

Regulation has always been the secret to success of free markets

- \* Basel Committee - proposed banking regulations for countries.
- \* G-7: discuss regulatory changes.
- \* G-20: financial stability board.

06/07/2023 WEEK #5

### Module #5: OPTIONS & BONDS

Student loan - a bond that the student issues. Can we use an equity model?

[Student loans responsive to income]!! **Seems kinda irrational to MA.**

Bubble in student loans because of growth of AI..

\* No declaring bankruptcy to get out of a student loan.

### FORWARDS & FUTURES ("derivatives")

Spot market = market for immediate delivery.

\* future delivery reflects time.

, diff price for diff delivery date  
**not a game of gambling - reflects economic activity**

buy a future - you're worried that the price will go up.

- \* Storing commodities is an essential component of every country's responsibilities
- \* What kind of assets would succeed at having a futures market? risk, social factors, etc.

FORWARD CONTRACTS: A contract to deliver @ a future date (exercise date or maturity date) at a specified exercise price.

Foreign Exchange (FX) forward:  
Contract to sell \$ & £ for ¥.

farmer ~~sell grains~~ to warehouse or grain elevator  
(don't hedge on future market)  
Always hedge in the future market

↓  
"hedgers" - will quote price to farmer as a final price

- \* Both sides are locked into the contract, no liquidity (no exchange)

Futures - no risk of counter party default bc your counterparty is the exchange.

### \* Forward Rate Agreements

#### FX Forwards

- like a pair of zero coupon bonds  
- reflects the interest rates of both countries.  
Futures contracts rely on Margin Calls.

Investor receives a margin call from a broker if the sec. in the portfolio ↓ in value past a certain pt.

⇒ investor must invest more money / sell some assets

Futures contracts require you to pay a settlement every day from future margin account

(M.A.'s understanding - M2M?).

if you bought a future & the price goes down, they'll deduct that amt from margin acc.

~~Buy~~ if you want to buy  
good coffee (better than  
std), buy a future &  
sell out before you  
actually buy good coffee

## Rice Futures

Dojima - storage center in Japan

91 Warehouses.

specific list of delivery  
dates, precise defn  
of quality

Sell contracts themselves

- creates liquidity in  
rice trade.

Consider you're a farmer &  
you're worried crop price will ↓.  
You could sell a future  
knowing very well you wouldn't  
deliver, & buy the contract  
before you want to sell your  
crop.

- Once you sell future  
if price ↑, you get a loss but  
if price ↓, you get a profit.  
This essentially helps to  
hedge.

FUTURES MARKETS ARE RARELY  
DELIVERED.

backwardation at the time of harvest (@ harvest, it would be dumped @ spot & fut price)

Contango → upward sloping nature of the futures curve

07/07/2023 WHEAT FUTURES

futures market - lot of speculation

\* maybe speculators aren't wrong, they think of the economy broadly, uses his intellectual curiosity etc so that opinion must be reflected on the market.

• Wheat - harvest once a year, so future prices reflect that. (they're going to dump it @ the spot mkt & prices will fall.)

! the futures market makes shortages less severe since you can see it coming thru prices.

⇒ futures market aids in price discovery.

### Buying, Selling & Settlement

When one "buys" a future contract (ie agrees to buy at a future date), they agree to a daily settlement procedure that's analogous to buying the commodity.

Settle price → final trade of the prev. day (consolidated based on last few trades).

buyer's margin account is credited/debited (if  $\text{amt} < 0$ )

$\Delta \text{amount} = \text{change in settle price} \times \text{contract amt.}$

Role of Arbitrage in the Futures Market:

Say if someone had rice. If the future price  $\neq$  spot price, they could ~~sell~~ buy the future contract, & sell on spot!

Example:

plot of futures prices - price was spiked up once.

shortage in Chicago (rail strike), grain was stuck in Iowa.

⇒ Arbitrage. (Divergence b/w spot & fut. price)

Cash Settlement

(Derivatives on instruments like Indices) - eg Nifty Future  
Final settlement = difference b/w the last futures price & the actual index.

The Index future will be priced exactly as much as the Index (otherwise can be arbitrated reliably).

### Fair Value in Futures Contract

$$P_{\text{future}} = P_{\text{spot}} (1 + r + s)$$

$r$  = interest rate

$s$  = cost of carry

(indexarb.com)

\* If the storage price is -ve, futures price < cash price.

o if commodity is not in storage:

$$P_{\text{future}} < P_{\text{spot}} (1 + r + s)$$

### OIL FUTURES

open interest = total no. of contracts outstanding in the market.

\* Most stored oil is moving through a pipeline or is not yet above ground.

\* ~~No~~ no obvious spot prices for oil since it is typically sold via long term contracts.

• Oil has not grown in price for the last 100 years.

there's always a talk of running out of oil but no uptrend

- alternate sources of energy

& new avenues for obtaining oil

- OPEC. Org of Petroleum Exporting Countries. OPEC is weak today

bc of conflict in middle east - hence oil prices are low.

OPEC tried to limit prodn of oil to keep oil prices high.

Govt Oil Reserves - stores oil to protect against volatility in oil prices (to use in times of war as well)

### Danger of Market Manipulation

- exchanges & govt have surveillance measures

### SPI & FFR Futures

Stock Price Index

futures (SPIF) - Cash Settlement

Storage cost for stocks is negative (they pay a dividend!)

$$\text{Fair value of SPI} = P + P(r - y)$$

↓      ↓  
stock price    interest rate  
index           or  
financing cost

dividend yield.

### Federal Funds Futures Mkt (FFR)

- Settlement price is 100 minus annualized federal funds rate averaged over contract month.
- \* not storable
- \* reflects expectation of interest rate.

Govt announces target for Federal funds rate. Hence the futures market reflects expectations on funds rate. Mkt has a lot of intelligent speculation.

$$s = 0.03$$

$$r = 0.05$$

$$\text{Spot price} = \$1000$$

$$1000(0.03 + 0.05) + 1000 = \$1080$$

## Lesson #13 - OPTIONS

Call Option - right to buy

Put Option - right to sell.

- \* No commitment/obligation, buyer of the option buys a choice from the seller or writer, who then receives a premium.
- \* buyer will exercise the choice if it's financially a "good choice"
- \* Truncated claims on an asset

### Terms:

- ① Exercise Date (last Thurs of month - India)
- ② Exercise Price (strike price)
- ③ Defn of underlying & no. of shares.

### Reading Options Pricing:

"ticker" → symbol/scrip in India.  
"out of the money"  
↳ right to buy for more than it is selling today (Call)

"in the money"

Right that would be profitable if exercised right now.

Right to buy @ a price less than current price  
(Call)

Buy

Bid - ~~sell~~ price offered

Ask - ~~buy~~ price offered.

→ diff = Bid - Ask Spread.

Why do we have options?

\* A major sense of economic inefficiency is cured by the options mkt - all risk must be able to be traded in a completely efficient mkt.

Behavioural Rationale behind options mkt:

- Salience & Attention

- Put option, sets a floor on the investment, piece of mind.

Silver lining theory - "at least I bought these PUT options, even though I lost so much money!"

- brokers tend to take advantage of traders who worry stock will fall

## Ubiquity of Options

Mortgages have an option to default.

- \* Standardized options - contract with specific terms (boilerplate)
- \* Several instruments such as ETFs include derivatives
  - might be risky (as in the case of 2008 subprime crisis)
  - serves as insurance.

?

## Put/Call Parity

Value of the option = "Intrinsic Value"

- \* options will be exercised if it's in the money.

Put/Call parity - relationship b/w put price & stock price given the same underlying, enforced by arbitrage.

$$\text{Price of call} + \text{pdv} + \text{pdv}_{\text{put}} = \text{Stock price} + \text{strike dividends} - \text{price} \quad (\text{considering zero interest rate})$$

# Flaw in Options Margin Requirements

11/07/2023.

Using Options to Hedge

→ buy PE, if stock price < strike, exercise option.  
Put option - lower floor.

Why not do a stop loss order?  
i.e. ask broker to sell if  
price hits a certain lowpoint.

→ To do put hedging, you need  
to pay premium but you  
don't have to pay anything  
for stoploss order  
(SKEW index - CBOE..)

Do options prices have a  
predictive value on stock  
price

if out-of-the-money prices  
go up for puts, market  
seems to be predicting a  
crash.

buying a Put  $\equiv$  selling a Future [w/  
no obligation]  $\equiv$  M2M profit if  
market goes down.

→ this is not correct. M2M is  
not profit/lose, it is mere  
adjustment of future contract.