

University of Lisbon

ISEG



GESTÃO FINANCEIRA II

Problem Set 3

Licenciatura – Undergraduate Course

1st Semester, 2016-2017

GESTÃO FINANCEIRA II

PROBLEM SET 3

SUBMISSION DEADLINE: from 12.00 H to 15:00 H at the reception desk (Miguel Lupi's Building), 9TH December, 2016

Attached you can find the quotes for several options on Tesla Motors, with maturity on December, 30 (assume 30 days to maturity). Please, use that data to solve this problem set. In addition consider that Tesla Motors's dividend yield is 0. Assume that all options are European.

Consider that the annual risk free interest rate is 0.5% and consider years of 365 days.

GROUP 1

For each of the next few questions, choose the Tesla Motors' options that you consider more suitable to build the following strategies with options. To each strategy, draw the respective payoff diagram, including all respective values. Also explain the rationale behind its usage.

- a) Protective Put.
- b) Bull Spread with puts.
- c) Straddle.

GROUP 2

Consider the Call and the Put with exercise price of \$200.

- a) Using the Black-Scholes model, compute the Call's price and compare it with the market price. Explain eventual differences. What is the probability of exercise the call?
- b) What is the Put's price? Compare your result with the market price and explain eventual differences.
- c) Verify the Put-Call parity for both market and theoretical prices. Do we have any arbitrage opportunity? If so, set up the strategy to take advantage of the arbitrage opportunity.
- d) Consider the binomial model with 2 steps. Calculate again the theoretical prices of the Call and the Put, using both the replication approach and the risk neutral valuation.
- e) If these options were American, should we exercise them before the expiration date? Explain. Hint: recalculate the options price.
- f) Consider the binomial model with 20 steps. Use Microsoft Excel to compute the call and put options price. What is the probability of exercise the call? Explain eventual similarities or differences between these prices and those found with Black-Scholes. Hint: use only risk neutral valuation.