Future and Forward I

outline

- Definitions
- Features of forward and futures
- Market structure
- Valuation

Origin of forward contract

- Suppose you are a farmer growing corns in Iowa
- You start growing corn in May and expect to harvest in September
- What are your concerns? Worries?

Forward contracts

- Forward contracts are agreements by two parties to engage in a financial transaction at a future point in time. The contact usually includes:
  - The exact assets to be delivered by one party, including the location of delivery
  - The settlement price
  - The date when the assets and cash will be exchanged

Forward price determination

- Recall forward rate determination in FX market
- Notations:

$$r_t\ , r_t^*, S_t\ , F_{t,1}$$

- Equilibrium condition
- Forward rate in discrete format

Forward price in FX market

- Important approximation for continuous format:

$$1+r \approx e^t \text{ and } (1+r)^t \approx e^{rt}, \text{if r} < 0.1,$$

- Notations:

r_t : current continously compouded domestic annual interest rate

r_t^* : current continously compouded foreign annual interest rate

S_t : spot exchange rate

$F_{t,T}$: forward exchange rate at time T

- Forward rate in continuous format

Forward price determination

- Commodity forward price
- Notations:

  r_t : current continously compouded annual interest rate

  S_t : spot price of the commodity

  $F_{t,T}$: forward price of the commodity at time T
- Alternative Investment Options for $1 fund
- Pricing formula

Forward price determination

- Interest rate forward contract
- Notations:

  r_{t,T_1} : current continously compouded annual interest rate

  r_{t,T_2} :

  r_{t+T_1,T_2-T_1} : at time T
- Forward rate formula

summary

- Pricing condition
- General formula

Value of forward contract

- Value of forward contract?
- Normally the price of a financial asset refers to the amount of money it costs to purchase the assets, is it the forward price?
- The Forward Price is the price you agree to buy the commodity on the expiration date of the contract, it is not the price you pay to enter the contract!
  - forward (and futures) contracts are always free when they are initialized!!! (some small commissions may apply)

Forward Markets

- **Pros**
  1. Flexible
- **Cons**
  1. Lack of liquidity: hard to find a counter-party and thin or non-existent secondary market
  2. Subject to default risk—requires information to screen good from bad risk

Futures Markets

- **Futures contract** is a contract to buy or sell a certain underlying assets at a certain date in the future, at a specified price
- Futures contracts are standardized contract, settled daily and traded on a futures exchange.

standard contract

- Underlying Asset
- Contract size
- Quality
- Maturity
- Delivery arrangement

See CBT's contract specifications for more details

pricing

- Futures price (specified price at maturity)
  - Corn (consider storage cost)
  - Stock (consider dividend)
- The value of future contract

Profit and Loss

- Short one future contract, 1000 bushel of corn, current future price is 100 cents per bushel
- Corn market news
  - Increasing use of ethanol
  - Corn chips are introduced to Asian Market
  - Severe drought this year in Midwest region
  - Pop corn is found to cause obesity

Daily Settlement

- Every day, the exchange defines a price called the “settle” price, which is essentially the last trade on that day.
- Every day until expiration a buyer’s margin account is credited (or debited if negative) with the amount: change in settle price $\times$ contract amount

Forward Vs future contracts

- Contracts are Standard?
  - Underlying assets
  - Contract size
  - Maturity term
  - Delivery date
- Daily Settlement?
- Delivery takes place?