

# Lesson 17-2 – Income Taxes

# Corporate Income Taxes

- Corporate taxes also have provincial and federal components.
  - Federal Small Business: 10%
  - Federal Corporate: Nominal 38%, but realistically 15% (it's complicated – see <http://www.cra-arc.gc.ca/tx/bsnss/tpcs/crprtns/rts-eng.html>)
  - BC Small Business: 2.0% (<\$500,000 revenue);  
BC General Corporate: 12%
- Small Business Deductions apply to small companies and give tax credits to provide higher after tax income for reinvestment and expansion.
- Tax rules change regularly
- We refer to income to describe the amounts before application of taxes
- We refer to profit as what is left after tax.

## Corporate Income Taxes Continued...

- Corporate income taxes are prepared by professional accountants who follow Generally Accepted Accounting Principles (GAAP).
- The Income Tax Act defines specific accounting rules for declaring and maintaining the value of assets:
  - Cost base
  - Depreciation
  - Book value
  - Salvage value
- As well as determining revenues, what are legitimate expenses, and anything else you can think of

# Corporate Income Taxes

## Cashflows

### INCOME STATEMENT For ABC Corporation For the year ending 7 January 2013

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Operating revenue	OR
Operating costs	– OC
	<hr/>
<b>Before-tax cash flow</b>	BTCF
CCA	– CCA
Debt interest	– I
	<hr/>
<b>Taxable income</b>	OR – OC – CCA – I
Less income tax (at rate $t$ )	– $t(\text{OR} - \text{OC} - \text{CCA} - \text{I})$
	<hr/>
<b>Net profit</b>	$(\text{OR} - \text{OC} - \text{CCA} - \text{I})(1 - t)$

# Taxable Income: Problem

Assume that the combined tax for a business is 34% and the business has a gross income of \$300,000, the operating expenses are \$120,000, and the assets of the business are currently worth \$800,000. Assuming the average CCA rate across all those assets is 12%, how much income tax is due in this year?

Solution:

The depreciation of the asset is  $800,000 \times 12\% = \$96,000$

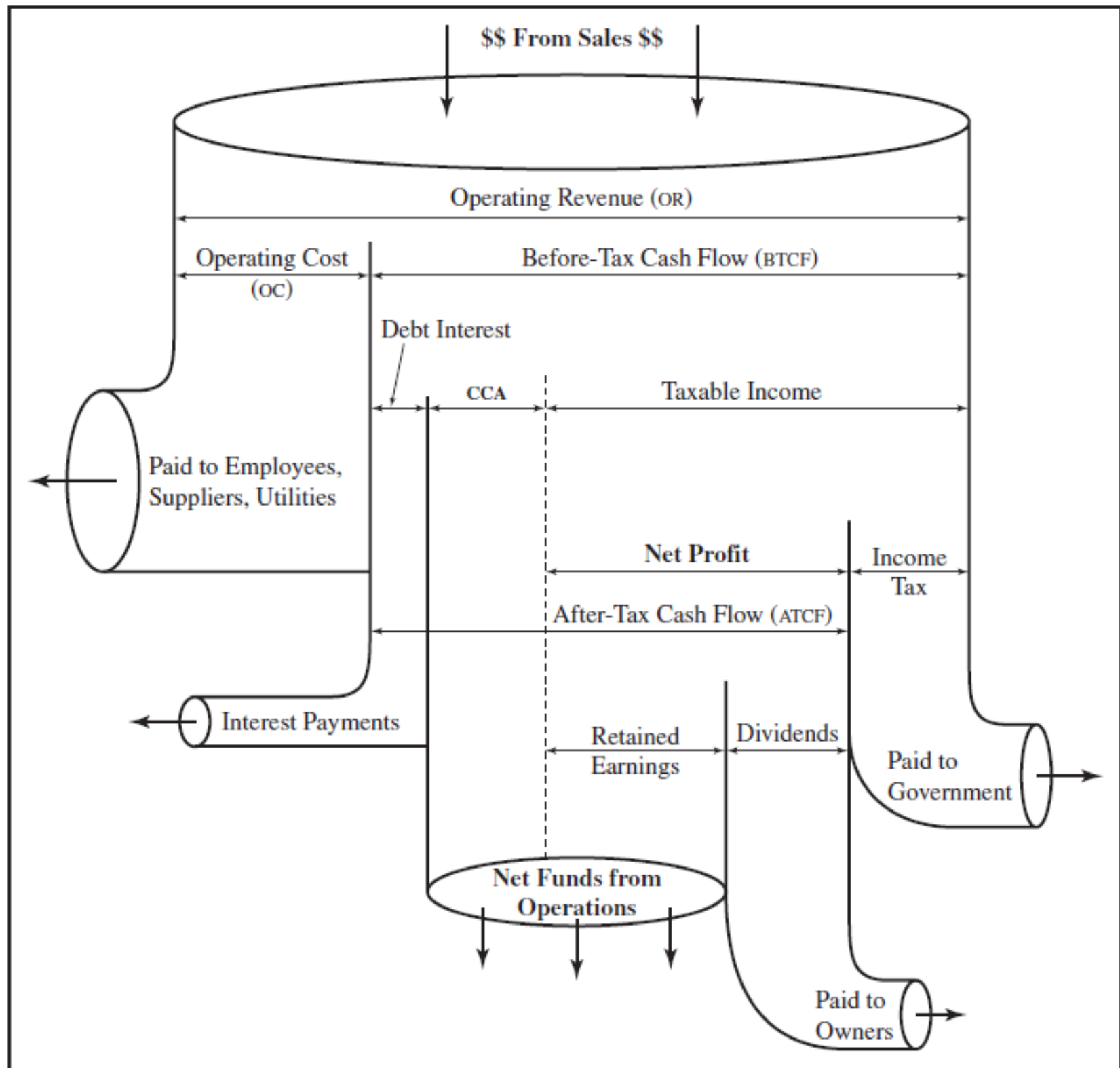
Taxable Income = OR – OC – Depreciation - Interest

Taxable Income =  $300,000 - 120,000 - 96,000 - \$0 = \$84,000$

Taxes =  $\$84,000(0.34) = \$28,560$

# What are all these things?

- Operating Revenue (OR)
  - Operating Costs or Expenses (OC or OpEx)
  - Before Tax Cashflow (BTCF)
  - Capital Cost Allowance (CCA) or Depreciation Expense
  - Debt Interest (I)
  - Taxable Income
  - Income Tax
  - Net Profit
- 
- After Tax Cashflow (ATCF)
  - Net Cashflow from Operations



# Before-Tax Cash Flow

- Before-tax cash flow (BATCF):
  - $BTCF = OR - OC$

Where:

OR = Operating Revenue

OC = Operating Costs



# Taxable Income

- Taxable Income
  - Taxable Income =  $\text{BTCF} - \text{CCA} - I$   
 $= \text{OR} - \text{OC} - \text{CCA} - I$

Where:

$I$  = debt interest;                       $t$  = tax rate

$\text{OR}$  = Operating Revenue

$\text{OC}$  = Operating Costs

$\text{CCA}$  = Capital Cost Allowance (for Canada,  
another depreciation expense in other places)

# Net Profit

- Net Profit
  - = Taxable Income – Income Tax
    - = Taxable Income –  $t(\text{taxable income})$
    - =  $(OR - OC - CCA - I)(1-t)$

Where:

$I$  = debt interest;                       $t$  = tax rate

$OR$  = Operating Revenue

$OC$  = Operating Costs

$CCA$  = Capital Cost Allowance (for Canada,  
another depreciation expense in other places)

# After-Tax Cash Flow

- After-tax cash flow (ATCF):
  - $ATCF = \text{Net profit} + CCA + I$   
 $= OR(1 - t) - OC(1 - t) + (CCA)(t) + (I)(t)$   
 $= BTCF - \text{Income Tax}$

Where:

$I$  = debt interest;                       $t$  = tax rate

$OR$  = Operating Revenue

$OC$  = Operating Costs

$CCA$  = Capital Cost Allowance

# Net Cashflow from Operations

- After-tax cash flow (ATCF):
  - $NCfO = ATCF - I - \text{Dividends}$   
 $= BTCF - \text{Income Tax} - \text{Interest} - \text{Dividends}$

Where:

$I$  = debt interest;                       $t$  = tax rate

OR = Operating Revenue

OC = Operating Costs

CCA = Capital Cost Allowance

# Net Cash Flow

A firm's net cash flow is:

Net cash flow = Net cash from operations

- + New equity

- + New debt

- + Proceeds from asset disposal

- Repurchase of equity

- Repayment of debt

- Purchase of assets

- Dividends

# What are Dividends?

- Dividends are portions of the profit that are paid to the shareholders
- The dividend is most often quoted in terms of the dollar amount each share receives (dividends per share).
  - Most secure and stable companies offer dividends to their stockholders. Their share prices might not move much, but the dividend attempts to make up for this.
  - High-growth companies rarely offer dividends because all of their profits are reinvested to help sustain higher-than-average growth.
- <http://www.investopedia.com/video/play/what-is-dividend/>

# What is Working Capital?

- An injected sum of money into an operation to cover the time lag between when money is returned from sales is called “working capital.”
- Often working capital is only necessary at the start, but depending on fluctuations can be required at other times.
- Working capital does not gain value nor does it depreciate in value during the project.

## How to Handle Loan Financing?

- Interest gets paid on the use of outside money.
- This is an expense of doing business.
- Interest is deducted from the before-tax income (See or Textbook Figure 12-2)
- As repayment of loan principle is just returning borrowed money, it comes from the after-tax cash flow. Example 12-12 demonstrates how this is handled on a spreadsheet.



# The CCA System

- The CCA (depreciation) expense reduces the taxable income but it increases the cash flow.
- The CCA increases the cash flow by an amount equal to:  $t(\text{CCA})$ , called the **CCA tax shield**.
- The CCA is added to the net income to get the net after-tax cash flow

# Capital Tax Factor

- When a capital asset is acquired, assuming the full CCA will be taken every year, the present value of the net capital investment is given by:

$$P = B \left[ 1 - \left( \frac{td}{i+d} \right) \left( \frac{1+i/2}{1+i} \right) \right]$$

B = Capital cost of asset or cost basis (could also be denoted as P)

d = CCA rate for the specified asset class

t = firm's marginal tax rate

i = discounted rate or interest rate

Present Worth of Tax Shield:

$$P = B \left[ \left( \frac{td}{i+d} \right) \left( \frac{1+i/2}{1+i} \right) \right]$$

# Disposing of Assets

- **Books-Open Assumption**

- Any difference between the book value and the actual salvage value will continue to be allocated at the regular CCA rate (continuing depreciation even after its sold/disposed-of)

- **Books-Closed Assumption**

- Calculate the recaptured CCA (taxes must be paid) or loss (tax credit received) and apply it to the fiscal year's income statement

- **Exception to both Assumptions: Capital Gain**

- $\text{Salvage value} - \text{Cost Basis} = \text{Capital Gain}$  (resulting in profit)
- Taxes must be paid on a capital gain; at a different rate than regular income

# Books-Closed Assumption

- Finding Net Salvage value (NSV) for Books-Closed Assumption:
  - $NSV = S(1 - t) + B_d t$   
 $= S + DTE$
  - $t$  = marginal tax rate  
(Reminder: marginal tax rate is the amount of tax paid on an additional dollar of income.)
  - $B_d$  = book value at disposal (UCC)
  - $DTE$  = disposal tax effect =  $t(B_d - S)$

## (Book-Open) Capital Salvage Factor

- When an asset is disposed of, the present value of the net salvage is:

$$S \left( 1 - \frac{td}{i + d} \right) \left( \frac{1}{1 + iN} \right)$$

Where:

S = Salvage Value

d = CCA rate for the specified asset class

t = firm's marginal tax rate

i = discounted rate (or interest rate)

N = lifetime (year of disposal)

# Books-Open Assumption

- More commonly used than books-closed
- Purchase of an asset for an amount B (or P) generates an infinite series of depreciation resulting in positive cash flows of tax credits
- Therefore the books have current record of all the assets that have come and gone throughout the corporation's history
- According to Canadian tax rules, an asset class remains open as long as there are assets remaining in it.
- When there are no more assets remaining in a class, you must reconcile the remaining UCC in the class – a positive value represents unclaimed depreciation that can be claimed as an expense. Negative UCC indicates CCA that must be recaptured.

# Books Open – Simple Example

Example: with CCA Recapture		
original cost of an item	\$15,000	
sales proceeds of the item	\$5,000	
UCC of the CCA class beginning of year		\$4,000
disposal (lower of \$5,000 and \$15,000)		<u>(\$5,000)</u>
balance of UCC after disposal		<u>(\$1,000)</u>
recapture added to income		<u>\$1,000</u>
final UCC		<u>\$ 0</u>

Example: No recapture		
original cost of an item	\$15,000	
Purchase Second Item	\$15,000	
sales proceeds of the 1st item	\$5,000	
UCC of the CCA class beginning of year		\$4,000
disposal (lower of \$5,000 and \$15,000)		<u>(\$5,000)</u>
Addition (purchase price of new asset)		<u>\$15,000</u>
balance of UCC after disposal		\$14,000
recapture added to income		<u>\$0</u>
final UCC		<u>\$14,000</u>

# Estimating the After-Tax Rate of Return

- It is usually a complex matter to obtain the after-tax MARR and it cannot usually be obtained from the before-tax MARR.
- $\text{MARR}_{\text{after-tax}} \approx \text{MARR}_{\text{before-tax}}(1-t)$  is only an approximation.
- We will assume, unless it is otherwise clearly stated, that we are using an after-tax MARR when we analyze the economics of a project with taxes.

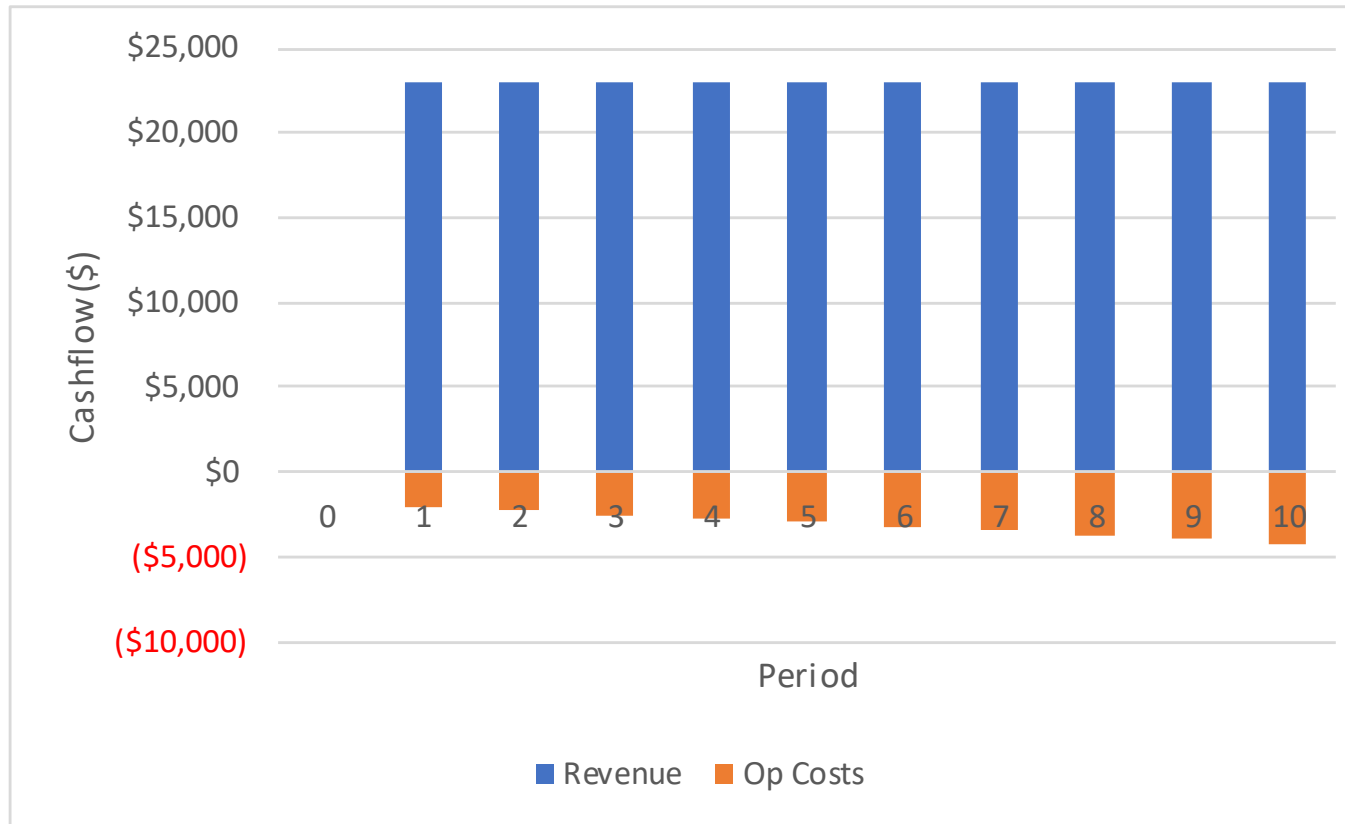


# Example – After Tax Cashflow Analysis

- You run a small bakery and want to add some conveyor cooling racks
- System cost: \$80,000, plus \$14,000 in electrical/structural improvements. Equipment, CCA class 10 (30%)
- Small business tax rate of 12%
- Expected sales increase: \$23,000 per year
- Expected cost increases
  - Electricity, \$500 per year
  - Maintenance: \$1500 in year one, increase \$250 per year
- Equipment will last 10 years with no salvage value
- Determine before and after tax NPV if MARR is 15%

# Before Tax:

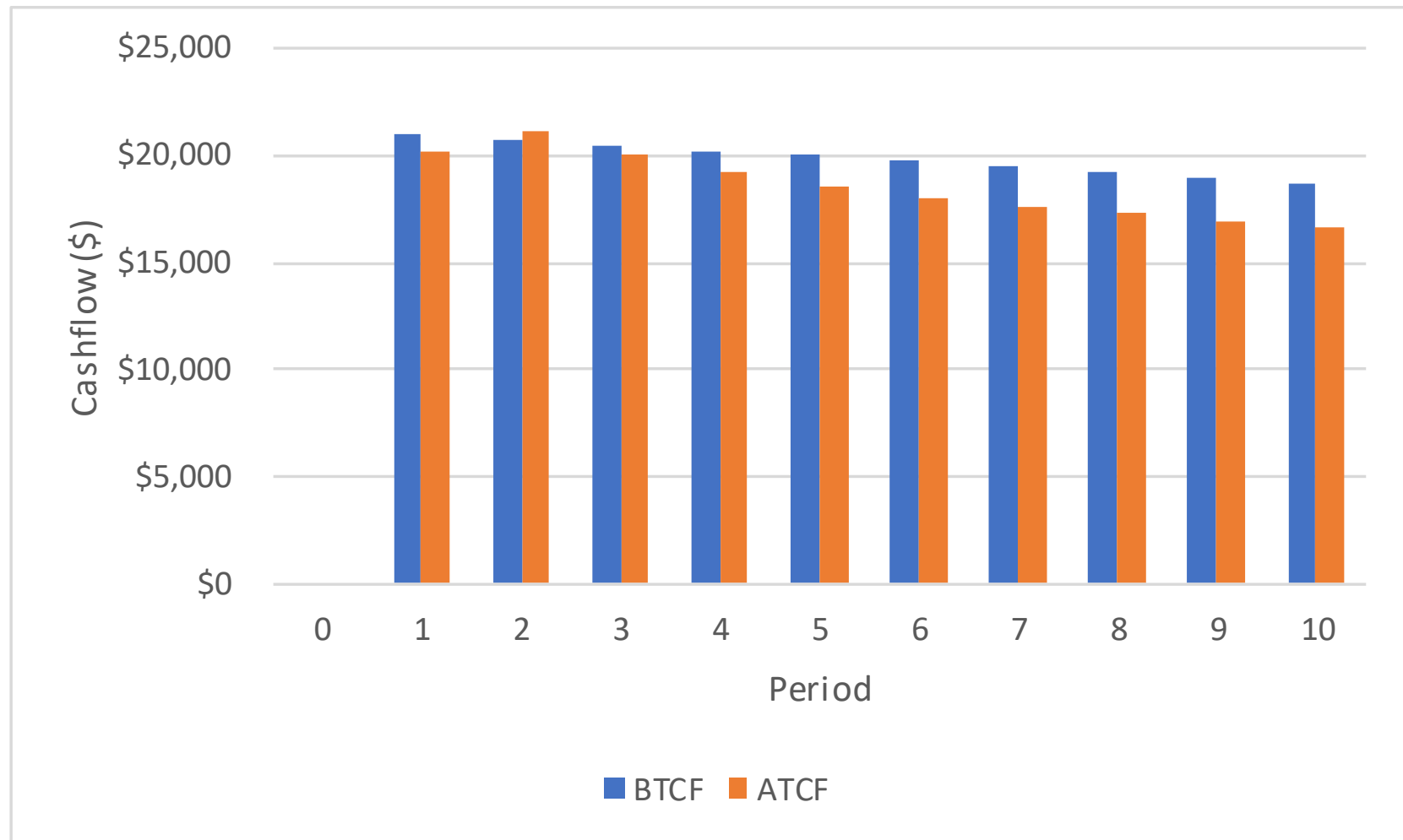
<b>Cost Basis</b>		\$94,000	
<b>MARR</b>	15%		<b>Tax Rate</b>
<b>Period</b>	<b>Revenue</b>	<b>Op Costs</b>	<b>BTCF</b>
0	\$0	\$0	\$0
1	\$23,000	(\$2,000)	\$21,000
2	\$23,000	(\$2,250)	\$20,750
3	\$23,000	(\$2,500)	\$20,500
4	\$23,000	(\$2,750)	\$20,250
5	\$23,000	(\$3,000)	\$20,000
6	\$23,000	(\$3,250)	\$19,750
7	\$23,000	(\$3,500)	\$19,500
8	\$23,000	(\$3,750)	\$19,250
9	\$23,000	(\$4,000)	\$19,000
10	\$23,000	(\$4,250)	\$18,750
		<b>NPV BTCF</b>	<b>\$7,149</b>



## After Tax

Cost Basis		\$94,000									
MARR	15%		Tax Rate	12%	CCA Rate	30%		Cost Basis		\$94,000	
Period	Revenue	Op Costs	BTCF	Opening UCC	CCA	Ending UCC	Taxable Income	Income Tax	Net Profit	ATCF	NCfO
0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1	\$23,000	(\$2,000)	\$21,000	\$47,000	\$14,100	\$32,900	\$6,900	\$828	\$6,072	\$20,172	\$20,172
2	\$23,000	(\$2,250)	\$20,750	\$79,900	\$23,970	\$55,930	(\$3,220)	(\$386)	(\$2,834)	\$21,136	\$21,136
3	\$23,000	(\$2,500)	\$20,500	\$55,930	\$16,779	\$39,151	\$3,721	\$447	\$3,274	\$20,053	\$20,053
4	\$23,000	(\$2,750)	\$20,250	\$39,151	\$11,745	\$27,406	\$8,505	\$1,021	\$7,484	\$19,229	\$19,229
5	\$23,000	(\$3,000)	\$20,000	\$27,406	\$8,222	\$19,184	\$11,778	\$1,413	\$10,365	\$18,587	\$18,587
6	\$23,000	(\$3,250)	\$19,750	\$19,184	\$5,755	\$13,429	\$13,995	\$1,679	\$12,315	\$18,071	\$18,071
7	\$23,000	(\$3,500)	\$19,500	\$13,429	\$4,029	\$9,400	\$15,471	\$1,857	\$13,615	\$17,643	\$17,643
8	\$23,000	(\$3,750)	\$19,250	\$9,400	\$2,820	\$6,580	\$16,430	\$1,972	\$14,458	\$17,278	\$17,278
9	\$23,000	(\$4,000)	\$19,000	\$6,580	\$1,974	\$4,606	\$17,026	\$2,043	\$14,983	\$16,957	\$16,957
10	\$23,000	(\$4,250)	\$18,750	\$4,606	\$1,382	\$3,224	\$17,368	\$2,084	\$15,284	\$16,666	\$16,666
	NPV BTCF		\$7,149						NPV ATCF	\$1,977.17	

# Cashflow Diagrams



## Example 2 – Using Factors

- You purchase a storage shed and rent out the space inside it.
- The shed cost \$4,000, and is Class 1, 4%
- You expect to save enough to retire in Hawaii in 6 years, and will sell the shed for \$2,000 then
- Your net annual profits are \$1500, and you have a tax rate of 22%
- Your MARR is 9%. use closed books for disposition
- What's the NPV of your investment?

# Shed Cost and Annual Profits

- PV of \$4000 Shed with CCA
  - = \$4000 \* Capital Tax Factor
  - $CTF = 1 - [(1+0.09/2)/(1+0.09)*(0.22*0.04)/(0.09+0.04)] = 0.935$
  - PV of Shed Cost = \$3740
- PV of annual benefits
  - $\$1500(1-0.22)*(P/A, 9\%, 6) = \$5249$
- PV of Salvage Value
  - $NSV = S + DTE = \$2000 + t(Bd - S)$
  - $Bd = B(1-d)^n = \$4000(1-0.04)^6 = \$3131$
  - $NSV = \$2000 + 0.22(3131-2000) = \$2249$
  - $PV(S) = \$2249(P/F, 9\%, 6) = \$1341$
- **NPV = \$5249 + \$1341 - \$3740 = \$2850**

# Practice Problem

Johnston Forwarding Inc. is considering the purchase of twenty new trucks for a special purpose fleet in their freight division. Each truck costs \$67,500. They are expected to be in service for eight years, then be salvaged for \$5,000 each. The trucks will be added to an existing CCA Class 10 asset pool. Each truck is expected to generate \$20,750 in annual revenue, net of direct operating costs. Johnston's maintenance cost-center charges \$1,550 per truck annually. There is also a fixed annual cost of \$35,000 to cover management and administration of the twenty trucks in the proposed fleet. Each truck will require an immediate investment of \$7,500 in net working capital. Johnston uses an after-tax minimum acceptable rate of return of 12¾ percent to analyze investments of this type. Johnston's marginal tax rate is 26½ percent. Determine whether Johnston Forwarding Inc. should invest in the new trucks. Use both a value and a rate of return criterion.

<i>Annual net revenue per truck:</i>	\$20,750
<i>Annual maintenance charge per truck:</i>	\$1,550
<i>Fixed costs:</i>	\$35,000
<i>Working capital per truck:</i>	\$7,500
<i>CCA rate:</i>	30%
<i>Tax rate:</i>	26.5%
<i>MARR:</i>	12.75%
<i>Planned lifetime (years):</i>	8
<i>Truck purchase</i>	-\$1,350,000.00
<i>PV(CCA tax shield gained)</i>	\$236,857.86
<i>Investment in working capital</i>	-\$150,000.00
<i>PV(Salvage)</i>	\$38,288.43
<i>PV(CCA tax shield lost on salvage)</i>	-\$7,120.31
<i>PV(recovered working capital)</i>	\$57,432.65
<i>PV(net after-tax operating cash flow)</i>	\$1,241,564.12
<i>NPV=</i>	<b>\$67,022.76</b>
<i>IRR=</i>	<b>14.004%</b>

**Johnston Forwarding Inc. should invest in the trucks.**

Example and  
spreadsheet by Ron  
McKinnon