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Please complete the following two applied problems. Show all your calculations and explain your results.

Problem 1:

A generous university benefactor has agreed to donate a large amount of money for student scholarships. The money can be provided in one lump sum of \$12 million in Year 0 (the current year), or in parts, in which \$7 million can be provided at the end of Year 1, and another \$7 million can be provided at the end of Year 2.

Describe your answer for each item below in complete sentences, whenever it is necessary. Show all of your calculations and processes for the following points:

- Assuming the opportunity interest rate is 8%, what is the present value of the second alternative mentioned above? Which of the two alternatives should be chosen and why?
- How would your decision change if the opportunity interest rate is 12%?
- Provide a description of a scenario where this kind of decision between two types of payment streams applies in the “real-world” business setting.

SOLUTION:

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a. $PV \text{ of future amount} = A / (1+r)^n$

Where A= annuity amount

r= opportunity rate of interest

n= number of year when amount will be received

So; $\$7000000 / (1+0.08)^1$

$$\$6,481,481.48$$

$$7000000 / (1+0.08)^2$$

$$\$6,001,371.74$$

$$\$6,481,481.48 + \$6,001,371.74$$

$$\$12,482,853.22$$

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From the first alternative's donation it was \$12 million while the second alternative provides \$12.48 million. Thus, the second alternative makes \$480,000 more than the first scholarship hence it is the best suit alternative to use.

- 1
b. If opportunity interest rate were 12%, we adjust calculations to show variances for the new parameters provided

So present value;

$$\$7000000 / (1+0.12)^1$$

$$\$6,250,000.00$$

$$\$7000000 / (1+0.12)^2$$

$$\$5,580,357.14$$

$$\$6,250,000 + \$5,580,357.14$$

$$\$11,830,357.14$$

The first alternative will be the best suit as it was \$12 million compared to the second alternative which is only \$11.83 million which means it is \$170 thousand less than the first value.

c. In the real world settings, financial managers use Present Value (NPV/FPV) calculations to account and manage for the time value of money (NPV). For instance, one may provide service for one year and receive payments later year. Hence, we assume the organization provides a service in February 2018 and agrees to be paid \$100 in February 2019. The time value of money shows that the \$100 is interest, which is for waiting one year for the \$100. Probably only \$90 of the \$100 is service revenue earned in 2018 and \$10 is interest earned in 2019. The present value calculation will remove the interest in order to determine the amount of service revenue.

Example 2 may involve land purchase; in this case the owners will sell it for \$350,000 if he receives the money today, or for \$400,000 if paid at the end of 2years. Therefore, at the end of the 2years, he would have earned interest for 2years on the amount he received it today.

Problem 2:

The San Diego LLC is considering a three-year project, Project A, involving an initial investment of \$80 million and the following cash inflows and probabilities:

Year 0	Year 1		Year 2		Year 3	
	Probability	Cash Flow (\$ mil.)	Probability	Cash Flow (\$mil.)	Probability	Cash Flow (\$ mil.)
	0.2	50	0.1	60	0.3	70
	0.3	40	0.2	50	0.4	60
	0.4	30	0.3	40	0.1	50

	0.1	20	0.4	30	0.2	40
Initial Investment \$80 mil.						
Discount Rate 8%						

Describe your answer for each question in complete sentences, whenever it is necessary. Show all of your calculations and processes for the following points:

- Describe and calculate Project A's expected net present value (ENPV) and standard deviation (SD), assuming the discount rate (or risk-free interest rate) to be 8%. What is the decision rule in terms of ENPV? What will be San Diego LLC's decision regarding this project? Describe your answer.
- The company is also considering another three-year project, Project B, which has an ENPV of \$32 million and standard deviation of \$10.5 million. Project A and B are mutually exclusive. Which of the two projects would you prefer if you do not consider the risk factor? Explain.
- Describe the coefficient of variation (CV) and the standard deviation (SD) in connection with risk attitudes and decision making. If you now also consider your risk-aversion attitude, as the CEO of the San Diego LLC will you make a different decision between Project A and Project B? Why or why not?

SOLUTION:

- Expected Net Present Value (ENPV)

The cash for year 1 cash flow = $0.2 \times 50 + 0.3 \times 40 + 0.4 \times 30 + 0.1 \times 20 = \36 million
The cash for year 2 cash flow = $0.1 \times 60 + 0.2 \times 50 + 0.3 \times 40 + 0.4 \times 30 = \40 million
The cash for year 3 cash flow = $0.3 \times 70 + 0.4 \times 60 + 0.1 \times 50 + 0.2 \times 40 = \54 million

So;

$ENPV = -80 + 36 / (1.08) + 40 / (1.08)^2 + 54 / (1.08)^3 = \30.5 million

The venture is worth the risk and so should San Diego LLC's accept the venture risk!

- Is it Project A or B?

From the calculations made in answer A, project B has a less ENPV. In cases of mutually exclusive projects, the best choice would be to choose projects with more ENPV. Hence, preferably project A over B.

- Risk-aversion attitude?

With the risk-aversion attitude for San Diego, LLC, he¹ will find the CV representing standard deviation for project B to have less deviation than A and would definitely go for project B. this is because the expected deviation for Project A is at \$30 million while B is at \$10.5 million. It is only sensible to avoid project A.

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