

M339W: January 19th, 2022.

Important Prerequisite Material .

- Basics of derivative securities from M339D

- (prepaid) forwards
- calls / puts
- spreads, strangles, straddles
- ...

- Arbitrage Portfolio

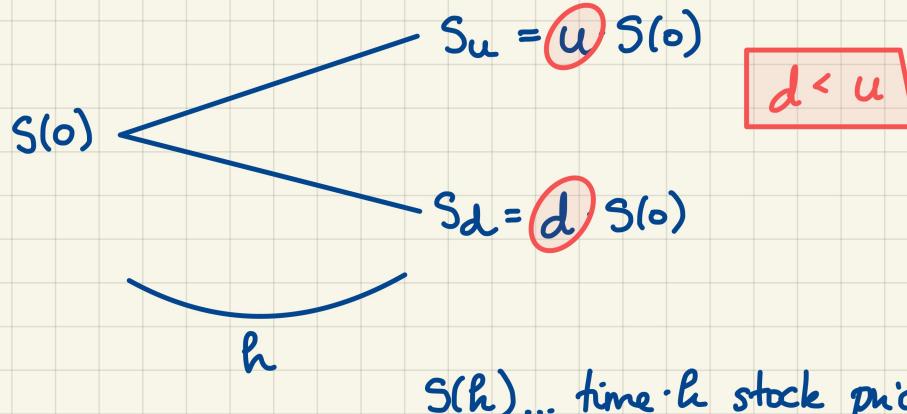
- Binomial option pricing

- Covariance Formula

$$\text{Var}[X+Y] = \text{Var}[X] + \text{Var}[Y] + 2\text{Cov}[X,Y]$$

- Normal Distribution

Binomial Asset Pricing Model .



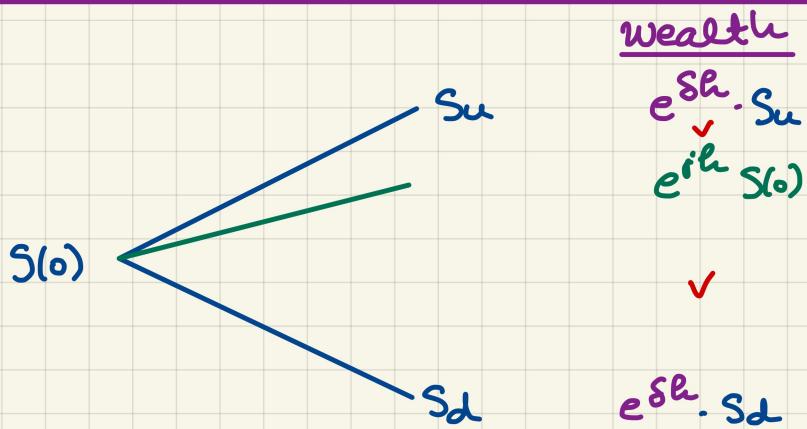
- r ... continuously compounded, risk-free interest rate,
i.e., accumulation ftn : $a(t) = e^{r \cdot t}$
- S ... dividend yield

Per share owned, the shareholder gets

$$S \cdot S(t) dt$$

in dividend payments over the time period $(t, t+dt)$.

Assume immediate and continuous reinvestment of dividend in the same stock.



$$e^{\delta \Delta t} \cdot S_d < e^{r\Delta t} \cdot S(0) < e^{\delta \Delta t} \cdot S_u$$

$$\cancel{e^{\delta \Delta t} \cdot d \cdot S(0)} < \cancel{e^{r\Delta t} \cdot S(0)} < \cancel{e^{\delta \Delta t} \cdot u \cdot S(0)}$$

$$d < e^{(r-\delta) \cdot \Delta t} < u$$

The no-arbitrage condition for the binomial asset pricing model.