



LISBON  
SCHOOL OF  
ECONOMICS &  
MANAGEMENT  
UNIVERSIDADE DE LISBOA

## Corporate Investment Appraisal

Masters in Finance

2016-2017

Fall Semester

Clara C Raposo

### Problem Set 10:

### Valuation of Warrants, Rights and Convertible Bonds

**HAND IN SOLUTIONS - CLASS OF DECEMBER 12<sup>TH</sup>, 2016**

1. Firm RAP currently has 4 million shares outstanding, with a unit market price of €5. The firm announces an issue of 700,000 warrants at €6 each. Each warrant gives its holder the right to buy two new shares at a price of €5.5 each, in 5 years time. The volatility estimated for RAP's equity rate of return is 30% per year. The annual risk-free rate (in continuous time) is 1%.
  - a. What is the market value of each warrant?
  - b. What is the stock price once the warrants are issued?
  - c. What would be the fair price of the warrants at the time of their issuance? Comment.
  - d. Going back to the initial data, re-compute the value of the warrants using the binomial model (building a tree with 5 periods).
  
2. Company OSO is all-equity financed with 2 million shares listed in the Stock Exchange. The Board of Directors decides to go the market to raise more equity in a seasoned offering. The aim is to raise £2.0 million through a rights issue. OSO's share price immediately before the rights issue is £4.0. The terms of the issue are as follows: Each old share is entitled to 1 right which can be converted into a fixed number of new shares at the end of 90 days, at a price of £4.0 per share. The offering is underwritten by investment bank CLAC that charges an upfront fee of £400,000 for the firm commitment service. Company OSO is not expected to pay dividends during the life of the rights. The annual volatility of OSO's asset rate of return is 30%. The annual riskless rate (continuous) is 1%.
  - a. Into how many shares is each right convertible?
  - b. At the time of the rights issue, at what price are they traded?
  - c. What is the share price once the rights are issued?
  - d. How do you assess the investment bank's fee?

3. Compute the value of the following issue of convertible bonds by company RA, knowing that:

- RA is entirely equity financed;
- The company announces an issue of European convertible bonds, with annual coupons of 4.5%, maturity in 5 years, and placed at face value;
- The face value is €1000 per bond;
- The number of bonds to issue is: 100,000;
- The conversion price of these bonds is €8 per share;
- The company currently has 40 million shares outstanding;
- RA's stock price, immediately before the bond issue announcement is €6.0;
- The annualized volatility predicted for RA's assets, after issuing the bonds, is 25%;
- The risk-free rate of interest is 1% (continuous, for 1 year);
- The yield of a "standard" bond – without convertibility – for a company in the same class of risk would be 5%.