




Lecture 5

More on Speculative Trading Strategies

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- Tailing the Spread
 - Butterflies and Tandems
 - Stereos and Turtles
 - Other Intercommodity Spreads



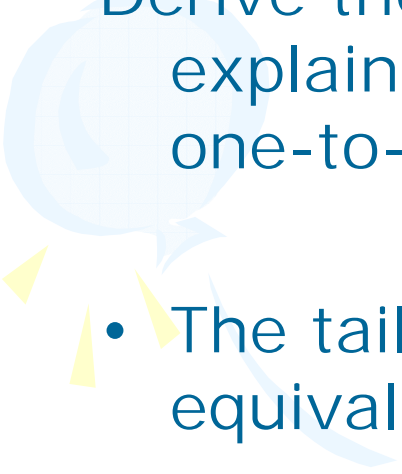
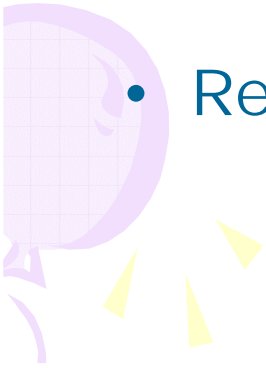
Intro to Hedging and Risk Management



Tailing the Spread

- Midterm Question 2a)

Derive the profit profile for a tailed spread and explain how this trade is different from one with one-to-one position sizes.


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- The tailed spread is dollar equivalent not quantity equivalent.
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- Reading: RSD, p.181-191; Poitras (1997).



Tailed Spread Profit Function

- The tailed spread profit function is:

$$\pi(1) = \{F(0,N) - F(1,N)\} Q_N + \{F(1,T) - F(0,T)\} Q_T$$

- In order to be dollar equivalent on the two legs of the spread the following condition has to be satisfied: $Q_N F(0,N) = Q_T F(0,T)$
 - To solve this let $Q_T = 1$ to get the result that $Q_N = \{F(0,T) / F(0,N)\} = \{1 + ic(0)\}$
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Solving the Profit Function

- Substituting the restriction on Q_N into the profit function and using the cash and carry arbitrage condition gives the final form of the profit function:

$$\pi(1) = F(1, N) \Delta ic$$



Compare to the one-to-one case and observe that the impact of ΔF has been eliminated.

- Note: Some tails are not dollar equivalent (e.g., RSD, p.268)
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Comparing tailed and untailed

- Midterm Question 2a)



Does your answer depend on the commodity under consideration?

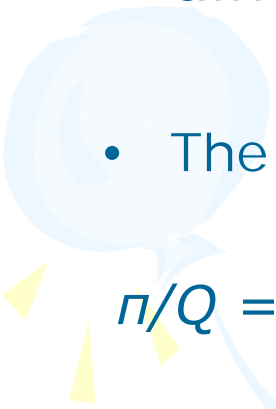


Tailed and untailed spreads will be the same when there is no need to tail. When does this happen and for what commodities?



Butterflies

- The 'butterfly' is used to describe both an options strategy and a futures strategy (same word, different trades). Reading, RSD, p.263-5.
- The profit function for a quantity equivalent butterfly is:


$$\begin{aligned}\pi/Q &= [\{F(1,T)-F(1,N)\} - \{F(0,T)-F(0,N)\}] \\ &\quad + [\{F(1,T)-F(0,T^*)\} - \{F(0,T)-F(0,T^*)\}] \\ &= \{F(0,N)-F(1,N)\} + 2\{F(1,T)-F(0,T)\} + \{F(0,T^*)-F(1,T^*)\}\end{aligned}$$



Where N is nearby, T is intermediate and T* is deferred



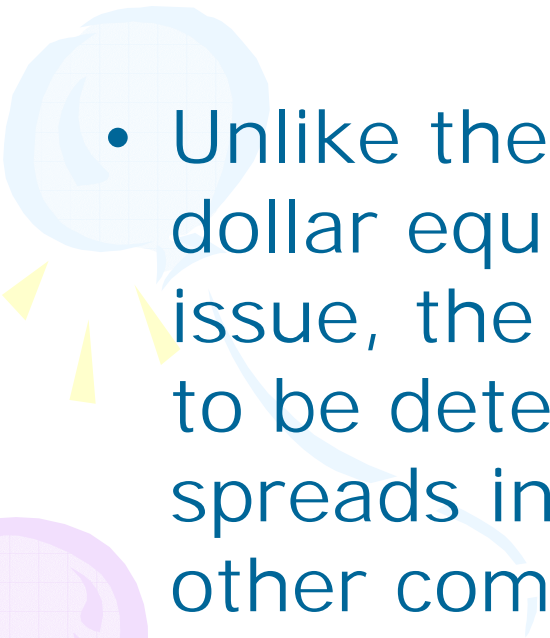

More on the butterfly

- The butterfly can be conceptualized as a 'spread of spreads' – a short (long) 'nearby' one-to-one spread is combined with a long (short) deferred one-to-one spread (where a short spread is short the nearby, long the deferred).
- It is possible to create dollar equivalent butterflies – making it possible to derive the profit function:

$$\pi/Q = F(1,N) \Delta ic(N,T) - F(1,T) \Delta ic(T,T^*)$$



Tandems: Intercommodity Butterflies

- The tandem is a butterfly where the spreads are in different commodities.
 - Unlike the butterfly where the problem of dollar equivalence is generally not an issue, the tandem requires a 'hedge ratio' to be determined – i.e., the number of spreads in one commodity relative to the other commodity spread.
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Tandem Profit Function

- The tandem profit function is:

$$\pi = \{Q1 [F(1,T)-F(1,N)] - Q2 [G(1,T)-G(1,N)]\} \\ - \{Q1 [F(0,T)-F(0,N)] - Q2 [G(0,T)-G(0,N)]\}$$

Solving this gives:

$$\Pi^* = \Delta ic_F - (Q2 G(1,T) / Q1 F(1,T)) \Delta ic_G$$



Reading: RSD, p.265-6 and p.284-7.



Stereos Defined

- Tailed spreads have a profit function of the form:

$$\pi(1) = F(1,N) \Delta ic$$

- Stereos are intercommodity trades where the $F(1,N) \Delta ic_F$ for one commodity is traded against the $G(1,N) \Delta ic_G$ for another commodity to produce profit function of the form:


$$\pi(1) = \Delta ic_F - \Delta ic_G$$



Reading: RSD, p.263-9



Stereo Example

- Midterm Question 2c): Assume that you are convinced that the spread between the implied carry return in gold futures will narrow relative to the return implied in silver futures. How would you design a trade to profit on your predictive ability in this case?
 - The solution to this question is a metal stereo. The question is asking the (S/L) positions in each commodity and the **hedge ratio**.
 - Reading: RSD, p.272-73 for calculating basis point value needed to determine the hedge ratio.
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Turtles Defined and Examples

- A turtle trade is constructed to speculate on the difference between the interest carrying charge in a (tailed) spread and some reference interest rate
- Examples: a) gold ic vs. Eurodollar (see Fig. 5.1)
b) Implied repo rate (irr) in Tbonds vs. Tbills or Fed funds (Note: this requires a different tailing procedure, see RSD, p.267-9)





Turtles Extended

- It is possible to extend the notion of turtles to trades that combine a tailed spread in one commodity with a naked position in another commodity.
 - Midterm Question 2b): What factors determine the profitability of: a copper turtle trade? (Reading: RSD, p.274-6). This question involves setting the correct hedge ratio to find the implied interest rate.
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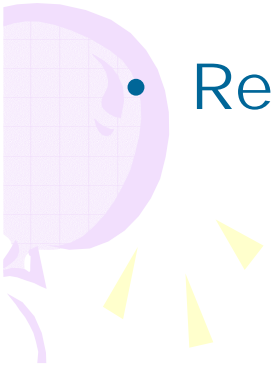


Other Intercommodity Spreads

- Many possible variations for intercommodity spread trades
 - **Production Spreads:** profitability depends on predicting changes in production relationships
 - Examples: Soy Crush spread; Feeder cattle spread; Oil Crack spread; Electricity Spark spread
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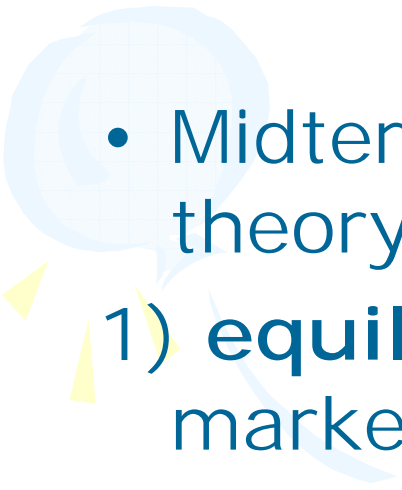



More Intercommodity Spreads

- TED Spread – (T)reasury Bills against (E)uro(D)ollars
 - The TED trade can be done as a **credit** spread, combining naked positions in bills and euros
 - The TED can also be done as a tandem where differing rates of **arbitrage convergence** determine profitability
 - Reading: RSD, p.276-282.
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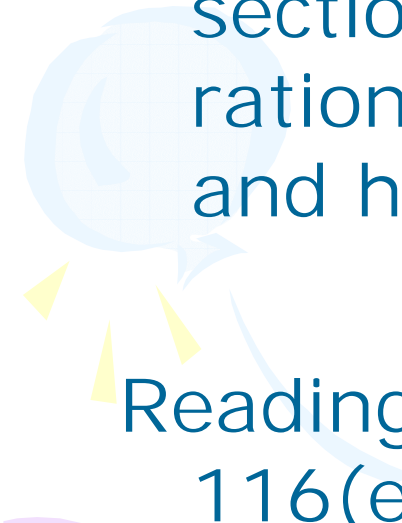
Intro to Hedging and Risk Mgmt.

- Will examine both **theory** and **practice** of corporate risk management
 - Midterm Exam question #3 deals with theory. Three elements to consider:
 - 1) **equilibrium** properties of derivative market with hedgers and speculators
 - 2) What is the optimal hedge ratio?
 - 3) What are the rationales for risk mgmt.?
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Midterm Exam Question #3

- The sample midterm question will be changed to merge 3a) and 3b) and a new section will be added that deals with the rationales for corporate risk management and hedging.



Reading: RSD, p.99-103 (review); p.111-116(equilibrium and optimal hedging_); p.139-51 (risk management rationales).

