

Capital Costs: Capitalization, Depreciation and Taxation

February 23. 2004

From an accounting perspective, there are two categories of costs:

- ‘Expensed’ costs
 - Items that are used up quickly; costs recovered out of current revenues
- ‘Capitalized’ costs
 - Long lifetime items; costs recovered progressively throughout the expected lifetime

Depreciation Example: Pizza Delivery Business

Sales: \$20,000/yr
Car purchase: \$6,000
Operating expenses: \$10,000
Car lifetime: 4 yrs
Net salvage value: \$0

Income statements (I): Expensing the car purchase

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Operating Revenues	20,000	20,000	20,000	20,000
Operating Expenses	10,000	10,000	10,000	10,000
Car Purchase	6,000	--	--	--
Operating Income (=operating revenues – operating expenses)	4,000	10,000	10,000	10,000
Net Cash Flow	4,000	10,000	10,000	10,000

Income Statements (II): Capitalizing the car purchase & straight-line depreciation

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Operating Revenues	20,000	20,000	20,000	20,000
Operating Expenses	10,000	10,000	10,000	10,000
Operating Income	10,000	10,000	10,000	10,000
Depreciation allowance	1500	1500	1500	1500
Net income (before taxes) = Operating income – depreciation allowance	8,500	8,500	8,500	8,500
Net cash flow	4000	10,000	10,000	10,000

Income statements (III): Expensing the car purchase; taxes included

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Op. Revenues (OR)	20000	20,000	20,000	20,000
Op. Expenses (OE)	10000	10,000	10,000	10,000
Car Purchase	6000			
Op. Income (OI)	4000	10000	10000	10000
Taxable Income (TI) (= OR-OE-‘other deductible items’)	4000	10000	10000	10000
Taxes (T= TI* τ) (τ = 30%)	1200	3000	3000	3000
Net Income After Taxes (=TI – T)	2800	7000	7000	7000
Net Cash Flow (= Total cash in – total cash out)	2800	7000	7000	7000

Income Statements (IV): Capitalizing and depreciating the car purchase; taxes included (Straight-line depreciation assumed)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Op. Revenues (OR)	20000	20,000	20,000	20,000
Op. Expenses (OE)	10000	10,000	10,000	10,000
Op. Income (OI)	10000	10000	10000	10000
Depreciation Allowance (D)	1500	1500	1500	1500
Taxable Income (TI = OR-OE-D)	8500	8500	8500	8500
Taxes (T= TI* τ) (τ = 30%)	2550	2550	2550	2550
Net Income After Taxes (ATNI =TI - T)	5950	5950	5950	5950
Net Cash Flow (NCF = Total cash in - total cash out)	1450	7450	7450	7450

Expensing the car cost

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Op. Revenues (OR)	20000	20,000	20,000	20,000
Op. Expenses (OE)	10000	10,000	10,000	10,000
Car Purchase	6000			
Op. Income (OI)	4000	10000	10000	10000
Taxable Income (TI) (= OR-OE-'other deductible items')	4000	10000	10000	10000
Taxes (T= TI* \square) (\square = 30%)	1200	3000	3000	3000
Net Income After Taxes (=TI - T)	2800	7000	7000	7000
Net Cash Flow (= Total cash in - total cash out)	2800	7000	7000	7000

Total taxes = \$10200

Depreciating the car cost

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Op. Revenues (OR)	20000	20,000	20,000	20,000
Op. Expenses (OE)	10000	10,000	10,000	10,000
Op. Income (OI)	10000	10000	10000	10000
Depreciation Allowance (D)	1500	1500	1500	1500
Taxable Income (TI = OR-OE-D)	8500	8500	8500	8500
Taxes (T= TI* \square) (\square = 30%)	2550	2550	2550	2550
Net Income After Taxes (ATNI =TI - T)	5950	5950	5950	5950
Net Cash Flow (NCF = Total cash in - total cash out)	1450	7450	7450	7450

Total taxes = \$10200

Expensing the car cost

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Op. Revenues (OR)	20000	20,000	20,000	20,000
Op. Expenses (OE)	10000	10,000	10,000	10,000
Car Purchase	6000			
Op. Income (OI)	4000	10000	10000	10000
Taxable Income (TI) (= OR-OE-'other deductible items')	4000	10000	10000	10000
Taxes (T= TI*□) (□= 30%)	1200	3000	3000	3000
Net Income After Taxes (=TI - T)	2800	7000	7000	7000
Net Cash Flow (= Total cash in - total cash out)	2800	7000	7000	7000

$$\begin{aligned} \text{NPV}(@10\%/yr) &= -6000 + 8800/1.1 + 7000/1.1^2 + 7000/1.1^3 + 7000/1.1^4 \\ &= \mathbf{\$17,825} \end{aligned}$$

Depreciating the car cost

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Op. Revenues (OR)	20000	20,000	20,000	20,000
Op. Expenses (OE)	10000	10,000	10,000	10,000
Op. Income (OI)	10000	10000	10000	10000
Depreciation Allowance (D)	1500	1500	1500	1500
Taxable Income (TI = OR-OE-D)	8500	8500	8500	8500
Taxes (T= TI*□) (□= 30%)	2550	2550	2550	2550
Net Income After Taxes (ATNI = TI - T)	5950	5950	5950	5950
Net Cash Flow (NCF = Total cash in - total cash out)	1450	7450	7450	7450

$$\begin{aligned} \text{NPV}(@0\%/yr) &= -6000 + 7450/1.1 + 7450/1.1^2 + 7450/1.1^3 + 7450/1.1^4 \\ &= \mathbf{\$17,615} \end{aligned}$$

Conclusion: On an after-tax NPV basis, the business would prefer to expense the car cost. But this is not permitted by the IRS!

Example: Capitalizing and depreciating the car; debt financing

Sales: \$20,000/yr

Car purchase: \$6,000

Operating expenses: \$10,000

Car lifetime: 4 yrs

Net salvage value: \$0

Car loan: \$4000

Loan term: 4 years

Repayment: Equal principal repayments
at end of year

Income Statement: Capitalization and (straight line) depreciation of the car + debt financing

	<u>T=0</u>	<u>End of Year 1</u>	<u>End of Year 2</u>	<u>End of Year 3</u>	<u>End of Year 4</u>
Operating Revenue (OR)		20000	20000	20000	20000
Operating Costs (OC)		10000	10000	10000	10000
Operating Income (OI = OR-OC)		10000	10000	10000	10000
Depreciation allowance (D)		1500	1500	1500	1500
Interest payment (IP)		400	300	200	100
Taxable income (TI = OI - D - IP)		8100	8200	8300	8400
Taxes (@ 30% of TI)		2430	2460	2490	2520
After-tax net income		5670	5700	5730	5760
Principal repayment (PR)		1000	1000	1000	1000
Net cash flow (NCF = OR - OC - IP - PR)	-2000	6170	6240	6310	6380

Sunset Inc.

INCOME STATEMENT & RETAINED EARNINGS

(For Year Ended December 31, 20xx)

Income statement

Net sales		
Sales & other operating revenue		\$303,000
Less sales return & allowances		<u>(3,000)</u>
		300,000
Cost of goods sold		
Labor	120,000	
Materials	60,000	
Overhead	8,000	
Depreciation	<u>20,000</u>	
Total		<u>(208,000)</u>
Gross profit		92,000
Operating expenses		
Selling	15,720	
General administration	29,000	
Lease payments	<u>14,000</u>	
Total	58,720	<u>(58,720)</u>
Net operating profit		33,280
Nonoperating revenues		0
Nonoperating expenses		
Interest payments		<u>(5,200)</u>
Net income before taxes		28,080
Income taxes (30%)		<u>(8,424)</u>
Net income		\$19,656
<i>Statement of retained earnings</i>		
Cash dividends		
Preferred stock (per share, \$6)		600
Common stock (per share, \$.95)		<u>9,456</u>
Total dividends		\$10,056
<i>Retained earnings</i>		
Beginning of year (1/1/20xx)		32,800
Current year		<u>9,600</u>
End of year		\$42,400
Earnings per share of common stock		
Net applicable income, (19,656 - 600)/10,000		<u>\$1.91</u>

2/23/04

Derivation of composite income tax rate:
Non-deductibility of federal taxes from state taxes

Let:

- τ = composite tax rate
- τ_f = federal tax rate
- τ_s = state tax rate
- T_f = federal taxes due
- T_s = state taxes due
- R = revenues received
- X = operating and maintenance expenses
- B = bond interest due
- D = depreciation allowance

Then:

$$T_f = \tau_f(R - X - D - B - T_s)$$

$$T_s = \tau_s(R - X - D - B)$$

Thus,

$$T_f = \tau_f(1 - \tau_s)(R - X - D - B)$$

$$\text{And total taxes, } T = T_f + T_s = (R - X - D - B)[\tau_f(1 - \tau_s) + \tau_s]$$

And if we define the total tax rate, τ as

$$T = \tau(R - X - D - B)$$

We have that

$$\tau = [\tau_f(1 - \tau_s) + \tau_s]$$