

Problems - Part 3

1.

(a) Use no arbitrage arguments in order to deduce the formula for the fair forward price for a forward contract.

(b) Consider a forward contract on a non-dividend paying share, with expiry date two years from now. Calculate the forward price, if the current share price is 10 Eur and the (continuously compounded) risk-free interest rate is 6% p.a.

2. Derive the lower bounds for European call options and European put options on a non-dividend paying share.

3.

(a) State what is meant by put-call parity.

(b) Consider a European call and a European put option on a non-dividend paying share with the same time to expiry (6 months from now) and the same strike price 10.5 Eur. Assume that the current share price is 10 Eur and the (continuously compounded) risk-free interest rate is 8% p.a. If the call option price is 0.5 Eur, calculate the price of the put option.

(c) By constructing two portfolios with identical payoffs at the exercise date of the options, derive an expression for the put-call parity of European options on non-dividend paying shares.

(d) By constructing two portfolios with identical payoffs at the exercise date of the options, derive an expression for the put-call parity of European options on a dividend paying share, where the dividend d is known to be payable at some date t_1 with $t < t_1 < T$.

(e) If the put-call parity in (b) does not hold, explain how an arbitrageur can make a riskless profit.