

Stand-alone principle

Sunk costs

Opportunity costs

Side effects

- Erosion

- Synergy

Net working capital

Exclude financing costs

A company is considering a new project that will generate sales of \$1.6 million, \$2 million, \$1.9 million, and \$1.4 million over the next four years. The variable costs are 30 percent of sales and fixed costs are \$400,000. The equipment necessary for the project costs \$1.5 million and will be depreciated on a 3-year MACRS schedule. The equipment will be worth \$100,000 in four years. Net working capital will be 20 percent of next year's sales. The tax rate is 40 percent and the required return is 11 percent. What is the payback period, NPV, and IRR?

ICO	
Equipment	\$(1,500,000)
NWC	<u>(320,000)</u>
	\$(1,820,000)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Sales	\$1,600,000	\$2,000,000	\$1,900,000	\$1,400,000
VC	480,000	600,000	570,000	420,000
FC	400,000	400,000	400,000	400,000
Dep	<u>499,950</u>	<u>666,600</u>	<u>222,300</u>	<u>111,150</u>
EBT	\$220,050	\$333,400	\$707,700	\$468,850
Tax	<u>88,020</u>	<u>133,360</u>	<u>283,080</u>	<u>187,540</u>
NI	\$132,030	\$200,040	\$424,620	\$281,310
+ Dep	<u>499,950</u>	<u>666,600</u>	<u>222,300</u>	<u>111,150</u>
OCF	\$631,980	\$866,640	\$646,920	\$392,460
Δ NWC	(80,000)	20,000	100,000	280,000
Capital sp				<u>60,000</u>
Net CF	\$551,980	\$886,640	\$746,920	\$732,460
Beg NWC	\$320,000	\$400,000	\$380,000	\$280,000
End NWC	<u>400,000</u>	<u>380,000</u>	<u>280,000</u>	<u>0</u>
NWC CF	\$(80,000)	\$20,000	\$100,000	\$280,000

Salvage value	
Sales price	\$100,000
Taxes	<u>(40,000)</u> $(BV - MV)T_c = (\$0 - 100,000)(.40)$
Aftertax salvage value	\$60,000

Payback period	2.51 years	$2 + 381,380 / 746,920$
NPV	\$425,531.75	
IRR	21.14%	

COOPER'S WOODWORKING

Cooper's Woodworking is a mid-sized company located in the western United States. The company has been in existence for 80 years and was founded by John Cooper, the current owner's great grandfather. The company has made fine quality furniture since its inception and is considering expansion into the cooper industry. Coopering is the process of creating barrels. The barrels manufactured by the company will be used for wine making.

Operations: Making wine barrels involves seasoning the wood for two years. After this period, the process of bending the wood into the barrel shape and charring the inside for flavor is done. Cooper's owns the necessary land, purchased 5 years ago for \$900,000, which would bring \$1.2 million aftertax on the market today. Since the wood requires a two year seasoning period, Cooper's would require an initial investment of 20 percent of sales in two years. Net working capital each year will be required amounting to 20 percent of the projected sales two years later. (Assume no taxes or tax credit on the inventory.) The equipment necessary for production will cost \$3.2 million and will be constructed in one year. The equipment will be depreciated on a 3 year MACRS schedule (found on page 249 of the textbook.) The wine barrels will sell for \$245 each. Variable costs will be \$130 per barrel and fixed costs will be \$450,000 per year when production begins. Cooper's expects it will sell 16,000, 16,400, 17,000, and 17,500 barrels per year, respectively, during years 2 through 5.

Other Issues: The Company does not feel that the sales of wine barrels will end in four years. In fact, the company believes the sales will last indefinitely. For the necessary net working capital in Years 4 and 5, the sales in years 6 and 7 will be \$4,373,250 and \$4,460,715, respectively. After year 5, Cooper's believes the total cash flow each year (including net working capital and operating cash flow) will grow by 2 percent per year indefinitely. In any given year, Cooper's will recover the cash spent on net working capital two years prior. In other words, in Year 2, the company will recover the cash flow from the initial net working capital cash flow, etc. Cooper's is in a 35 percent tax bracket and requires a 13 percent rate of return on a project of this risk level.

Analysis: Calculate the payback period, NPV, and IRR for the project. Can you use all 3 of these in your analysis? Should the company undertake the project?

CF @ time 0

Land	-\$1,200,000
Inventory	<u>-784,000</u>
Total	-\$1,984,000

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Sales	\$0	\$3,920,000	\$4,018,000	\$4,165,000	\$4,287,500
VC	0	2,080,000	2,132,000	2,210,000	2,275,000
FC	0	450,000	450,000	450,000	450,000
Depreciation	0	1,066,560	1,422,080	474,240	237,120
EBT	<u>\$0</u>	<u>\$323,440</u>	<u>\$13,920</u>	<u>\$1,030,760</u>	<u>\$1,325,380</u>
Tax	0	113,204	4,872	360,766	463,883
NI	<u>\$0</u>	<u>\$210,236</u>	<u>\$9,048</u>	<u>\$669,994</u>	<u>\$861,497</u>
+Depreciation	0	1,066,560	1,422,080	474,240	237,120
OCF	<u>\$0</u>	<u>\$1,276,796</u>	<u>\$1,431,128</u>	<u>\$1,144,234</u>	<u>\$1,098,617</u>
NWC spending	-\$803,600	-\$833,000	-\$857,500	-\$874,650	-\$892,143
NWC recovered		\$784,000	\$803,600	\$833,000	\$857,500
Capital spending	-\$3,200,000				
Total CF	-\$4,003,600	\$1,227,796	\$1,377,228	\$1,102,584	\$1,063,974

Year 5 terminal value = $(\$1,063,974)(1.02) / (.13 - .02) = \$9,865,941$

Cash Flows	<u>t</u>	<u>CF</u>
	0	-\$1,984,000
	1	-4,003,600
	2	1,227,796
	3	1,377,228
	4	1,102,584
	5	9,865,941

NPV \$2,420,096.38

Your company is considering a project that will require an investment of \$160,000 in equipment and will result in sales of 11,000 units in Year 1 and 10,000 units in Year 2. The current price of the item is \$45, the current variable cost is \$27, and the current fixed cost per year is \$85,000. These costs will increase at the general inflation rate of 6 percent, and the nominal required return on the project is 14 percent. If the tax rate is 40 percent, what is the NPV of the project?

Inflation	6%
Nominal return	14%
Real	7.547%

	Nominal		Real	
	Year 1	Year 2	Year 1	Year 2
Price	\$47.70	\$50.56		
VC	\$28.62	\$30.34		
Sales	\$524,700.00	\$505,620.00	\$495,000.00	\$450,000.00
VC	314,820.00	303,372.00	297,000.00	270,000.00
FC	90,100.00	95,506.00	85,000.00	85,000.00
Dep	80,000.00	80,000.00	75,471.70	71,199.72
EBIT	\$39,780.00	\$26,742.00	\$37,528.30	\$23,800.28
Tax	15,912.00	10,696.80	15,011.32	9,520.11
NI	\$23,868.00	\$16,045.20	\$22,516.98	\$14,280.17
OCF	\$103,868.00	\$96,045.20	\$97,988.68	\$85,479.89
NPV	\$5,015.94		\$5,015.94	