

Introduction to Finance - II
Quiz 5 February 25, 2020

Read the questions carefully. Don't make them harder than they are! Answer succinctly and precisely. Show all of your work. As a reminder, the annuity factor (AF) for a T -year annuity discounted at $k\%$ (annually compounded) is computed as the difference between two perpetuities—one that starts today and one that starts in T years:

$$\text{AF} = \frac{1}{k} - \frac{\frac{1}{k}}{(1+k)^T}$$

And the present value of an annuity of $\$P$ for T years, discounted at $k\%$ (annually compounded) is: $P \cdot \text{AF}$.

1. Tucson Properties (TP) is a private equity shop that is considering undertaking a project involving an office building in downtown Tucson. TP would lease the building from HSL Properties for 10 years. The annual lease and improvement payments are predictable at \$1.6 million per year (on an after-tax basis) at the end of each of the next 10 years. TP has an 8% cost of equity capital, and would not (and could not) use debt for this project. Your market economics assessment suggests that there are three possible future states of demand for the office space on which you will be selling very short-term leases in a shared office format. In the low state, you expect annual net after-tax revenues of \$800,000 per year. Annual after-tax revenues would be \$2 million in the middle state and \$3.2 million per year in the up-state. The three states of nature are equally likely. You will learn which state is the actual one after one year of operating the property.

(a) **(20 points)** What is this project's net present value? What does this mean for TP?

(b) **(50 points)** HSL also offers a lease termination option. If you enter the lease, you can also buy the termination option for an up-front fee of \$1.8 million. If you purchase this option, then you have the right to terminate your lease after one year, at no additional cost. That is, the termination option gives you the right to walk away from the lease after one year.

What is the value of this option to TP? What should TP do?

(c) **(30 points)** What is the effect on your answers to the preceding questions if your net after-tax revenues were \$300,000, \$2 million, and \$3.7 million in the three possible (equally probable) states of nature, respectively? Be sure to speak to the three questions:

- i. The project's NPV without the option.
- ii. The value of the lease termination option.
- iii. What TP should do.

and relate these answers to your answers in the original case.