

Worksheet on (6.a.iv) Net Present Value and Opportunity Costs

Remember the formula: $FV = (PV)(1 + i)^T$

FV = future value

PV = present value

i = interest rate

T = time, usually the number of years

(1) Most any investment can be described as a cost incurred today in return for money down the road. To determine whether an investment is profitable one must take into account the fact that a dollar today is worth more than a dollar tomorrow, simply because a dollar today can be invested and turned into more than a dollar tomorrow—thus, a dollar today is preferable to a dollar tomorrow. Consider this hypothetical investment. You have the opportunity spend \$50,000 today on an investment that will be worth \$80,000 in 10 years. What is the opportunity cost of that investment? Answer that by assuming you can invest money at low risk at a 4% interest rate. If, instead of using the \$50,000 to buy the investment, you invested it at a 4% interest rate in 10 years, how much money would you have in 10 years? Is that more or less than \$80,000? What does that say about the profitability of this investment?

(2) Another way of assessing the profitability of the investment is to ask the present value of \$80,000 in ten years, using 4% as the interest or discount rate. What is the present value, and how does it compare to the \$50,000 cost of the investment? What does this say about the profitability of the investment.

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(3) We say that an investment, one incurring a cost of X today in return for more than X in T years, is profitable if, when the investment pays off, that payoff is greater than the opportunity cost. That “opportunity cost” is what?

(a) The amount of money that can be accumulated if that X is invested in the next best alternative estimate for T years.

(b) The present value of X , over T years.

(c) The amount of money the investment will make in T years, minus the present value of the initial investment of X .

(4) You have the opportunity to spend \$200,000 today on an investment that will earn you \$80,000 in one year, \$80,000 in two years, and another \$80,000 in three years. Is this a profitable investment? Answer by taking the present value of the next three years of investment profits, summing them, and comparing it to the \$200,000 outlay today. Assume that if the investment were not made, you would invest the \$200,000 at an interest rate of 4%. Answer by filling in the table below and indicating whether the investment is profitable.

	Cost	Revenues	Present value of revenues minus costs for each year
Today	\$200,000	\$0	
Year 1	\$0	\$80,000	
Year 2	\$0	\$80,000	
Year 3	\$0	\$80,000	
Sum of present values of yearly cash flows (revenues – costs) = _____ This investment is (circle one) PROFITABLE / NOT PROFITABLE			