

Chapter 6 - Commodity Forwards and Futures

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Section 6.1 Introduction to Commodity Forwards

Introduction to Commodity Forwards

- Commodity forward prices can be described by the same formula as that for financial forward prices

$$F_{0,T} = S_0 e^{(r-\delta)T}$$

Introduction to Commodity Forward (Cont'd)

- ▶ For financial assets, δ is the dividend yield
- ▶ For commodities, δ is the commodity lease rate
 - ▶ The lease rate is the return that makes an investor willing to buy and then lend a commodity
 - ▶ The lease rate for a commodity can typically be estimated only by observing the forward prices

Introduction to Commodity Forward (Cont'd)

- ▶ Differences between commodities and financial assets include
 - ▶ Storage costs
 - ▶ Carry markets
 - ▶ Lease rate
 - ▶ Convenience yield

Introduction to Commodity Forward (Cont'd)

- ▶ The set of prices for different expiration dates for a given commodity is called the **forward rate** (or the **forward strip**) for that date
- ▶ If on a given date the forward curve is upward sloping, then the market is in **contango**. If the forward curve is downward sloping, the market is in **backwardation**
 - ▶ Note that forward curves can have portions in backwardation and portions in contango

Section 6.2 Equilibrium Pricing of Commodity Forwards

Equilibrium Pricing of Commodity Forwards

- As with financial forwards, the commodity forward price is a biased estimate of the expected spot price, $E(S_T)$, with the bias due to the risk premium on the commodity, $r - \alpha$. (**NB**: $r - \alpha = -(\alpha - r)$).

$$F_{0,T} = E_0(S_T)e^{-(\alpha-r)T}$$

Introduction to Commodity Forwards (Cont'd)

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Equilibrium Pricing of Commodity Forwards

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Equilibrium Pricing of Commodity Forwards (Cont'd)

- ▶ Different commodities have their distinct forward curves, reflecting different properties of
 - ▶ Storability
 - ▶ Storage costs
 - ▶ Production
 - ▶ Demand
 - ▶ Seasonality

Short-selling and the Lease Rate

Section 6.3 Pricing Commodity Forwards by Arbitrage

Section 6.4 Gold

Section 6.5 Corn

Section 6.6 Energy Markets

Section 6.7 Hedging Strategies

Section 6.8 Synthetic Commodities