Lecture 21: Futures Markets

Economics 252, Spring 2008 Prof. Robert Shiller, Yale University



FX Forwards and Forward Interest Parity

- FX Forward is like a pair of zero coupon bonds.
- Therefore, forward rate reflects interest rates in the two currencies
- Forward Interest Parity:

forward exchange rate (Y/\$) =

spot exchange rate (Y/\$)
$$\times \frac{1 + r_Y}{1 + r_{\$}}$$

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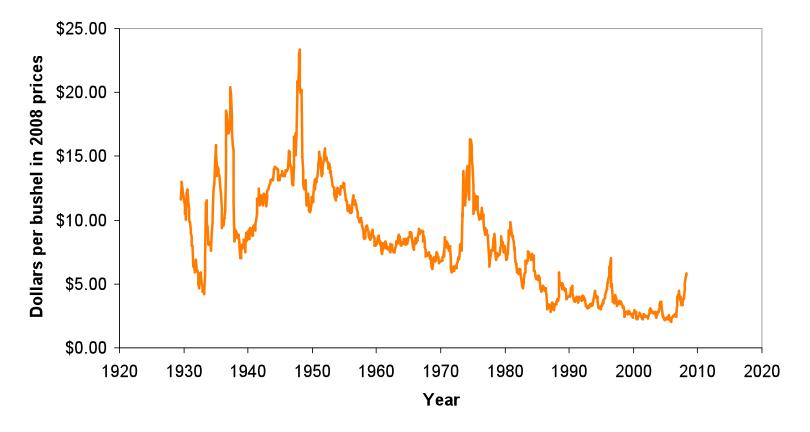
Forward Rate Agreements

- Promises interest rate on future loan.
- *L*=actual interest rate on contract date
- *R*=contract rate
- *D*=days in contract period
- *A*=contract amount
- *B*=360 or 365 days

Settlement = $\frac{(L-R) \times D \times A}{B \times 100) + L \times D}$

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Real CBOT Corn Price \$/Bushel in 2008 Dollars, 1929-2008



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CBOT Wheat Futures

- Delivery: No 2 Soft red winter, No 2 Hard Red winter, no dark northern spring, no 2 northern spring at par
- No 1 soft red winter, no 1 hard red winter, no 1 dark northern spring and no 1 northern spring at 3 cents /bushel over contract price
- Jul, sp, Dec Mar May,

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Fair Value in Futures Contract

- r =interest rate
- *s* = storage cost
- *r*+*s*=cost of carry
- Futures price is normally above cash price (contango) (otherwise, "backwardation")

 $P_{f\,uture} = P_{spot}(1+r+s)$

(See http://www.indexarb.com)

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Arbitrage Enforcing Fair Value

- If commodity is in storage, there is a profit opportunity that will tend to drive to zero any difference from fair value.
- If commodity is not in storage, then it is possible that:

$$P_{f\,uture} < P_{spot}(1 + r + s)$$

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Example of Hard Winter Wheat (Holbrook Working)

- No. 2 Hard Winter Wheat Kansas City Wheat Futures
- Plant winter wheat in Fall, harvest in May
- $\frac{3}{4}$ of US wheat crop is hard.
- Hard wheat is used for bread, soft wheat for pie crusts, breakfast foods and biscuits

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Working's Example of Wheat in Storage, Typical Year

- July 2
 - Spot 229 ¹/₄ Sept future 232 ¹/₄ Spot premium –3 Basis 3

September 4 Spot 232 ¹/₂ Sept future 233 ¹/₂ Spot premium –1 Basis 1

Gain of 2 (reflects gain in premium)



Continuing Working's Example

- Sept 4
 Spot No. 2 232 ¹/₂
 Dec. Future 238 ¹/₄
 Spot Premium -5 3/4
 - December 1 252 252 0

Gain of 5 3/4

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Just Before May Harvest

• May 1

Spot No. 2 247 ¹/₄ July future 229 ¹/₄ Spot premium +18 July 1
 Spot No. 2 218 1/2
 July future 225
 Spot premium -6 ¹/₂

Loss of 24 1/2

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