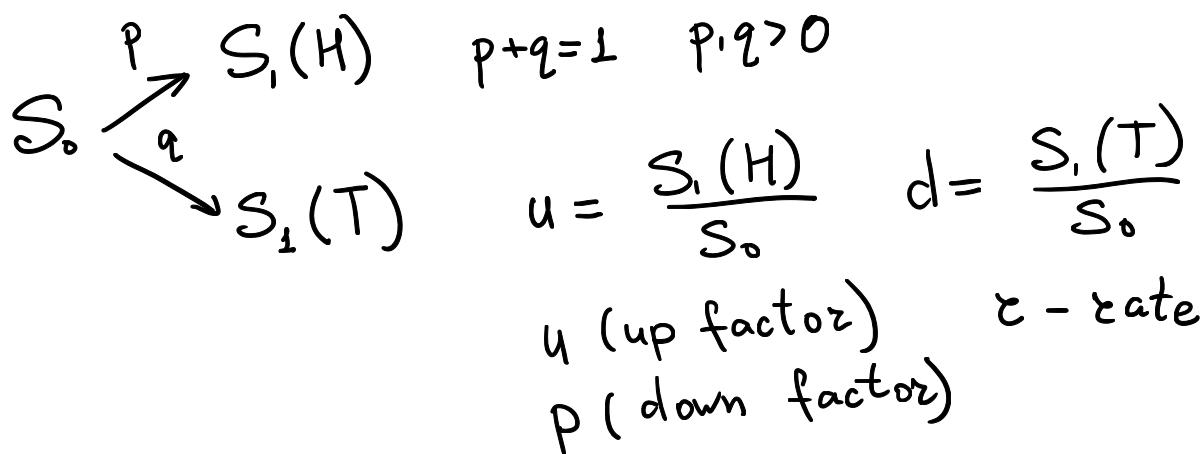


Stochastic Calculus for finance I

1. One-period binomial model



Defintion: Arbitrage is defined as
trading strategy that buying with
zero money and there is zero
probability of losing money
and there is also probability > 0
to gain money.

No-arbitrage condition

$$0 < d < 1 + \gamma < u$$

1.2 Arbitrage pricing model

(Approach that tries to price option by replicating it by trading in the stock and market money.)

If there is no arbitrage, the price of the option should be equal to the price of replicating portfolio

Example

$$S_0 = 4$$

$$u = 2$$

$$d = \frac{1}{2}$$

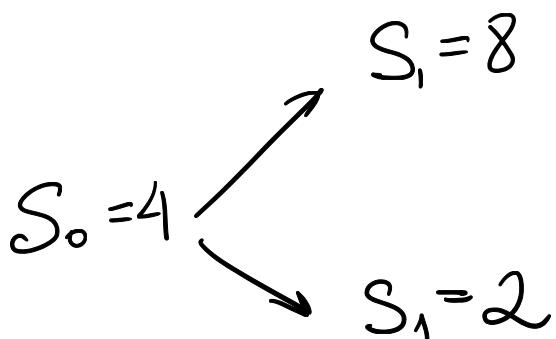
$$r = 0,25$$

$$K = 5$$

$$\chi_0 = 1.2 \quad \Delta_0 = \frac{1}{2}$$

$$\text{Cash}_0: (\chi_0 - \Delta_0 S_0) = -0,8$$

$$\text{Cash}_{t=1} (1+r) (\chi_0 - \Delta_0 S_0) = -1$$



$$\chi_1(H) = S_1(H) + (1+r)(X_0 - \Delta_0 S_0)$$

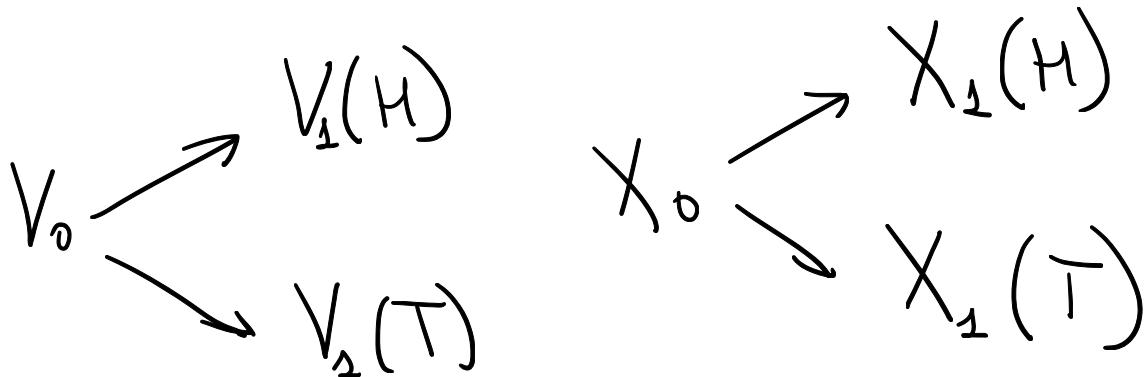
$$\chi_1(T) = S_1(T) + (1+r)(X_0 - \Delta_0 S_0)$$

$$\chi_2(H) = u S_0 + (1+r)(X_0 - \Delta_0 S_0)$$

$$\chi_2(T) = d S_0 + (1+r)(X_0 - \Delta_0 S_0)$$

$$\chi_1(H) = 3 \quad \chi_1(T) = 0$$

General approach to arbitrage pricing



derivative sec.

$$V_1 = X_1 \rightarrow V_0 = X_0$$

