Hedging Solutions for the Grain Market Participants

Abdelatif Abada, Morgan Stanley

Abu Dhabi. 23rd IAOM Conference. 5-8 Dec 2012

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Abdelatif.Abada@ms.com; +971 50 107 4964; +971 4 709 7131

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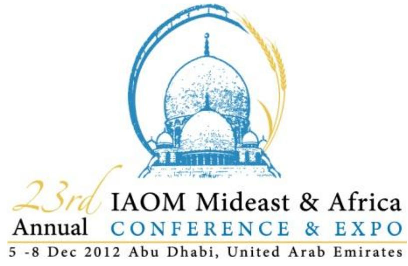

Section 1

Morgan Stanley Agriculture Capabilities

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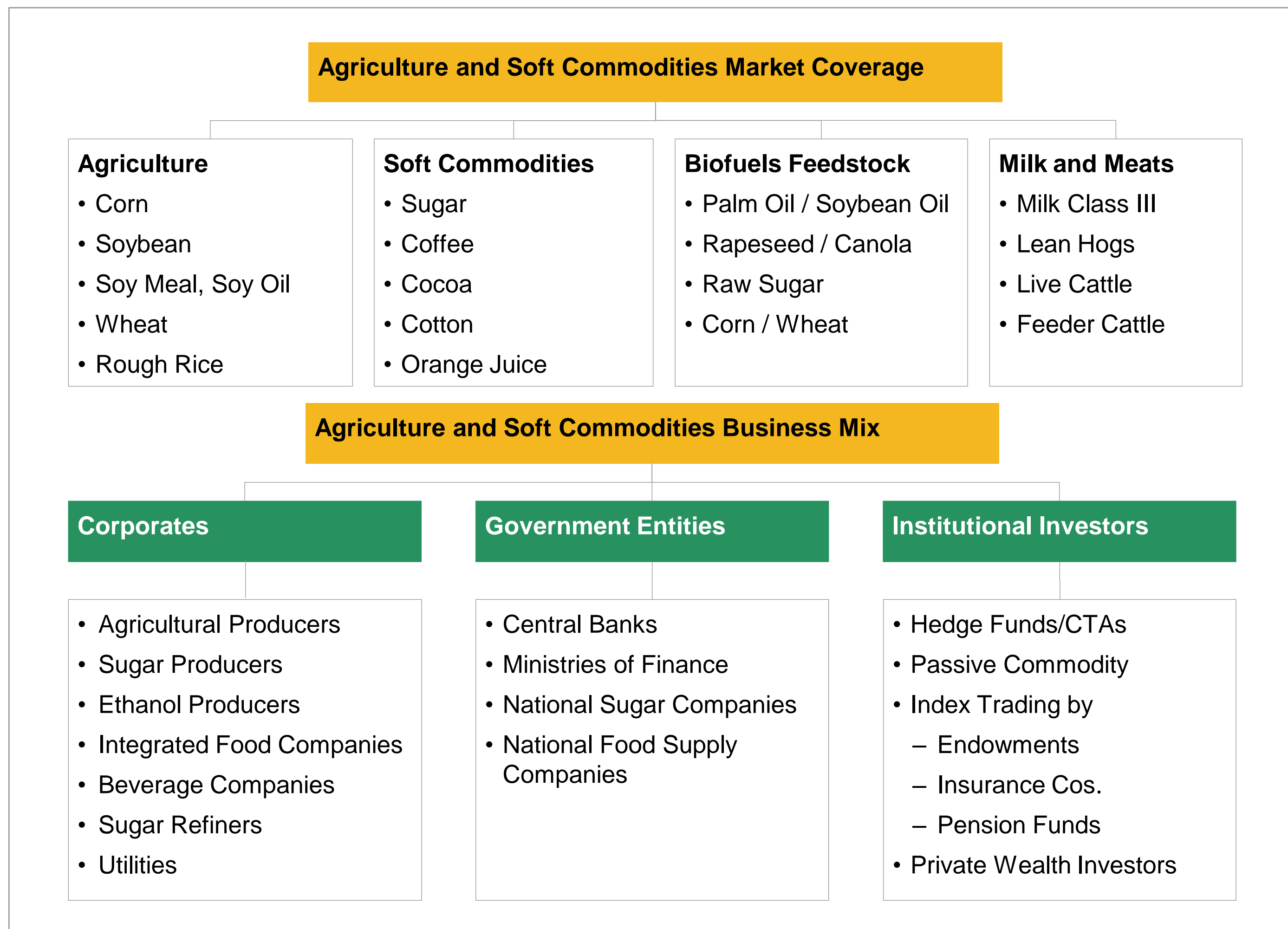
Service Offering

- Offer liquidity during and outside exchange times and in all time zones
- **➔ Clear leader in breaking down the complexity of deals and providing creative solutions**
- Clearing members of CBOT and NYBOT
- Offering liquidity on larger volumes and longer maturities
- Extensive research and knowledge on fundamentals of the agricultural markets
- **➔ Experience of providing integrated and 'tailor made' hedging strategies for some of the largest food/beverage companies and producers in the world**

MORGAN STANLEY AGRICULTURE CAPABILITIES

Morgan Stanley Agriculture/Soft Commodities

Market Coverage and Business Mix



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Agriculture Futures

Exchange Traded Derivatives

- Some of the main traded agricultural commodities include
  - Cotton, Coffee, Cocoa, Corn, Raw Sugar, White Sugar, Wheat, Soybeans, Milk and Cattle
- Centralised financial and physical markets revolve around agriculture exchanges. In the U.S., the commodities listed above can be traded on the following exchanges
  - Chicago Board of Trade
  - Kansas City Board of Trade
  - New York Board of Trade
  - Chicago Mercantile Exchange
- There are also commodities **indices**, based on the most liquid agricultural futures. These can be used to provide **investors** with financial exposure in agricultural commodities markets. The main index used by investors is the S&P GSCI, which not only provides a cross commodity index, but also a suite of sub-indices to help investors express their views on the market.

Source Morgan Stanley Commodities

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Rationale of Hedging Fertiliser Exposure

- Significant weight in agricultural production costs
  - Up to 30% for US grains
- Volatile prices
- The fertiliser market is currently undergoing rapid development, with prices indexed to physical markets in key geographical areas
- Morgan Stanley is an active liquidity provider in these markets

Contract Information

- Contracts are financially settled
- Cleared swaps or OTC
- All quoted in USD
- Global volume cleared 2.5 mln MT p.a.

Fertiliser Capabilities

Products Traded

Morgan Stanley Commodities has a variety of fertiliser capabilities across the fertiliser production cycle.

- Morgan Stanley can provide liquidity on a range of fertiliser products through the market or through working orders.
- The most liquid fertiliser products Morgan Stanley trades are **Urea**, **Ammonium Nitrate** and **DAP**.
- Morgan Stanley Commodities' agriculture and energy capabilities complement its fertiliser capabilities, enabling farmers and fertiliser producers to hedge across their value chain.
  - Morgan Stanley can help farmers and producers manage revenues and costs through fertiliser spreads (for instance, **wheat vs. DAP**, **energy vs. Urea**, **sulphur vs. DAP**, etc.).
- Morgan Stanley can warehouse risk to aid risk management activity of counterparties through bespoke products.

Fertiliser Capabilities Across the Production Chain

- Morgan Stanley can provide liquidity and hedging facilities for components across the fertiliser production chain, including the following products:

Basic Raw Materials	Simple Fertilisers	Mixed Fertilisers	Agricultural Products
• LNG • US and European Natural Gas • Ammonia • Sulphur • Phosphoric Acid	• Urea • Ammonium Nitrate • DAP • MAP • Ammonium Sulphate • TSP • SSP • Potassium Sulphate • Potassium Chloride	• Nitrogen • Phosphorous • Potash	• Grains • Oilseeds • Softs

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Over-The-Counter

- Using OTC derivatives enables greater flexibility in risk management
- **➔Clients also have the capability to conduct a more suitable hedge by choosing instruments that are better suited to their business**
- OTC products can benefit from increased liquidity provided by large market participants
- **➔Clients may also benefit from the provision of credit and balance sheet in order to reduce margin requirements**

The Morgan Stanley OTC Offer

- Morgan Stanley Commodities provides the full range of risk management products to its agribusiness clientele
- Morgan Stanley Commodities' energy and fertiliser capabilities complement its agriculture capabilities, enabling producers and agriculture industrials to hedge across their value chain.
- Morgan Stanley can help importers / exporters (farmers, food manufacturers, feed compounders, traders,…) to manage their risk OTC by:

  - **'Providing OTC instruments priced off exchange futures and options contracts.**
  - **Providing monthly-average swaps and options, enabling clients to replicate their industrial exposure**
  - **Providing tailor-made products to enable clients to monetize existing optionality in their businesses**

- Morgan Stanley can warehouse risk in order to aid the risk management activities of its counterparties through bespoke products.

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MORGAN STANLEY AGRICULTURE CAPABILITIES

Agriculture: Market Coverage

Morgan Stanley is active in all of the agricultural markets, trading:

- Swaps
- Indices
- OTC market
- Options
- Forwards
- Futures
- Bilateral/Screen Brokered/Voice Brokered

Agriculture (Grain)		Versus Exchange Last Contract
Corn	Up to Four Years Forward	Up to Two Years Forward
Wheat	Up to Four Years Forward	Up to Three Years Forward
Soybeans	Up to Four Years Forward	Up to Three Years Forward
Soy Oil/Soy Meal	Up to Four Years Forward	Up to Three Years Forward
Rough Rice	Up to Two Years Forward	Up to One Year Forward
Soft Commodities		
Sugar (No. 11 and No. 5)	Up to Five Years Forward	Up to Three Years Forward
Cotton	Up to Four Years Forward	Up to Two Years Forward
Coffee	Up to Three Years Forward	Up to Three Years Forward
Cocoa	Up to Three Years Forward	Up to Two Years Forward
Orange Juice	Up to Two Years Forward	Up to One Year Forward
Others (Milk and Meat)—CME		
Milk Class III	Up to Two Years Forward	Up to One Year Forward
Lean Hogs	Up to Two Years Forward	Up to One Year Forward
Live Cattle	Up to Two Years Forward	Up to One Year Forward
Feeder Cattle	Up to Two Years Forward	Up to One Year Forward
Biofuels Feedstocks		
Palm Oil	Up to Four Years Forward	Up to Two Years Forward
Rapeseed	Up to Two Years Forward	Up to One Year Forward

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Section 2

Trade Strategies – Consumer Example

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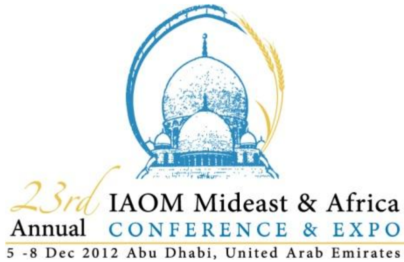
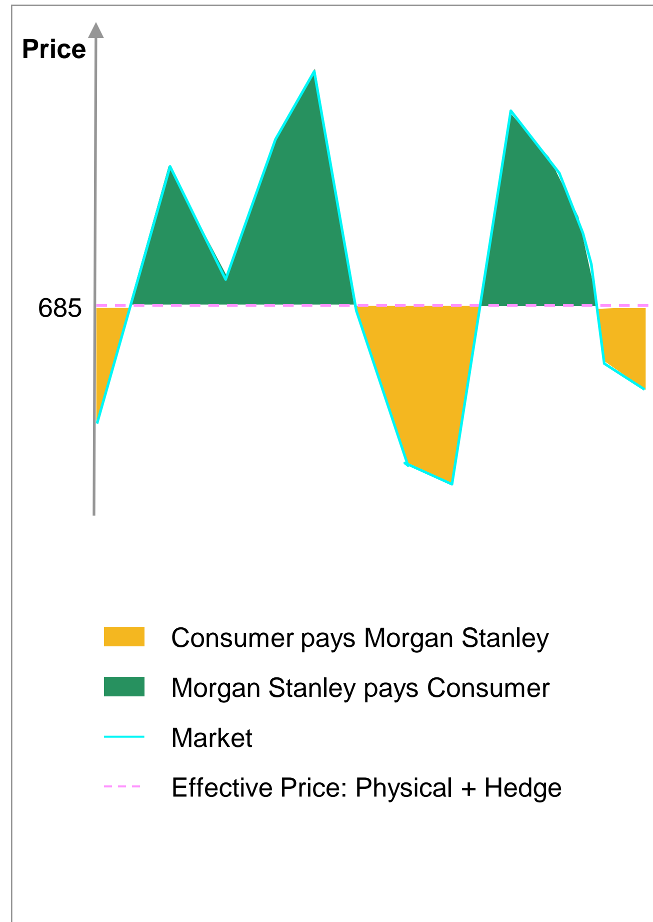


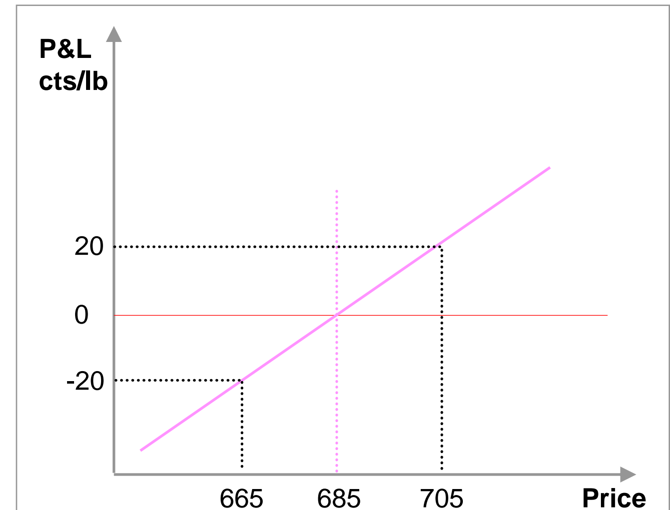
Swap for a Consumer

- Strategy
  - A consumer buys a swap to protect against escalating prices
- A swap (or fixed for floating contract) is the simplest strategy for consumers to lock in forward market prices
- Unlike an option, a swap does not have an up-front premium cost. A swap is a purely financial transaction that establishes a fixed price
- When market prices are higher than the swap price, Morgan Stanley pays the consumer the difference (market price less swap price)
- When market prices are lower than the swap price, the consumer pays Morgan Stanley the difference (swap price less market price)

Consumer Buys a Swap



Source Morgan Stanley Commodities



All units in cts/lb
Settlement for the swap:

Average price = 685, consumer's P&L = 0

Average price < 685, consumer pays money
e.g. pays 20 at the price of 665

Average price > 685, consumer receives money
e.g. receives 20 at the price of 705

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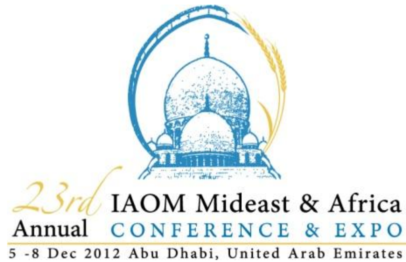
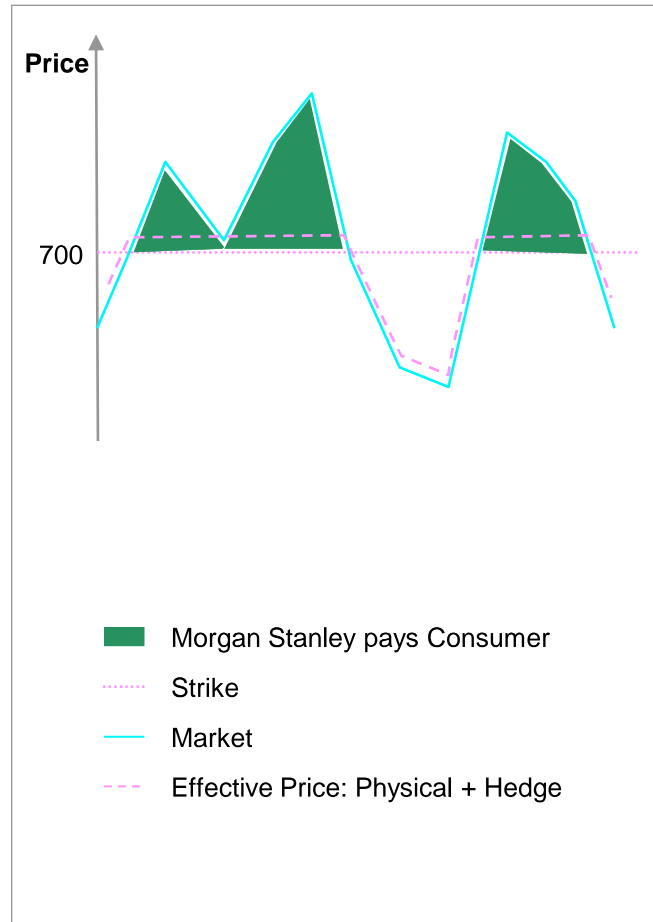


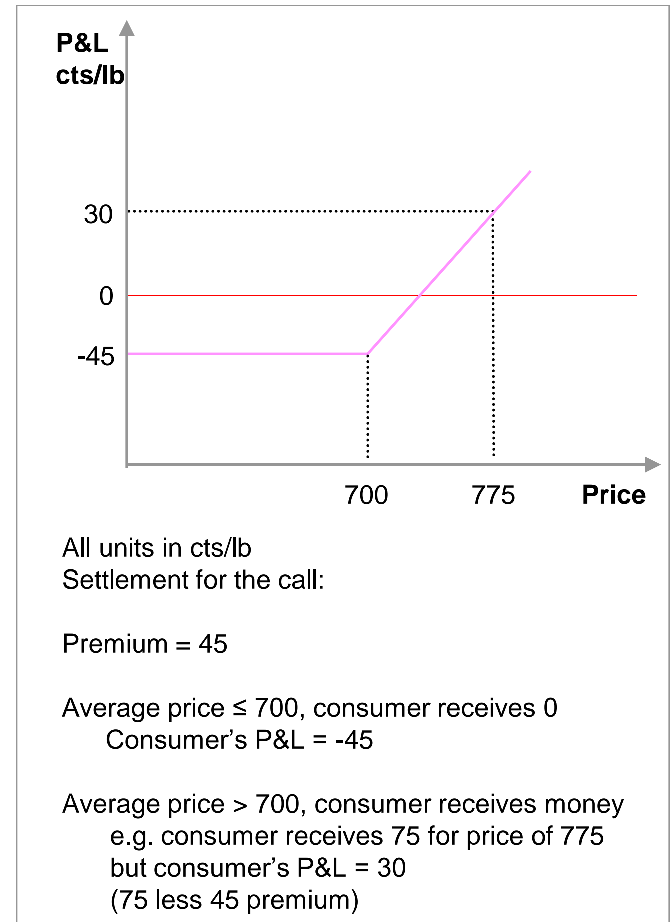
- Strategy
  - A consumer buys a call to guard against a rising market price and to be able to continue to take advantage of stable or lower prices
- A call option gives the holder the right (but not obligation) to buy the underlying commodity at a predetermined price by a specified date
- The premium (price of the option) is paid up front by the option holder (consumer) to the option grantor (Morgan Stanley)
- With a call option, a consumer protects himself against rising prices by establishing a maximum purchase price
- Unlike a swap, a call option does not lock the consumer into a fixed purchase price so the consumer will participate in falling prices

Call for a Consumer



Source Morgan Stanley Commodities

Consumer Buys a Call



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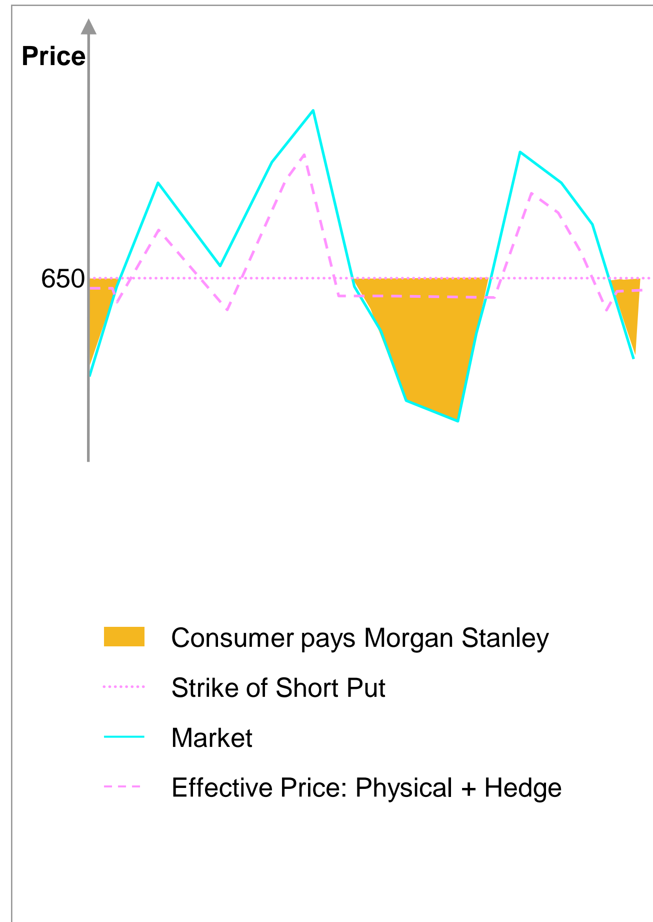
TRADE STRATEGIES – CONSUMER EXAMPLE

Short Put for a Consumer (Can be risky)

- Strategy
  - **A consumer sells a put to obtain and collect a premium. Risky trade. But excellent if he has a buyer to whom he can re-sell at an agreed price.**
- A put option gives the holder the right (but not obligation) to sell the underlying commodity at a predetermined price by a specified date
- The premium (price of the option) is paid up front by the option holder (Morgan Stanley) to the option grantor (consumer)

Consumer Sells a Put



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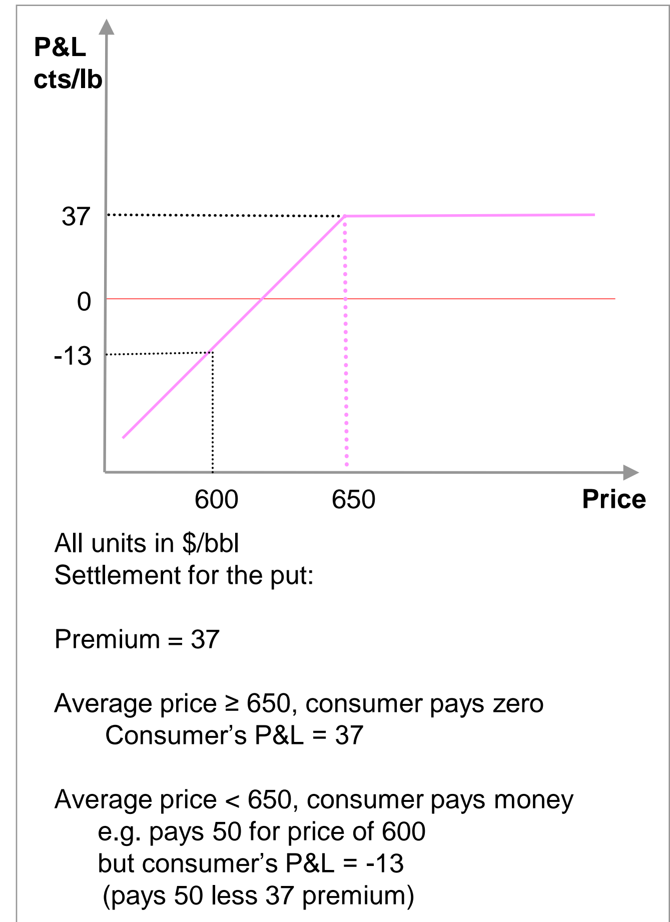

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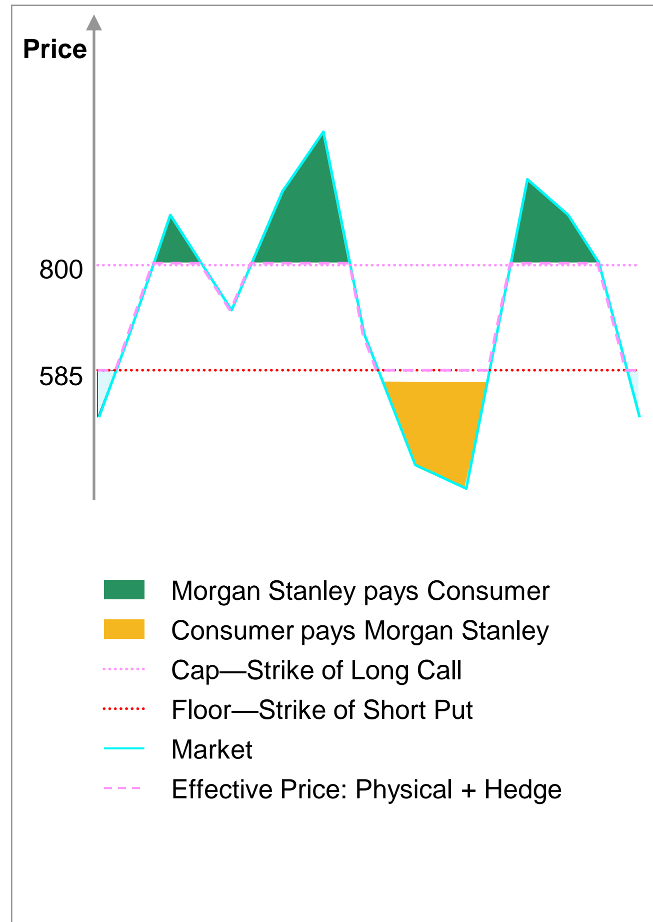
- Strategy
  - A zero-cost method for a consumer to establish upside price protection
  - However, the collar limits participation in any potential savings from falling prices
- For a consumer, a zero-cost collar is a combination of a long call and a short put
- As prices rise above the call strike, the consumer exercises his call option to establish a price ceiling
- As prices trade below the put strike, Morgan Stanley exercises the put option, establishing a price floor
- At prices between the put and call option strikes, both options are out-of-the-money, and the consumer's purchase price is the market price
- The premium income received for the put finances the cost of buying the call

TRADE STRATEGIES – CONSUMER EXAMPLE

Collar: Put—Call for a Consumer



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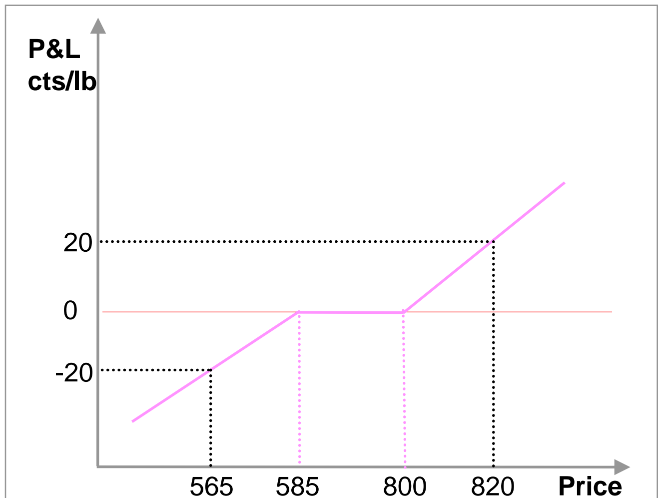
Consumer Buys a Call and Sells a Put with Equal Premiums



All units in cts/lb
Settlement for the zero-cost collar:

585 ≤ Observed price ≤ 800, consumer's P&L = 0

Observed price > 800, consumer receives money
e.g. receives 20 at the price of 820

Observed price < 585, consumer pays money
e.g. pays 20 at the price 565

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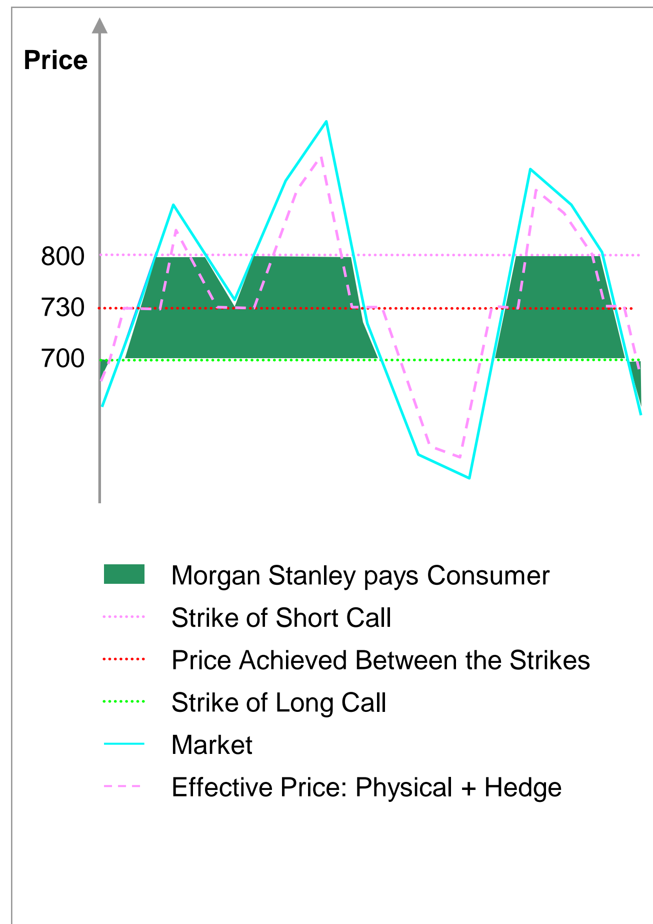
TRADE STRATEGIES – CONSUMER EXAMPLE

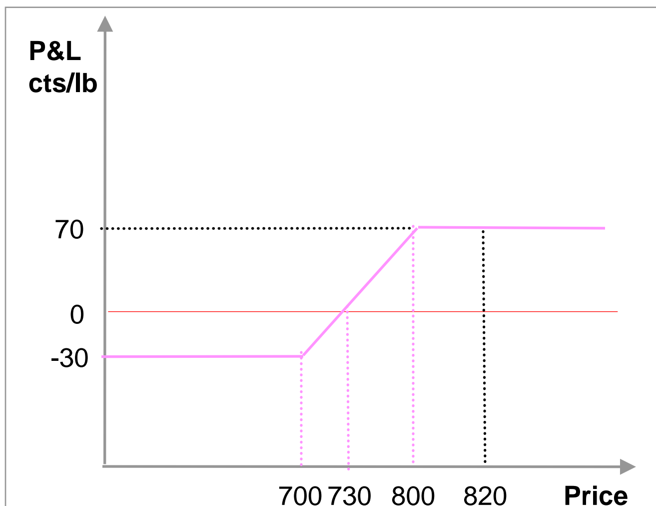
Bull Call Spread for a Consumer

- Strategy
  - A low cost method for a consumer to hedge in moderately bullish markets
- For a consumer, a call spread is a combination of an at-the-money long call and an out-of-the-money short call
- At prices below the long call strike, both calls are out-of-the-money and the consumer pays market price plus the difference between the premiums
- As prices rise above the short call strike, both calls are exercised
- At prices between the two strikes, the consumer exercises his call option
- The premium income received for the out of the money call finances part of the cost of buying the at the money call



Source Morgan Stanley Commodities

Consumer Buys an At-the-Money Call and Sells an Out-of-the-Money Call



All units in cts/lb
Settlement for the collared swap:

Observed price < 700, consumer P&L = -30

700 ≤ Observed price ≤ 800, consumer receives money; receives 30 at 730, consumer P&L = 0

Observed Price > 800, consumer receives maximum 100 (P&L = 70); consumer is exposed to any further price increase

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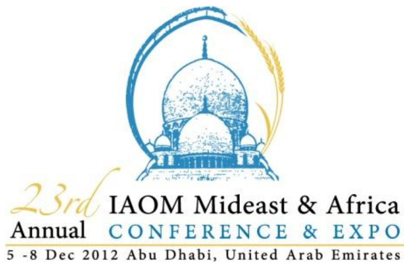
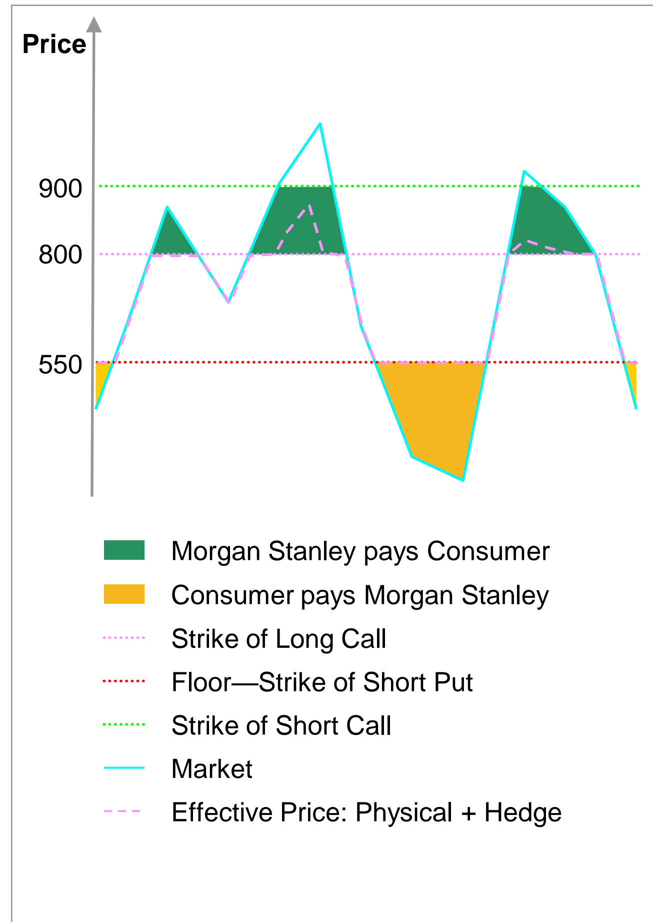


- Strategy
  - For a moderately bullish consumer who does not believe the price will rise above a certain level
- A 3-way collar is a zero-cost strategy in which a consumer gives up some upside protection to achieve a better strike for the put the consumer sold when compared to a normal collar
- For a consumer, a zero-cost 3-way collar includes a long call, a short put, and a short call

3-Way Collar: Put—Calls for a Consumer



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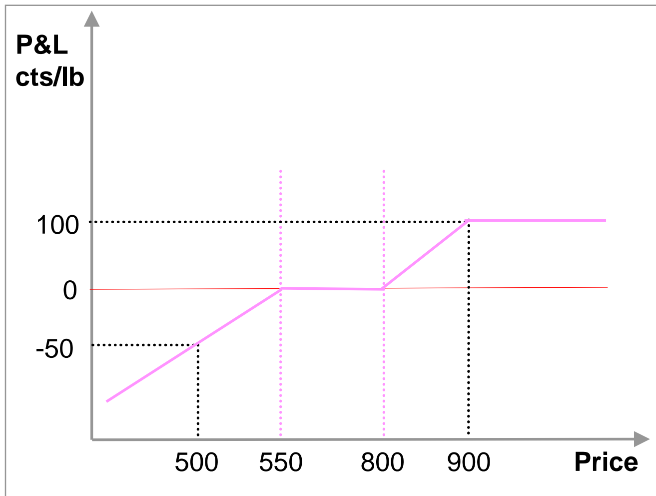
Consumer Buys a Call, Sells a Put, and Sells a Call with Offsetting Premiums



All units in cts/lb
Settlement for the 3-way collar:

550≤ Observed price ≤800, consumer's P&L = 0

800 < Observed price ≤ 900, consumer receives money
e.g. receives 100 at the price 900

Observed price < 550, consumer pays money
e.g. pays 50 at the price of 500

Observed price > 900, consumer receives maximum 100; consumer is exposed to any further price increase

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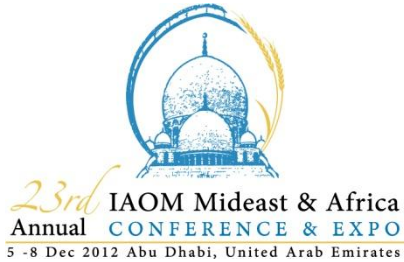
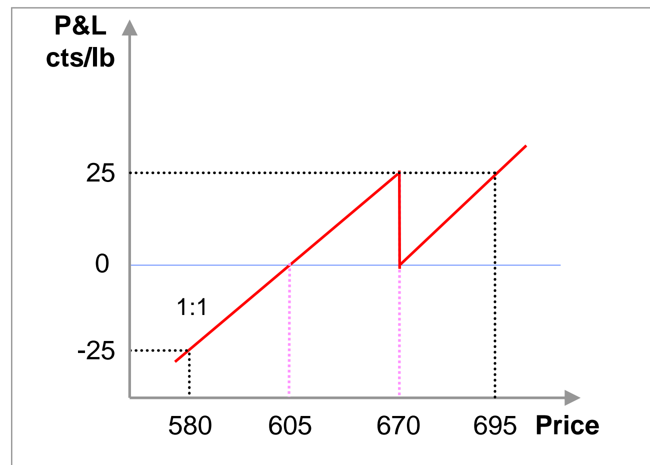


- A reset accumulator is a zero cost product that provides a lower swap level in the initial range than a basic swap
- However, if the market were to reach a predetermined level (reset price), the accumulator price would change to the reset price
- The accumulator level reverts to the original price when the market drops back below the reset level

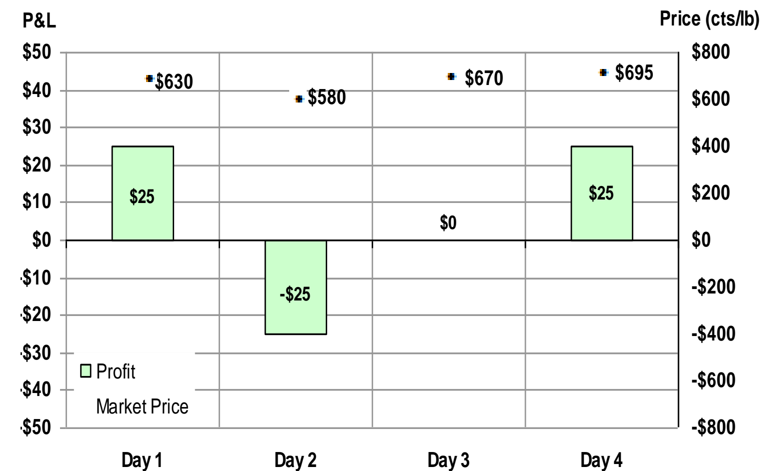
Trade Example: Reset Accumulator for a Consumer

Daily Settlement



Source Morgan Stanley Commodities

Daily Payoff Scenarios



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- The accumulator settles daily against the reference price, CBOT Corn Dec 2013 for Jan-Oct 2013, according to the fixed levels set at 605 and 670 when the market is at 630
- The payout for the accumulator occurs at expiry

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Trade Example: Reset Accumulator with Daily KO

Example

- In the example below, we illustrate an **accumulator** strategy which would enable the client to buy a daily quantity of corn at a **lower price** than the market, should the market remain in a pre-defined range. If the market price moves higher than the range, then there is no accumulation. If the market price moves lower than the range, then the client buys twice the volume.
- ➔*Accumulator Strategies are extensively used by Participants in the Gold industry (e.g., regular buyers of physical gold such as Central Banks)*

Below is an example priced as of 23 November 2012:

- Underlying: CBOT Corn Dec-13 at $**6.23 USD/bu**
- On a daily basis:
  - Client can buy at **$5.85** USD/bu as long as the market is between $5.85 and **$7.00;**
  - If the market is between **$7.00** USD/bu and 8.00 USD/bu, client accumulates at $**7.00;**
  - If the market is above **$8.00** USD/bu, client does not accumulate any volume;
  - If the market settles below **$5.85** USD/bu, client buys 2x the daily volume at **$5.85.**
- This could prove to be a very good tool for industrial clients that know they can buy more volume at a given price because their margin is good enough and also know that they will stop buying when the market reaches a certain level because they get into negative margin territory. In between, they can always achieve a price better than the market.

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Target Redemption Forward Example

Example

- In the example below, we illustrate a TRF which enables a Consumer to buy a daily quantity of wheat at a lower price than the market, up until a pre-determined gain is attained.
- Once the **Target** is reached, the structure **terminates**.

- ➔ *These TRF are also extensively used by Participants in the Metal industry (copper, zinc, ..)*

Below is an example priced as of 26 November 2012:

- Underlying: Wheat
- *Wheat Jan13 ref:* ***$8.67/bu***
- Structure: Client is long 1 Call / Short 2.50 Put Spreads
- Quantity per Settlement: 44,088 bu / 110,220 bu (2.50 x Leverage - 60cts max loss per settlement)
- Target: **$1.00** (only on positive payout)
- **Strike = $8.07/bu**
- Averaging: Yes
  - Averaging Frequency: Daily
  - Averaging Start Date: 01 December 2012
- First Expiry: 17 December 2012
  - Last Expiry: 01 July 2013
  - Number of Expiries: 15 (every 2 weeks)
- Settlement: T+5 (against the average)

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A Summary of Risk Management

- Market prices are an important driver for the value of many businesses
- With this in mind, buyers and sellers are highly exposed to **agricultural price volatility** (due to: weather, regime policies, growth, new taxation, unilateral government decisions on exports, etc)
- Market *outlooks* and *forecasts* are necessary to adequately position oneself, amongst other types of information – however, although these may be good guides, they are not sufficient.
- **Price Risk Management** (*hedging*) is the art of mitigating exposure to price volatility. It refers to the market based steps taken to reducing uncertainty in firms' future cash flows. This comes from reducing *both* downside *and* upside potential, implemented through the use of financially-settled instruments.
- Hedging is **NOT** a tool to trade on market views or 'make money'.
- In doing so, price risk management facilitates a **more stable business operating environment**

<u>However</u>

- Before implementing these solutions, one must understand the pros and cons of each strategy and the resulting possible payoffs – whether that be a member of the board, treasurer or trader.
- One must also adopt a clear framework to conduct a hedging policy, with a clear mandate to the hedging committee and execution team.

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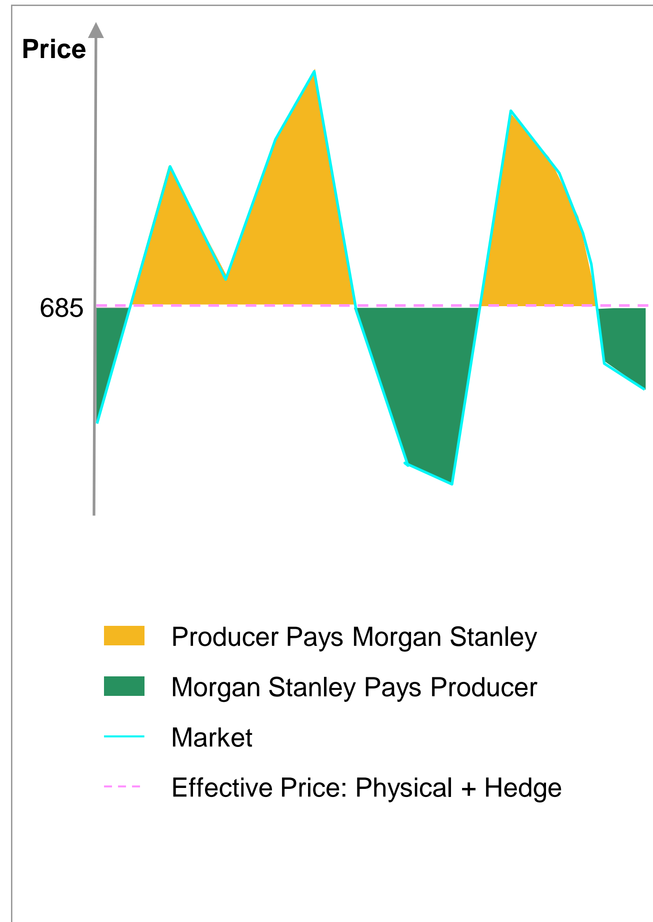
Appendix A

Strategies for Producers

Abdelatif.Abada@ms.com; +971 50 107 4964; +971 4 709 7131

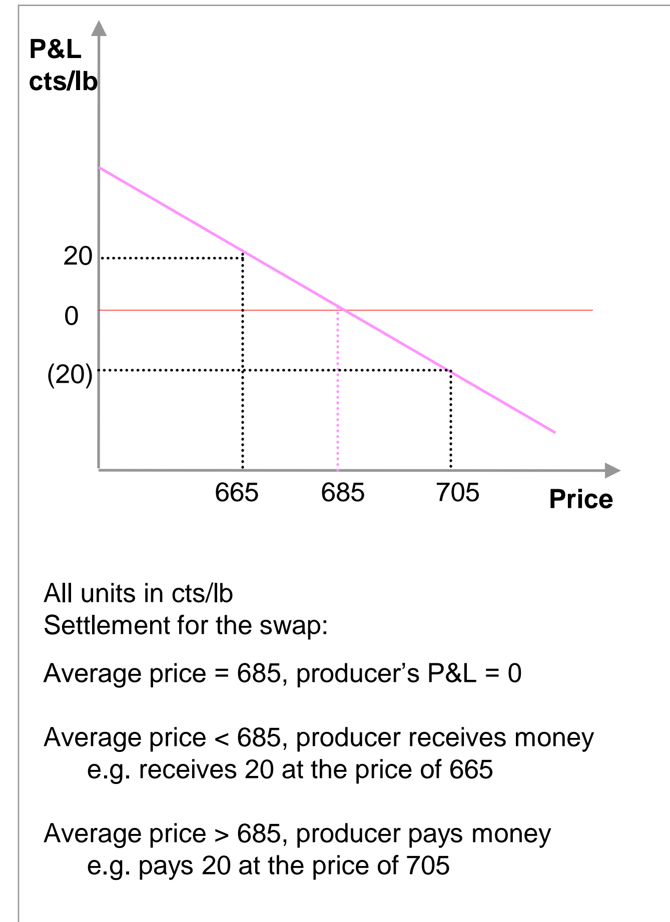
- Strategy
  - A producer sells a swap to protect against declining prices
- A swap (or fixed for floating contracts) is the simplest strategy for a producer to lock in forward market prices
- Unlike an option, a swap does not have an up-front premium cost. A swap is a purely financial transaction that establishes a fixed price
- When market prices are lower than the swap price, Morgan Stanley pays the producer the difference (swap price less market price)
- When market prices are higher than the swap price, the producer pays Morgan Stanley the difference (market price less swap price)

Swap for a Producer



Source Morgan Stanley Commodities

Producer Sells a Swap



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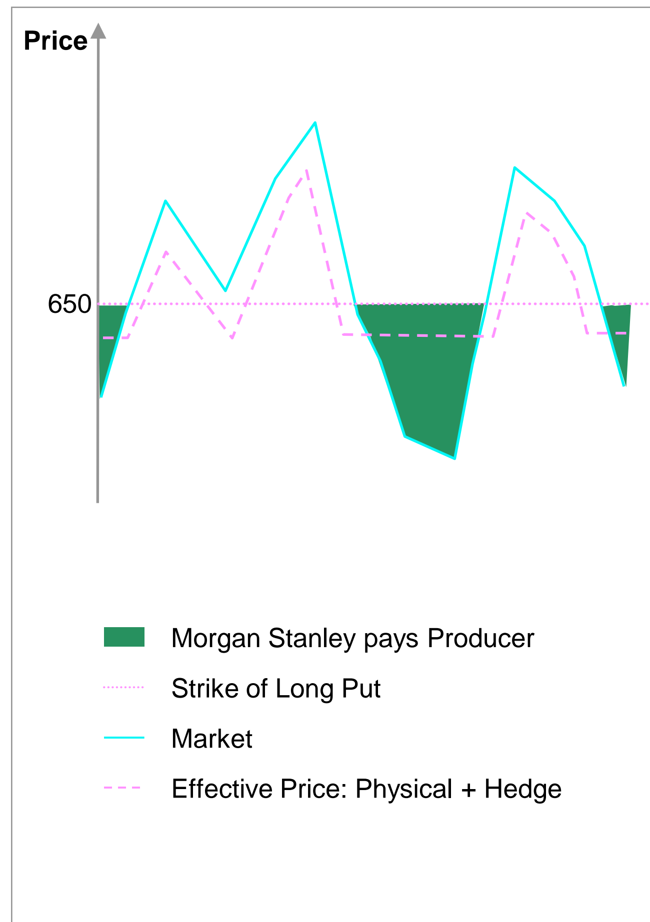
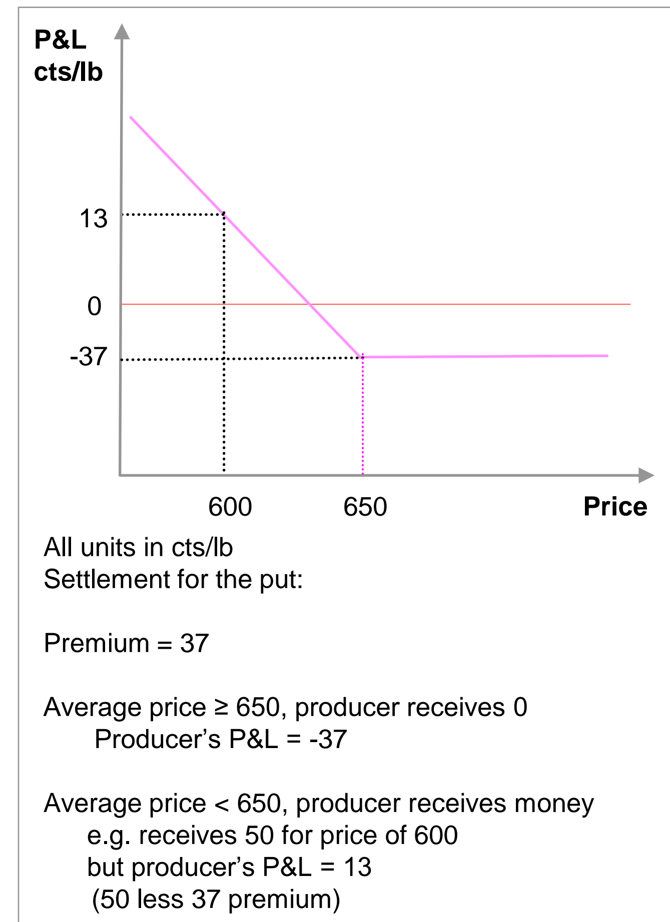
Put for a Producer

- Strategy
  - A producer buys a put to guard against falling market prices and to continue to take advantage of stable or higher prices
- A put option gives the holder the right (but not obligation) to sell the underlying commodity at a predetermined price by a specified date
- The premium (price of the option) is paid up front by the option holder (producer) to the option grantor (Morgan Stanley)
- With a put option, a producer protects himself against falling prices by establishing a minimum sales price
- Unlike a swap, a put option does not lock the producer into a fixed sales price



Source Morgan Stanley Commodities

Producer Buys a Put



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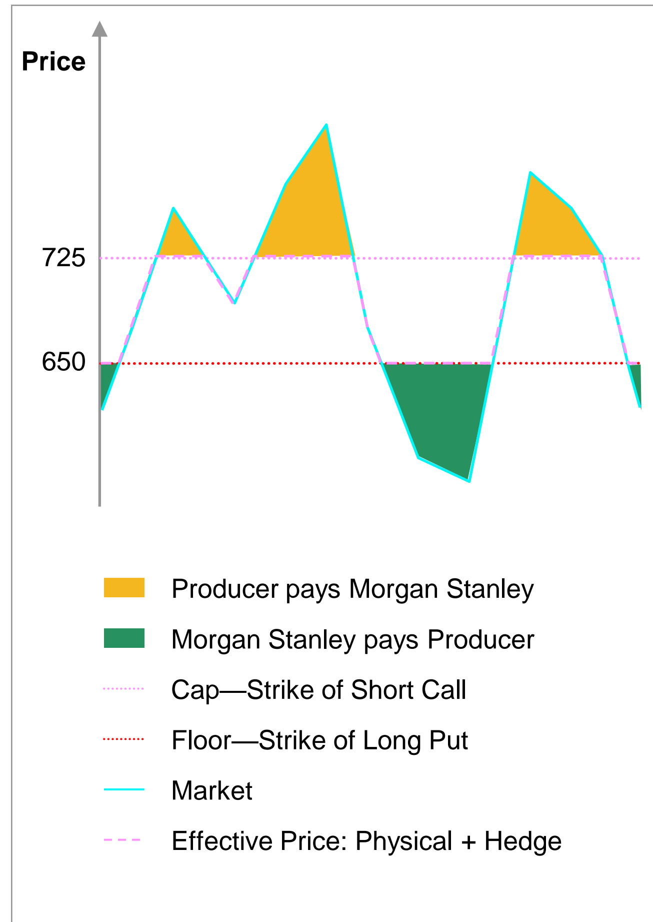
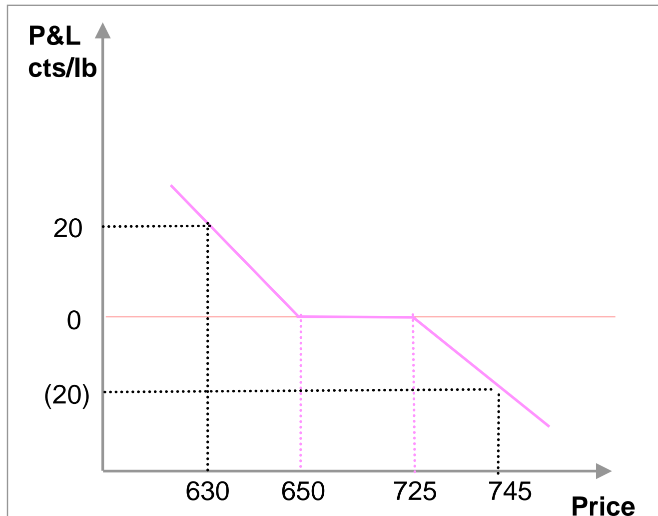
Collar: Put - Call for a Producer

- Strategy
  - A zero cost method for a producer to establish downside price protection
  - However, the collar limits participation in any potential gains from rising prices
- For a producer, a zero-cost collar is a combination of a long put and a short call
- As prices drop below the put strike, the producer exercises his put option to establish a price floor
- As prices rise above the call strike, Morgan Stanley exercises the call option, establishing a price ceiling
- At prices between the put and call option strikes, both options are out-of-the-money, and the producer's selling price is the market price
- The premium income received for the call finances the cost of buying the put



Source Morgan Stanley Commodities

The Producer Buys a Put and Sells a Call with Equal Premiums



All units in cts/lb
Settlement for the zero-cost collar:

650 ≤ Observed price ≤ 725, producer's P&L = 0

Observed price < 650, producer receives money
e.g. receives 20 at the price 630

Observed price > 725, producer pays money
e.g. pays 20 at the price of 745

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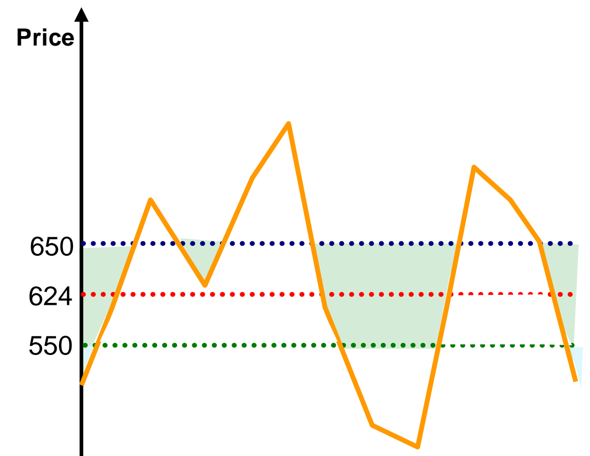
Put Spread for a Producer

- Strategy
  - A low cost method for a producer to hedge in moderately bearish markets to establish limited downside protection while providing upside participation
- For a producer, a put spread is a combination of an at-the-money long put and a deep out-of-the-money short put
- The amount paid to enter the strategy is the difference between the premia – the net premium
- At prices above the long put strike, both puts are out-of-the-money and the producer incurs the net premium to enter the trade, as mentioned above
- As prices fall below the short put strike, both puts are exercised, giving the producer the difference between the strikes (the spread) less the net premium (the difference between the premia)
- At prices between the two strikes, the producer exercises his long put option
- The premium income received for selling the out of the money put finances part of the cost of buying the at the money put

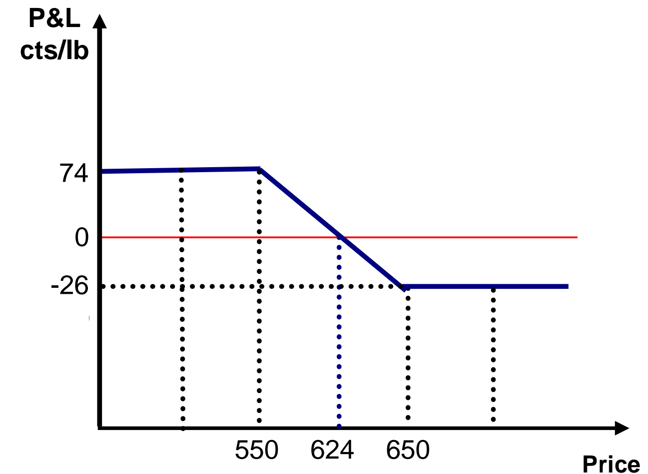
Put Spread Monthly Settlement Casflow
Without Accounting For Premium



- Morgan Stanley pays Producer
- Strike of Short Put
- Price achieved between the two strikes
- Strike of Long Put
- Market
- Effective Price: Physical + Hedge

Source Morgan Stanley Commodities

Producer buys an at-the-money put and sells an out-of-the-money put



All units in cts/lb
Settlement for the put spread:

Observed price > 650, consumer P&L = -26

550 ≤ Observed price ≤ 650, consumer receives money; receives 26 at 624, consumer P&L = 0

Observed Price < 550, consumer receives maximum 100 (P&L = 74); consumer is exposed to any further price decrease

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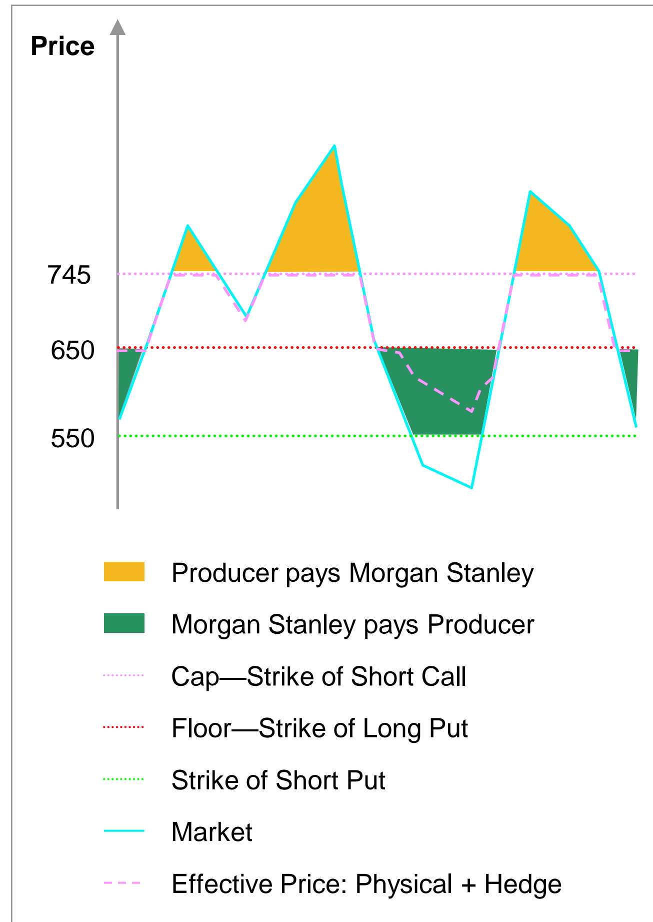
STRATEGIES FOR PRODUCERS

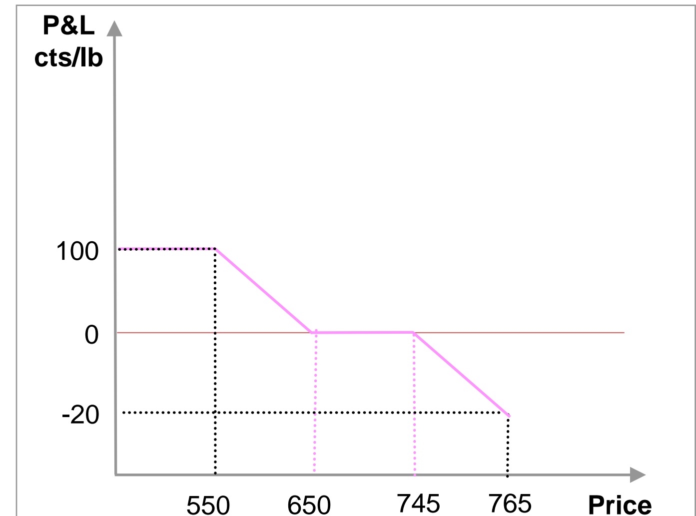
3-Way Collar: Puts - Call for a Producer

- Strategy
  - For a moderately bearish producer who does not believe the price will drop by a great amount, as the short put will eliminate his protection at a certain level
- For a producer, a zero-cost three way collar includes a long put, a short call, and a short put
- A 3-way collar is a zero cost strategy in which a producer gives up some downside protection to achieve a better strike for the call the producer sold when compared to a normal collar



Source Morgan Stanley Commodities

Producer Sells a Lower Strike Put, Buys a Higher Strike Put, and Sells a Call with Offsetting Premiums



All units in cts/lb
Settlement for the 3-way collar:

650 ≤ Observed price ≤ 745, producer's P&L = 0

550 ≤ Observed price < 650, producer receives money
e.g. receives 100 at the price 550

Observed price > 745, producer pays money
e.g. pays 20 at the price of 765

Observed price < 550, producer receives maximum 100; producer is exposed to any further price drop

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