- If no arbitrage & market complete then there exists a unique set of r.n. probabilities Q s.t. initial price C_0 of any (derivative) security can be calculated as

$$C_0 = E_0^Q\left[\sum_{i=1}^{n} \frac{F_{t_i}}{(1+r)^{t_i}}\right] \quad (\star)$$

where F_{t_i} = cash-flow at time t_i that goes to owner of the security

e.g. $F_T = \max(0, S_T - K)$, $F_{t_i} = 0$, $t_i < T$ } for a European call option

(1st Fundamental Thm of Asset Pricing)

- No-arb, mkts are incomplete $\Rightarrow$ there exist many sets of r.n. probabilities Q

And using $(\star)$ $\Rightarrow$ no-arb

2nd F.T. of A.P.

  - If a cash-flow can be replicated via a s.f. trading strategy then each possible Q will give same price for that cash-flow
- If a cash-flow $(F_{t_1}, F_{t_2}, \ldots, F_{t_n})$ can't be replicated then different Q's give different prices for that cash-flow