

If a question asks “why/explain”, you should give a full explanation that would convince a skeptic.

Name: _____
(also write your name on the back)

Finance 325: Quiz #3 – Solutions

November 9, 2010

1. You work for the Whiman County Department of Transportation, and you are looking to buy a bus for the Pullman Transit Authority. You have two different buses to choose from. The first bus (Bus A) costs \$350,000, and will require \$7,500 per year in maintenance costs over the life of the bus. This bus will last for 10 years. The second bus (Bus B) only costs \$220,000 and requires \$10,000 per year in maintenance costs over the life of the bus, and it will last for 7 years. Assume that the revenues from each bus will be the same. At the end of the service life of the bus, you will purchase the same bus again, and continue this cycle indefinitely. The discount rate used to evaluate bus purchases is 14%. Which bus should Pullman Transit buy? (4 pts)

This is an EAA question. First we solve for the NPV of each bus, and then compute the EAA.

	0	1	2	3	4	5	6	7	8	9	10
Bus A	-350	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5	-7.5
Bus B	-220	-10	-10	-10	-10	-10	-10	-10			

$$NPV_A = -350 - 7.5 \left(\frac{1}{0.14} - \frac{1}{0.14(1.14)^{10}} \right) = -389.121$$

$$NPV_B = -220 - 10 \left(\frac{1}{0.14} - \frac{1}{0.14(1.14)^7} \right) = -262.883$$

EAA_A :

$$-389.121 = EAA_A \left(\frac{1}{0.14} - \frac{1}{0.14(1.14)^{10}} \right)$$

$$EAA_A = \frac{-389.121}{\left(\frac{1}{0.14} - \frac{1}{0.14(1.14)^{10}} \right)} = -74.6$$

EAA_B :

$$-262.883 = EAA_B \left(\frac{1}{0.14} - \frac{1}{0.14(1.14)^7} \right)$$

$$EAA_B = \frac{-262.883}{\left(\frac{1}{0.14} - \frac{1}{0.14(1.14)^7} \right)} = -61.3$$

Thus, we would choose bus B, as it has a lower EAA cost.

2. We discussed alternatives to NPV when making investment decisions. Describe the payback period method, and give at least 2 reasons why payback period is an inappropriate measure for making an investment decision. (3 pts)

Payback period is the length of time until the sum of future CFs equals the initial investment. The decision rule is to accept any project with a payback period less than the benchmark payback period.

Payback period has the following problems:

- **Payback period does not correspond to a measure of the investment's effect on the value of the firm**
- **Payback does not discount future CFs**
- **Payback ignores distant CFs**
- **The benchmark period is arbitrary**

3. You want to value the stock of RealNetworks. The company does not currently pay a dividend, but you expect them to start paying an annual dividend 2 years from today. The dividend in 2 years will be \$6 per share, and will grow at the rate of inflation (which is 3% APR, compounded annually). The discount rate for RealNetworks' stock is 16% APR, compounded annually. What should be the share price of RealNetworks' stock? (3 pts)

0	1	2	3	4	5	6	...
		6	6(1.03)=6.18	6(1.03)²=6.37	6(1.03)³=6.56	6(1.03)⁴=6.75	...

This is a growing perpetuity, starting in year 2. To discount this, we use our growing perpetuity formula, which gives us the PV as of year 1, then discount back 1 year:

$$PV_1 = \frac{CF_2}{r - g} = \frac{6}{0.16 - 0.03} = \$46.15$$

$$PV_0 = \frac{46.15}{1.16} = \$39.78$$