

# Advanced Corporate Finance—Part II

## Final Exam

June 2021

**Instructions:** This part of the exam is worth 50% of the final grade. Solve all parts of all problems. Please upload files with your answers and derivations. Problem 1 is worth 60% of this part of the exam, Problem 2 is worth 40% of this part of the exam. Within each problem, all parts have equal weight.

**Problem 1 (Valuation).** Your friend Bob wants to start a fruit-juice company, JUS Corporation. The business plan is as follows. Bob considers investing in a machine that costs €1 million this year (2021), and he believes that with the machine he will produce and sell 100,000 bottles of fruit-juice each year for the next ten years (starting in 2022). Additional unit costs to produce one bottle amount to €3 and each bottle will be sold for a price of €5. JUS Corporation will depreciate the machine's value in equal amounts over the next ten years and is subject to a corporate tax rate of 30%. Assume a typical firm in the fruit-juice business has a financing structure with 50% equity and 50% debt, cost of equity of 12% and cost of debt of 6%.

- (a) Calculate JUS's free cash flows for each of the next ten years.
- (b) Use the WACC rule to compute JUS Corporation's unlevered enterprise value. *[Hint: simplify the computations using the annuity formula.<sup>1</sup> If you have not answered part (a), assume constant free cash flows equal to  $X$  over the life of the firm and solve part (b).]*
- (c) Assume that Bob plans to ask for a bank loan to finance part of the initial investment. Assume the cost of debt is 6% and the loan contract requires JUS Corporation to pay €40,000 in interests on the loan for the next ten years. Use the APV method to compute JUS Corporation's enterprise value. *[Hint: simplify the computations using the annuity formula.]*

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<sup>1</sup>**Annuity formula.** The present value of periodic constant cash flows  $C$  over  $N$  periods with per-period discount rate  $r$ :

$$\frac{C}{r} \left[ 1 - \frac{1}{(1+r)^N} \right]$$

## Problem 2 (Real Options)

- (a) It is the beginning of September and you have been offered the following deal to go heli-skiing. If you pick the first week in January and pay for your vacation now, you can get a week of heli-skiing for €2500. However, if you cannot ski because the helicopters cannot fly due to bad weather, there is no snow, or you get sick, you do not get a refund. There is a 40% probability that you will not be able to ski. If you wait until the last minute and go only if you know that the conditions are perfect and you are healthy, the vacation will cost €4000. You estimate that the pleasure you get from heli-skiing is worth €6000 per week to you (if you had to pay any more than that, you would choose not to go). If your cost of capital is 8% per year, should you book ahead or wait?
- (b) You own a wholesale plumbing supply store. The store currently generates revenues of €1 million per year. Next year, revenues will either decrease by 10% or increase by 5%, with equal probability, and then stay at that level as long as you operate the store. Other costs run €900,000 per year. There are no costs for shutting down; in that case, you can always sell the store for €500,000. What is the business worth today if the cost of capital is fixed at 10%