\$.30 per bushel
  - If the current cash price is only \$3.00 per bushel, the producer might choose to deliver on the contract for a +\$.20 gain
- A speculator in Chicago bought 10 Dec Corn Futures contracts
  - He receives a notice that he will have to accept deliver of 10 contract of corn, 50,000 bushels
  - He will try and get out of his position in the market buy selling 10 Dec Corn Futures
    - That selling pressure will lower the Dec Corn Futures
- The local elevator in the producers area needs more corn
  - To get the producer to sell to him rather than deliver on the futures, he raises his price

Example from www.cattlemarketanalysis.org

# Session 2.3: Introduction to Hedging CONVERGENCE AND DELIVERY

- Dec Corn declines to \$3.40 and the local cash come up to \$3.10
  - Basis is as expected
  - The producer sells to local elevator and buys 10 Dec Corn Futures to offset his position in the futures market
- This is an over simplification, but many traders in the markets make this happen

Example from www.cattlemarketanalysis.org

### Session 2.3: Introduction to Hedging CASH SETTLEMENT

- Several futures contracts are "Cash Settled" or "Financially Settled"
  - This means contracts held to maturity are settled in cash rather than commodity delivery
- An index of cash prices is used to determine the final settlement price
  - For example, Lean Hogs futures contracts are cash settled based on the CME Lean Hog Index
- At maturity, "Winners" are paid the difference between what they bought or sold futures contacts for and what the cash index price is
  - "Losers" provide this money

# Session 2.3: Introduction to Hedging CLOSING (OFFSETTING) A POSITION

- To exit a position before delivery, the trader must make the opposite transaction
  - If you bought 10 contracts, you must sell 10 contracts to offset the position
  - If you sold 10 contracts, you must buy 10 contracts to offset the position





# Session 2.3: Introduction to Hedging SHORT FUTURES HEDGE TEMPLATE

Date	Cash	Futures	Basis
Initial Date	Expected Sale Price	Avg. Futures Sale Price	Expected Basis
End Date	Actual Cash Sale Price	Avg. Futures Buy Price	Actual Basis
		Profit/Loss	
Net sale price = Actual Cash Sale Price + Profit/Loss in futures			



### Session 2.3: Introduction to Hedging SHORT FUTURES HEDGE

"Perfect Hedge" - Basis does not change

Date	Cash	Futures	Basis
January 15	\$5.30	Sell Sept KE \$5.60	-\$0.30
August 20	\$5.10	Buy Sept KE \$5.40	-\$0.30
		+0.20	
Net sale price = \$5.10+ 0.20 = \$5.30			

# Session 2.3: Introduction to Hedging SHORT FUTURES HEDGE

Basis strengthens

Date	Cash	Futures	Basis
January 15	\$5.30	Sell Sept KE \$5.60	-\$0.30
August 20	\$5.10	Buy Sept KE \$5.30	-\$0.20
		+0.30	
Net sale price = \$5.10+ 0.30 = \$5.40			

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# Session 2.3: Introduction to Hedging SHORT FUTURES HEDGE

Basis weakens

Date	Cash	Futures	Basis
January 15	\$5.30	Sell Sept KE \$5.60	-\$0.30
August 20	\$5.10	Buy Sept KE \$5.50	-\$0.40
		+0.10	
Net sale price = \$5.10+ 0.10 = \$5.20			



# Session 2.3: Introduction to Hedging LONG FUTURES HEDGE TEMPLATE

Date	Cash	Futures	Basis	
Initial Date	Expected Purchase Price	Avg. Futures Buy Price	Expected Basis	
End Date	Actual Cash Purchase Price	Avg. Futures Sale Price	Actual Basis	
		Profit/Loss		

Net purchase price = Actual Cash Purchase Price - Profit/Loss in futures

## Session 2.3: Introduction to Hedging LONG FUTURES HEDGE

"Perfect Hedge" - Basis stays the same

Date	Cash	Futures	Basis
June 20	\$4.80	Buy Dec ZW \$4.20	+\$0.60
October 15	\$5.40	Sell Dec ZW \$4.80	+\$0.60
		+\$0.60	
Net purchase price = \$5.40 - \$0.60 = \$4.80			



# Session 2.3: Introduction to Hedging LONG FUTURES HEDGE

Basis weakens

Date	Cash	Futures	Basis
June 20	\$4.80	Buy Dec ZW \$4.20	+\$0.60
October 15	\$5.40	Sell Dec ZW \$5.00	+\$0.40
		+\$0.80	
Net purchase price = \$5.40 - \$0.80 = \$4.60			

# Session 2.3: Introduction to Hedging LONG FUTURES HEDGE

Basis strengthens

Date	Cash	Futures	Basis
June 20	\$4.80	Buy Dec ZW \$4.20	+\$0.60
October 15	\$5.40	Sell Dec ZW \$4.60	+\$0.80
		+\$0.40	
Net purchase price = \$5.40 - \$0.40 = \$5.00			

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# Session 2.3: Introduction to Hedging CROSS-HEDGING

- **Cross-hedging** is the process of hedging a commodity using a closely related futures contract intended for a different commodity
  - Common examples are...
    - Hedging soft white wheat with soft red wheat futures contracts
    - Hedging barley with corn futures
- This CAN be a good practice, but should be done with caution
  - Before cross-hedging, the hedger should check that the commodity they intend to produce or own responds to similar market information and that the prices tend to move together

Increases basis risk



#### **ADVANTAGES OF HEDGING**

- Extends time period to make a pricing decision
- Eliminates risk of an adverse price change
- Allows hedger to reverse positions quickly, as it is generally a very liquid market
- Reduces price risk, as the basis is normally more predictable than the cash price
  - Short hedging is intended to limit downside risk
  - Long hedging is intended to limit upside risk
- Encourages you to place additional attention on your marketing efforts

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#### DISADVANTAGES OF HEDGING

- Decreases potential profit if there is an adverse change in basis
- Margin requirements increase interest costs and may cause cash flow problems
  - Loans or operating lines are often required to cover hedging costs
- Contracts are in increments of 1,000 or 5,000 bushels only
  - "Mini" contracts exist for some commodities that trade in 1,000 bushel increments
- Eliminates gains from price changes
  - We can take advantage of these if we hedge with options
- Requires understanding of futures markets and basis relationships

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#### Session 2.2: Introduction to Basis **SUMMARY**

• Hedging is not an exact science – but it is an excellent marketing tool

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- Short hedging is most successful when basis strengthens
- Long hedging is most successful when basis weakens
- Producers do NOT have to hedge 100% of their crop!
  - Leaving commodities unhedged is another form of speculation


### SESSION 2 WRAP-UP AND CONCLUSIONS





# Session 2: Introduction to futures, basis and hedging **CONCLUSIONS**

- Futures markets have deep roots in agriculture and were created for farmers and commodity users to manage risk
- Cash prices will be different from the futures price, but react to the same information
  - Basis is much more stable than either cash OR futures prices
- Hedging can give producers more reliable returns, year-in and year-out

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• Hedging is NOT a magic formula for getting rich!



# Session 2: Introduction to futures, basis and hedging **NEXT SESSION**

• Session 3: Introduction to options and market scenarios

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- Session 3.1: Introduction to options
- Session 3.2: Hedging with options
- Session 3.3: Grain Marketing Scenarios



# Session 2: Introduction to futures, basis and hedging **REFERENCES**

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Schwager, J. D. (1995). Futures Fundamental Analysis. United States: John Wiley & Sons.

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#### COMMODITY MARKETING: USING FUTURES AND OPTIONS AS A RISK MANAGEMENT TOOL

#### By: Brett Wilder, Hernan Tejeda & Norm Ruhoff University of Idaho





### WORKSHOP OUTLINE

- Session 1: Overview of risk and market analysis
- Session 2: Introduction to futures, basis and hedging
- Session 3: Introduction to options and market scenarios





### **TODAY'S AGENDA**

- Session 3: Introduction to options and market scenarios
  - Session 3.1: Introduction to options
  - Session 3.2: Hedging with options
  - Session 3.3: Grain Marketing Scenarios





### SESSION 3.1 INTRODUCTION TO OPTIONS





# Session 3.1: Introduction to Options WHAT IS AN OPTION?

- Futures contracts are an obligation
  - The purchaser of a futures contract MUST deliver or offset
  - The purchaser is liable for margin calls
  - The trader is "locked into" a given price
- **Options** give the buyer the right, but not the obligation, to take a position in the futures market at a given price (called the strike price)

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# Session 3.1: Introduction to Options WHAT IS AN OPTION?

- Options are tied to an underlying futures contract
- Options are purchased and sold at "Strike Prices"
  - These are predetermined by the exchange
- To purchase an option, the buyer pays a "premium"
  - The purchaser can not lose more than the value of the option premium

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- There are no margin calls (For the buyer only)
- There are two types of options: Puts and Calls

# Session 3.1: Introduction to Options PUT & CALL OPTIONS

- **Put options** give the buyer of the option the *right* to **SELL** the futures contract at a specified strike price
- **Call options** give the buyer of the option to *right* to **BUY** the futures contract at a specified strike price

• A trader can buy puts, buy calls, sell puts, or sell calls





## Session 3.1: Introduction to Options OBLIGATIONS/RIGHTS OF OPTION TRADERS

#### Put Options

- Buyers:
  - Can exercise the right to a short position at the strike price at any time before the option expires. For this right, they pay an option premium
- Sellers (writers):
  - Must provide the option buyer with a short futures position if the option is exercised
  - Must meet margin calls if the underlying futures contract price moves below the option strike price
  - Receive the option premium after the option expires



# Session 3.1: Introduction to Options PUT OPTION VS. SHORT FUTURES



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## Session 3.1: Introduction to Options OBLIGATIONS/RIGHTS OF OPTION TRADERS

Call Options

- Buyers:
  - Can exercise the right to a long position at the strike price at any time before the option expires. For this right, they pay an option premium
- Sellers (writers):
  - Must provide the option buyer with a long futures position if the option is exercised
  - Must meet margin calls if the underlying futures contract price moves below the option strike price
  - Receive the option premium after the option expires



## Session 3.1: Introduction to Options CALL OPTION VS. LONG FUTURES



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# Session 3.1: Introduction to Options OPTION TERMINOLOGY

Strike Price Relationship to the Underlying Futures Price

Condition	Put Option	Call Option			
Strike < Futures	Out-of-the money (OTM)	In-the money (ITM)			
Strike = Futures	At-the money (ATM)	At-the money (ATM)			
Strike > Futures	In-the money (ITM)	Out-of-the money (OTM)			



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## Session 3.1: Introduction to Options EXAMPLE: STRIKE PRICE TERMINOLOGY

- Example 1:
  - December corn futures are trading at \$4.05/bu
  - Would a put option with a \$4.00/bu strike price be ITM, ATM, or OTM?
- Example 2:
  - December wheat futures are trading at \$5.60/bu
  - Would a call option with a \$5.50/bu strike price be ITM, ATM, or OTM?

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• Why do we care?



# Session 3.1: Introduction to Options CALCULATING OPTION PREMIUMS

#### Premium = Intrinsic Value + Time Value

- Intrinsic Value
  - The strike price relative to the underlying futures price
  - An option only has intrinsic value if it is "In-the-money"
- Time Value
  - The amount of value derived from the days remaining until expiration
    - Decreases as the time to expiration approaches





## Session 3.1: Introduction to Options EXAMPLE: CALCULATION OPTION PREMIUMS

- I can buy a \$4.00/bu December corn put for \$0.20/bu
- Today, December corn futures are trading at \$3.95/bu What is the Intrinsic Value? Time Value?
- Since the put is \$0.05 in-the-money, intrinsic value is \$0.05
- Time value = Premium Intrinsic value, so time value is \$0.15

Premium = Intrinsic Value + Time Value

0.20 = 0.05 + 0.15

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# Session 3.1: Introduction to Options READING AN OPTION CHAIN

/ZW	🕑 🚺 Wheat Futur	es,ETH (SEP 17) 559.	75 +4.75 B: 558.25 H ±	:38.891							:=
Y Futures		: single ]									C.
Symbol	Days		Exp Last X	Net Chng	Bid X	Ask X	Size	Volume	Open	High	Low
ZWU7 ACT	TIVE 56		SEP 17 559.75 G	+4.75	558.25 G	558.25 G	16 x 11	186,685	563.75	574.50	536.75
> Trade Lind											⊐ , ≡,
✓ Uption Chai	in Filter: <b>Off</b> Spre	ad: Sin Layout: Vo	nu me, Open Interest								▼ [
		CALL			Strikes: 14	-			PUTS		
	Volume	Open.Int	Bid X	Ask X	Exp	Strike	Bid X	Aska	volume	Open.In	nt ,
> AUG 17	(16) 1/ZWU7									50.3	8% (±48.295)
> SEP 17	(51) 1 /ZWU7									37.	.69% (±63.77)
> OCT 17	(79) 1/ZWZ7									31.1	0% (±67.664)
✓ DEC 17	(142) 1/ZWZ7									29.	.36% (±85.85)
	٦1	1,318	80.750 G	82.125 G	/OZWZ7	510	11.875 G	16.500 G	240	5	502
	93	2,051	33.875 G	75.125 G	/OZWZ7	520	9.000 G	15.375 G	37	1,4	183
	4	2,176	9.000 G	68.625 G	/OZWZ7	530	18.250 G	22.000 G	122	1	32
	83	4,096	6.000 G	62.375 G	/OZWZ7	540	22.125 G	43.000 G	8	2,8	369
	398	3,059	30.000 G	56.875 G	/OZWZ7	550	26.500 G	27.375 G	737	3,5	561
	32	1,876	50.875 G	51.875 G	/OZWZ7	560	31.375 G	32.250 G	146		5
	107	25/	46.250 G	47.250 G	/07\//77	570	26 750 G	37 500 G	566		00
	183	3,144	32.000 G	43.000 G	/OZWZ7	580	42.375 G	43.250 G	133		19
	63	257	3.500 G	39.125 G	/OZWZ7	590	48.500 G	49.375 G	90	8	300
	671	4,369	5.500 G	35.500 G	/OZWZ7	600	27.000 G	55.750 G	385	4	115
	478	454	2.250 G	32.250 G	/OZWZ7	610	61.500 G	62.375 G	0		0
	65	2,592	4.500 G	29.250 G	/OZWZ7	620	68.500 G	69.625 G	0	3	390
	24	419	1.125 G	26.375 G	/OZWZ7	630	75.625 G	76,750 G	0		0
	167	1,200	23.000 G	23.750 G	/OZWZ7	640	83.125 G	84.250 G	0		0

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# Session 3.1: Introduction to Options CLOSING AN OPTION POSITION

- Let it expire
- Offset (Exit) the position
- Exercise it
  - Places trader in a short (put) or long (call) position in the futures market

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- The position will have been sold (or bought) at the strike price
- Options can ONLY be exercised when they are "In-the-money"



# Session 3.1: Introduction to Options **RISK PROFILES: 560 DEC CORN PUT**



# Session 3.1: Introduction to Options



# Session 3.1: Introduction to Options CLOSING: OFFSET THE POSITION



# Session 3.1: Introduction to Options CLOSING: EXERCISE THE OPTION



# Session 3.1: Introduction to Options **SUMMARY**

- Options provide much more flexibility than futures contracts
- But, it comes at a price!
  - Option premium for futures contracts can be VERY expensive if purchased with much time left to expiration

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- Options are a great way to hedge commodities if used correctly
  - Discussed in next section



### SESSION 3.2 HEDGING WITH OPTIONS





# Session 3.2: Hedging with Options HEDGING WITH OPTIONS

- Hedging with futures locks in a price level
  - Regardless of which direction the cash price moves, the effective hedge price stays the same
- Hedging with options establishes a minimum (or maximum) expected price
  - For the cost of an options premium, the hedger gains the ability to take advantage of upward (or downward) moves in price
- Hedging with options provides "Staying Power"
  - After the option premium is paid, a producer can stay in the position with no concern about margin calls

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# Session 3.2: Hedging with Options SHORT HEDGING WITH OPTIONS

- A "Short Hedger" is person who owns the physical commodity and wants to protect downside risk
- If the hedger suspects prices might move higher, but wants to protect the value of their commodity should prices move lower, they will choose to buy a put option rather than sell futures
  - The hedger will choose a strike price and pay the option premium
  - Determines the "Minimum Expected Price"



Minimum Expected Price = Strike Price – Option Premium + Basis



# Session 3.2: Hedging with Options SHORT HEDGING EXAMPLE

- On April 1<sup>st</sup>, a farmer plants Hard Red Wheat
- He plans to market his wheat through Portland in September
- His breakeven price is \$4.80/bu
  - He wants to eliminate his downside price risk, but take advantage of upside potential

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- Today's KC HRW futures price is \$4.50 per bushel
- The cost for an ATM put option is \$0.20
- Expected Basis in September is +\$0.60

# Session 3.2: Hedging with Options SHORT HEDGING EXAMPLE

Futures Price = \$4.50/bu Option Premium = \$0.20/bu Expected Basis = +\$0.60

Hedging with Futures

Expected Sale Price = Futures Price + Expected Basis

= \$4.50 **+**\$0.60 **= \$5.10** 

Hedging with Options

Minimum Expected Price = Strike Price – Option Premium + Basis

= \$4.50 - \$0.20 + \$0.60 = **\$4.90** 

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#### Session 3.2: Hedging with Options SHORT HEDGING EXAMPLE

Comparison of Pricing Strategies – Short Hedge



# Session 3.2: Hedging with Options SHORT HEDGE – BASIS ADJUSTED

Comparison of Pricing Strategies - Basis Adjusted



# Session 3.2: Hedging with Options LONG HEDGING WITH OPTIONS

- A "Long Hedger" is a person who is planning to purchase the physical commodity and wants to protect upside price risk
- If the hedger suspects prices might move lower, but wants to fix a maximum price for purchasing a commodity, they will choose to buy a call option rather than buy futures
  - The hedger will choose a strike price and pay the option premium
  - Determines the "Maximum Expected Price"



#### Maximum Expected Price = Strike Price + Option Premium + Basis



# Session 3.2: Hedging with Options LONG HEDGING EXAMPLE

• On May 1<sup>st</sup>, a Portland wheat mill plans to purchase Hard Red Wheat in August

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- Their breakeven purchase price is \$5.50/bu
  - They want to eliminate upside price risk, but take advantage of downside potential
  - Today's KC HRW futures price is \$4.75
  - The cost for an ATM put option is \$0.25
  - Expected Basis in August is +\$0.50



# Session 3.2: Hedging with Options LONG HEDGING EXAMPLE

Futures Price = \$4.75/bu Option Premium = \$0.25/bu Expected Basis = +\$0.50

Hedging with Futures

Expected Purchase Price = Futures Price + Expected Basis

= \$4.75 +\$0.50 = **\$5.25** 

Hedging with Options

Maximum Expected Price = Strike Price + Option Premium + Basis

= \$4.75 + \$0.25 + \$0.50 = **\$5.50** 

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### Session 3.2: Hedging with Options LONG HEDGING EXAMPLE

Comparison of Pricing Strategies - Long Hedge



### Session 3.2: Hedging with Options LONG HEDGE – BASIS ADJUSTED

Comparison of Pricing Strategies - Basis Adjusted



## Session 3.2: Hedging with Options ADVANCED OPTION HEDGING

- Options open the door to more advanced strategies
  - "Paper Farming"
  - Establishing Price Windows
  - Selling covered calls





### Session 3.2: Hedging with Options "PAPER FARMING"

- **Paper Farming** is a commonly used term for when a producer sells their grain, then establishes re-ownership with call options
  - The idea is to take advantage of future price movements
  - This method establishes a minimum price
- Formula: Minimum Price = Cash sale price premium





### Session 3.2: Hedging with Options PAPER FARMING EXAMPLE

- On September 1<sup>st</sup>, a farmer sells Soft White Wheat for \$5.40
- He expects market prices to continue moving upward
- His breakeven price is \$4.80/bu
  - He wants to eliminate his downside price risk, but take advantage of upside potential
  - Today's December Chicago SRW futures price is \$5.05 per bushel
  - The cost for an ATM call option is \$0.35
  - IF the producer chooses to use the "Paper Farming Strategy:

Minimum Price = Cash sale price - premium \$5.05 = \$5.40 - \$0.35

## Session 3.2: Hedging with Options ESTABLISHING PRICE WINDOWS

- Want to take advantage of an upward price move, but think prices may stay within a range? Try using options to establish a **price window**
- How?
  - Buy put options to establish a minimum price
  - Sell OTM call options to establish a maximum price

Expected Minimum Price = Put Strike Price + Expected Basis – Net Premium Expected Maximum Price = Call Strike Price + Expected Basis – Net Premium

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### Session 3.2: Hedging with Options **PRICE WINDOW EXAMPLE**

- On April 1<sup>st</sup>, a farmer plants Hard Red Wheat
- He plans to market his wheat through Portland in September
- His breakeven price is \$4.80/bu
  - He wants to eliminate his downside price risk, but take advantage of upside potential
  - Today's KC HRW futures price is \$4.50 per bushel
  - The producer does not believe prices will rise above a \$5.50 resistance level
  - The ask price for an ATM put option is \$0.35
  - The bid price for a \$5.50 call option is \$0.10
  - Expected Basis in September is +\$0.60

### Session 3.2: Hedging with Options **PRICE WINDOW EXAMPLE**

Futures Price = \$4.50/bu Net Premium = \$0.25/bu Expected Basis = +\$0.60

Establishing a Minimum Price

Expected Minimum Price = Put Strike Price + Expected Basis – Net Premium

= \$4.50 + \$0.60 - \$0.25 = **\$4.85** 

Establishing a Maximum Price

Expected Maximum Price = Call Strike Price + Expected Basis – Net Premium

= \$5.50 + \$0.60 - \$0.25 = **\$5.85** 

# Session 3.2: Hedging with Options ESTABLISHING PRICE WINDOWS

- Price windows can ALSO be used in Post-Harvest considerations
- How?
  - After selling you physical grain...
  - Buy ATM call options to establish a minimum price (Paper Farming)
  - Sell OTM call options to establish a maximum price

Minimum Price = Cash sale price – Net Premium

Maximum Price = Cash sale price – Net Premium + Strike Price Spread

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### Session 3.2: Hedging with Options **PRICE WINDOW EXAMPLE**

- On September 1<sup>st</sup>, a farmer sells Soft White Wheat for \$5.10
- He expects market prices to continue moving upward
- His breakeven price is \$4.80/bu
  - He wants to eliminate his downside price risk, but take advantage of upside potential
  - Today's December Chicago SRW futures price is \$4.90 per bushel
    - The farmer does not expect prices to break resistance at \$5.50 before December
  - The ask price for an ATM call option is \$0.35
    - The bid price of a December \$5.50 call option is \$0.10



### Session 3.2: Hedging with Options **PRICE WINDOW EXAMPLE**

Futures Price = \$4.90/bu Net Premium = \$0.25/bu Strike Price Spread = \$0.60

#### Establishing a Minimum Price

Minimum Price = Cash sale price – Net Premium

= \$5.10 - \$0.25 = **\$4.85** 

#### Establishing a Maximum Price

Maximum Price

= Cash sale price - Net Premium + Strike Price Spread= \$5.10 - \$0.25+ \$0.60 = \$5.45

### Session 3.2: Hedging with Options SELLING COVERED CALLS

- If you have unpriced grain in storage, you can sell out-of-the money call options to earn a premium while it sits
  - Pro: If the price doesn't increase, you still turn a profit!
  - Con: This method doesn't help much with downside risk You still own the grain, and must pay storage costs
- Covered calls establish a maximum price

Expected Maximum Price = Call Strike Price + Expected Basis + Premium

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### Session 3.2: Hedging with Options COVERED CALL EXAMPLE

- On August 1<sup>st</sup>, a farmer decides to store hard red wheat after harvest
- His breakeven price is \$5.00/bu
  - Today's December KC HRW futures price is \$4.20 per bushel
    - The farmer does not expect futures prices to break resistance at \$5.20 before December
  - The bid price of a December \$5.20 call option is \$0.25
  - Expected basis in December is +0.60

Expected Maximum Price = Call Strike Price + Expected Basis + Premium

6.05 = 5.20 + 0.60 + 0.25

### Session 3.2: Hedging with Options **SUMMARY**

- Options provide farmers with more marketing flexibility
- Whenever a strategy includes SELLING an option
  - You can be left open to margin calls if the trade is in-the-money
  - You must pay close attention to the markets while the trade is open!
- Next Steps
  - How can we put these tools together?
  - When should we use these strategies?



### SESSION 3.3 GRAIN MARKETING SCENARIOS





## Session 3.3: Grain marketing scenarios REVIEW OF GRAIN MARKETING TOOLS

- You have several options for pre-harvest grain marketing
  - Speculation (Leaving the commodity unhedged)
  - Forward contracts
  - Hedge to Arrive contracts
  - Hedging
  - Futures
  - Options
- The following scenarios will be from the standpoint of a grain producer



### Session 3.3: Grain marketing scenarios PRE-HARVEST SCENARIO: SWW

- On April 1, a farmer plants soft white spring wheat
- Today's Chicago SRW future's price is \$4.75
  - He expects prices will not rise above \$5.50 by harvest
- Expected Basis to Portland is +0.75
- ATM September Put option premium is \$0.30
- \$5.50 September Call option premium is \$0.10
- He has an available forward contract at \$5.50 cash
- He has an available Hedge to Arrive (HTA) contract at +\$0.75 over



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: A

#### Futures price increases to **\$5.75/bu**, Basis stays at **+\$0.75**

Marketing Strategy	Calculation	<b>Ending Price</b>
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$6.50
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	\$5.50
Short Futures Hedge	= Gain/Loss on Futures + Cash Price	\$5.50
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$6.00
Hedge with Put Options	IF Futures > than original strike price, = Cash sale price – put premium	\$6.20
Established Price Window	Maximum price = Call strike price + actual basis – net premium	\$6.05



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: B

Futures price increases to \$5.75/bu , Basis strengthens to +\$1.00

Marketing Strategy	Calculation	Ending Price
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$6.75
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	\$5.75
Short Futures Hedge	= Gain/Loss on Futures + Cash Price	\$5.75
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$6.25
Hedge with Put Options	IF Futures > than original strike price, = Cash sale price – put premium	\$6.45
Established Price Window	Maximum price = Call strike price + actual basis – net premium	\$6.30



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: C

#### Futures price increases to \$5.75/bu , Basis weakens to +\$0.50

Marketing Strategy	Calculation	<b>Ending Price</b>
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$6.25
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	\$5.25
Short Futures Hedge	= Gain/Loss on Futures + Cash Price	\$5.25
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$5.75
Hedge with Put Options	IF Futures > than original strike price, = Cash sale price – put premium	\$5.95
Established Price Window	Maximum price = Call strike price + actual basis – net premium	\$5.80



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: D

#### Futures price decreases to **\$3.75/bu** , Basis stays at **+\$0.75**

Marketing Strategy	Calculation	<b>Ending Price</b>
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$4.50
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	\$5.50
Short Futures Hedge	= Gain/Loss on Futures + Cash sale price	\$5.50
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$5.00
Hedge with Put Options	IF Futures < than original strike price, = Strike price – put premium + basis	\$5.20
Established Price Window	Minimum price = Put strike price + actual basis – net premium	\$5.30



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: E

Futures price decreases to \$3.75/bu , Basis strengthens to +\$1.00

Marketing Strategy	Calculation	<b>Ending Price</b>
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$4.75
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	\$5.75
Short Futures Hedge	= Gain/Loss on Futures + Cash sale price	\$5.75
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$5.25
Hedge with Put Options	IF Futures < than original strike price, = Strike price – put premium + actual basis	\$5.45
Established Price Window	Minimum price = Put strike price + actual basis – net premium	\$5.55



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: F

#### Futures decreases to **\$3.75**, Basis weakens to **+\$0.50**

Marketing Strategy	Calculation	Ending Price
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$4.25
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	\$5.25
Short Futures Hedge	= Gain/Loss on Futures + Cash sale price	\$5.25
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$4.75
Hedge with Put Options	IF Futures < than original strike price, = Strike price – put premium + basis	\$4.95
Established Price Window	Minimum price = Put strike price + actual basis – net premium	\$5.05



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: G

#### Futures price stays at **\$4.75**, Basis strengthens to **+\$1.00**

Marketing Strategy	Calculation	<b>Ending Price</b>
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$5.75
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	5.75
Short Futures Hedge	= Gain/Loss on Futures + Cash sale price	\$5.75
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$5.75
Hedge with Put Options	IF Futures = to original strike price, = Strike price – put premium + basis	\$5.45
Established Price Window	IF Futures do not change = Cash sale price – net premium	\$5.55



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: H

#### Futures price stays at **\$4.75**, Basis weakens to **+\$0.50**

Marketing Strategy	Calculation	<b>Ending Price</b>
Speculative (Cash)	Cash sale price = Futures price + Actual Basis	\$5.25
Forward Contract	Forward contract price = Original negotiated cash sale price	\$5.50
Hedge to Arrive Contract	HTA contract price = Original Futures price +/- Actual Basis	5.25
Short Futures Hedge	= Gain/Loss on Futures + Cash sale price	\$5.25
50/50 Futures Hedge/Cash	= (Gain/Loss on Futures + Cash Price)*.5 + (Cash Sale Price)*.5	\$5.25
Hedge with Put Options	IF Futures = to original strike price, = Strike price – put premium + basis	\$4.95
Established Price Window	IF Futures do not change = Cash sale price – net premium	\$5.05



#### Session 3.3: Grain marketing scenarios

### PRE-HARVEST SCENARIO OVERVIEW

	Α	В	С	D	Е	F	G	Н	Mean	Min	Max	Range
Speculative (Cash)	\$6.50	\$6.75	\$6.25	\$4.50	\$4.75	\$4.25	\$5.75	\$5.25	\$5.50	\$4.25	\$6.75	\$2.50
Forward Contract	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$5.50	\$0.00
Hedge to Arrive Contract	\$5.50	\$5.75	\$5.25	\$5.50	\$5.75	\$5.25	\$5.75	\$5.25	\$5.50	\$5.25	\$5.75	\$0.50
Short Futures Hedge	\$5.50	\$5.75	\$5.25	\$5.50	\$5.75	\$5.25	\$5.75	\$5.25	\$5.50	\$5.25	\$5.75	\$0.50
50/50 Futures Hedge/Cash	\$6.00	\$6.25	\$5.75	\$5.00	\$5.25	\$4.75	\$5.75	\$5.25	\$5.50	\$4.75	\$6.25	\$1.50
Hedge with Put Options	\$6.20	\$6.45	\$5.95	\$5.20	\$5.45	\$4.95	\$5.45	\$4.95	\$5.58	\$4.95	\$6.45	\$1.50
Established Price Window	\$6.05	\$6.30	\$5.80	\$5.30	\$5.55	\$5.05	\$5.55	\$5.05	\$5.58	\$5.05	\$6.30	\$1.25

- A = Futures increase, Basis doesn't change
- B = Futures increase, Basis strengthens
- C = Futures increase, Basis weakens
- D = Futures decrease, Basis doesn't change

- E = Futures decrease, Basis strengthens
- F = Futures decrease, Basis weakens
- G = Futures doesn't change, Basis strengthens
- H = Futures doesn't change, Basis weakens

# Session 3.3: Grain marketing scenarios **POST-HARVEST CONSIDERATIONS**

- Decisions made before harvest are only half of the marketing battle
- If you chose a pre-harvest option that required grain delivery, you have a few options to regain ownership in the futures market

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- Enter a long futures position
- Paper Farming (Buying Calls)
- Establishing a "Price Window" with a Bull Call Vertical Spread



### Session 3.3: Grain marketing scenarios **POST-HARVEST SCENARIO** 1:

- On September 1, a farmer sold Hard Red Wheat for \$6.00 in the cash market
- Today's Kansas City HRW future's price is \$5.25
  - The producer wants to take advantage of prices if they move higher
  - The producer does not think futures price will break resistance at \$6.00
- ATM December Call option premium is \$0.35
- \$6.00 December Call option premium is \$0.10





### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: A

Futures price stays at **\$5.25** 

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Long Futures)	Net Price = Cash sale price + Gain/Loss in Futures	\$6.00	\$0.00
Paper Farming (Buy Calls)	Net Price = Cash sale price + (Futures price – Strike price) – call premium	\$5.65	-\$0.35
Established Price Window (Bull Call Vertical Spread)	Net Price = Cash sale price – net premium + (Futures price – Strike price)	\$5.75	-\$0.25

### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: B

Futures price decreases to \$4.50

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Long Futures)	Net Price = Cash sale price + Gain/Loss in Futures	\$5.25	-\$0.75
Paper Farming (Buy Calls)	Net Price = Cash sale price – call premium	\$5.65	-\$0.35
Established Price Window (Bull Call Vertical Spread)	Net Price = Cash sale price – net premium	\$5.75	-\$0.25

### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: C

Futures price increases to \$6.00

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Long Futures)	Net Price = Cash sale price + Gain/Loss in Futures	\$6.75	+\$0.75
Paper Farming (Buy Calls)	Net Price = Cash sale price + (Futures price – Strike price) – call premium	\$6.40	+\$0.40
Established Price Window (Bull Call Vertical Spread)	Net Price = Cash sale price – net premium + (Futures price – Strike price)	\$6.50	+\$0.50



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: D

Futures price increases to \$7.00

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Long Futures)	Net Price = Cash sale price + Gain/Loss in Futures	\$7.75	+\$1.75
Paper Farming (Buy Calls)	Net Price = Cash sale price + (Futures price – Strike price) – call premium	\$7.40	+\$1.40
Established Price Window (Bull Call Vertical Spread)	Maximum Price = Cash sale price – net premium + Strike Price Spread	\$6.50	+\$0.50

#### Session 3.3: Grain marketing scenarios

### **POST-HARVEST SCENARIO 1 OVERVIEW**

	Change from Harvest					
	Α	В	С	D	Mean	Range
Speculative (Long Futures)	\$0.00	(\$0.75)	\$0.75	\$1.75	\$0.44	\$2.50
Paper Farming (Buy Calls)	(\$0.35)	(\$0.35)	\$0.40	\$1.40	\$0.28	\$1.75
Established Price Window (Bull Call Vertical Spread)	(\$0.25)	(\$0.25)	\$0.50	\$0.50	\$0.13	\$0.75

A = Futures price stays at \$5.25

B = Futures price decreases to \$4.50

C = Futures price increases to \$6.00

D = Futures price increases to \$7.00

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# Session 3.3: Grain marketing scenarios **POST-HARVEST CONSIDERATIONS**

- If you chose a pre-harvest option that did NOT require grain delivery, you still hold the physical commodity and have different options
  - Leave it unhedged
  - Maintain a short futures position (Storage Hedge)
  - Sell Covered Calls
- Since we still hold the physical commodity, basis is still important
- In this scenario, storage costs are a major concern
  - Even if you have your own grain bin storage isn't free



## Session 3.3: Grain marketing scenarios STORING GRAIN

- General rule of thumb
  - Store grain when basis is weaker than normal at harvest OR
  - Store grain when you expect a price increase to exceed storage costs
- Advantages of storage
  - You have control of the grain AND can take full advantage of a price rally
- Disadvantages of storage
  - Cost of Storage & Interest on grain
    - Grain quality can deteriorate
  - No price floor

### Session 3.3: Grain marketing scenarios CALCULATING STORAGE COSTS

• A good estimate for storage cost is...

Futures Price x (Interest rate + Operating Line Interest Rate) x (# Days / 360)

- For our examples..
  - Interest Rate equals 2%
    - This is a cost of storage/shrinkage adjustment
  - Operating Line Interest Rate = 4%
    - This assumes there is a cost of capital to store grain
  - Cost of carry will be shown for the 20<sup>th</sup> Day of each futures delivery month (Expiration Day)
## Session 3.3: Grain marketing scenarios CALCULATING STORAGE COSTS

#### Example cost of carry calculations

KC HRW Futures Delivery Month		# Days	Cost of Carry	KC HRW Cash Price	
	9/20/2017	19	\$0.017	Cash Price	\$6.00
	12/20/2017	110	\$0.096	Basis	\$0.75
	3/20/2018	200	\$0.206	Futures Price	\$5.25
	5/20/2018	261	\$0.269	Current Date	9/1/2017
	7/20/2018	322	\$0.332	Interest Rate (Cost of Storage)	2%

Operating Line Interest Rate 4%

Futures Price x (Interest rate + Operating Line Interest Rate) x (# Days / 360)

# Session 3.3: Grain marketing scenarios **POST-HARVEST SCENARIO 2:**

- On September 1, a farmer harvested Hard Red Wheat, He plans to market his grain by December 1
- Today's Cash Price is \$6.00
- Today's Kansas City HRW future's price is \$5.25
- Expected Basis to Portland is +0.75
  - The producer wants to take advantage of prices if they move higher
  - The producer does not think futures price will break resistance at \$6.00
- \$6.00 December Call option premium is \$0.10
- Cost of carry from September 1 to December 1 is \$0.08



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: A

Futures price stays at **\$5.25**, Basis stays at **+\$0.75**, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$5.92	-\$0.08
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$5.92	-\$0.08
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$6.02	+\$0.02



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: B

Futures price stays at \$5.25, Basis weakens to +\$0.50, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$5.67	-\$0.33
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$5.67	-\$0.33
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$5.77	-\$0.23



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: C

Futures price stays at **\$5.25**, Basis strengthens to **+\$1.00**, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$6.17	+\$0.17
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$6.17	+\$0.17
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$6.27	+\$0.27





### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: D

Futures price increases to \$6.25, Basis stays at +\$0.75, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$6.92	+\$0.92
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$5.92	-\$0.08
Sell Covered Calls (Sell OTM Calls)	Maximum Price = Call Strike Price + Actual Basis + Call Premium – Storage Costs	\$6.77	+\$0.77

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### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: E

Futures price increases to \$6.25, Basis weakens to +\$0.50, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$6.67	+\$0.67
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$5.67	-\$0.33
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$6.77	+\$0.77

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### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: F

Futures price increases to **\$6.25**, Basis strengthens to **+\$1.00**, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$7.17	+\$1.17
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$6.17	+\$0.17
Sell Covered Calls (Sell OTM Calls)	Maximum Price = Call Strike Price + Actual Basis + Call Premium – Storage Costs	\$7.02	+\$1.02

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### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: G

Futures price decreases to \$4.25, Basis stays at +\$0.75, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$4.92	-\$1.08
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$5.92	-\$0.08
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$5.02	-\$0.98

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### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: H

Futures price decreases to \$4.25, Basis weakens to +\$0.50, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$4.67	-\$1.33
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$5.67	-\$0.33
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$4.77	-\$1.23



### Session 3.3: Grain marketing scenarios SCENARIO RESULTS: I

Futures price decreases to \$4.25, Basis strengthens to +\$1.00, Grain Marketed December 1

Marketing Strategy	Calculation	Net Price	Change from Harvest
Speculative (Unhedged)	Net Price = Cash sale price – Storage Costs	\$5.17	-\$0.83
Storage Hedge (Short Futures)	Net Price = Cash sale price + Gain/Loss from Futures – Storage Costs	\$6.17	+\$0.17
Sell Covered Calls (Sell OTM Calls)	Net Price = Cash Sale Price + Call Premium – Storage Costs	\$5.27	-\$0.73



#### Session 3.3: Grain marketing scenarios

### **POST-HARVEST SCENARIO 2 OVERVIEW**

		Change from Harvest									
	Α	В	С	D	E	F	G	Н	Ι	Mean	Range
Speculative (Unhedged)	(\$0.08)	(\$0.33)	\$0.17	\$0.92	\$0.67	\$1.17	(\$1.08)	(\$1.33)	(\$0.83)	(\$0.08)	\$2.50
Storage Hedge (Short Futures)	(\$0.08)	(\$0.33)	\$0.17	(\$0.08)	(\$0.33)	\$0.17	(\$0.08)	(\$0.33)	\$0.17	(\$0.08)	\$0.50
Sell Covered Calls (Sell OTM Calls)	\$0.02	(\$0.23)	\$0.27	\$0.77	\$0.77	\$1.02	(\$0.98)	(\$1.23)	(\$0.73)	(\$0.04)	\$2.25

- A = Futures doesn't change, Basis doesn't change
- B = Futures doesn't change, Basis weakens
- C = Futures doesn't change, Basis strengthens
- D = Futures increase, Basis doesn't change
- E = Futures increase, Basis weakens

- F = Futures increase, Basis strengthens
- G = Futures decrease, Basis doesn't change
- H = Futures decrease, Basis weakens
- I = Futures decrease, Basis strengthens



### Session 3.3: Grain marketing scenarios **SUMMARY**

- Grain marketing is not easy, and it is not a perfect science
  - There is no perfect plan to get rich farming
- What happens after harvest is just as important as what you do before harvest
- Pigs get fat, hogs get slaughtered
  - If you've made a nice profit, don't think you've found a crystal ball pocket the gain and continue to follow your marketing plan



### SESSION 3 WRAP-UP AND CONCLUSIONS





# Session 3: Introduction to options and market scenarios **CONCLUSIONS**

- Options are complex, but add to flexibility in your marketing plan
- There are countless possible market scenarios you could encounter in a given year
  - And they won't come in nice, round numbers like our examples!
- The BEST way to market your grain is to choose a plan and stick to it
- What should you do next?
  - Continue your grain marketing education never stop learning
  - Evaluate your current marketing plan can you improve it?



# Session 3: Introduction to options and market scenarios FURTHER EDUCATION: WEBSITES

- Idaho AgBiz, Crop Markets Page
  - <u>https://www.uidaho.edu/cals/idaho-agbiz/crop-markets</u>
- K-State Ag Manager, Grain Marketing Page
  - <u>http://www.agmanager.info/grain-marketing</u>
- Iowa State Ag Decision Maker
  - <u>https://www.extension.iastate.edu/agdm/crops/html/a2-40.html</u>





# Session 3: Introduction to options and market scenarios FURTHER EDUCATION: BOOKS

- Grain Marketing is Simple, Edward Usset
  - Talks about grain marketing plans for pre- and post-harvest, walks through pricing tools
- A Complete Guide to the Futures Market, Jack D. Schwager
  - Looks at technical and fundamental analysis from a trader's perspective





### Session 3: Introduction to options and market scenarios **REFERENCES**

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