Chapter 3

Integrative Examples and Cash Flow Estimation in Practice

In this chapter, we use two hypothetical examples to illustrate the net cash flow calculations. We conclude the chapter by considering the problems of cash flow estimation in the real world.

INTEGRATIVE EXAMPLE: THE EXPANSION OF THE WILLIAMS 5 & 10

The Williams 5 & 10 Company is a discount retail chain, selling a variety of goods at low prices. Business has been very good lately, and the Williams 5 & 10 Company is considering opening one more retail outlet in a neighboring town at the end of 1999. Management figures that it would be about five years before a large national chain of discount stores moves into that town to compete with its store. So it is looking at this expansion as a 5-year prospect. After five years, it would most likely retreat from this town.

The Problem

Williams' managers have researched the expansion and determined that the building needed could be built for $400,000 and that it would cost $100,000 to buy the equipment. Under MACRS, the building would be classified as 31.5-year property and depreciated using the straight-line method, with no salvage value. This means that $1/31.5$ of the $400,000 is depreciated each year. Also under MACRS, the equipment would be classified as 5-year property. Management expects to be able to sell the building for $350,000, and the equipment for $50,000, after five years.

The Williams 5 & 10 extends no credit on its sales and pays for all its purchases immediately. The projections for sales and expenses for the new store for the next five years are:

Year	Sales	Expenses
2000	$200,000	$100,000
2001	300,000	100,000
2002	300,000	100,000
2003	300,000	100,000
2004	50,000	20,000

The new store requires $50,000 of additional inventory. Since all sales are in cash, there is no expected increase in accounts receivable. The tax rate is a flat 30%, and there are no tax credits associated with this expansion. Also, capital gains are taxed at the ordinary tax rate.

The Analysis

To determine the relevant cash flows to evaluate this expansion, let's look at this problem bit-by-bit.

> The Williams 5 & 10 Company is a discount retail chain, selling a variety of goods at low prices. Business has been very good lately, and the Williams 5 & 10 Company is considering opening one more retail outlet in a neighboring town at the end of 1999.

This is an expansion of the business into a new market. Since Williams has other similar outlets, this is most likely a low risk type of investment.

> Management figures that it would be about five years before a large national chain of discount stores moves into that town to compete with its store. So it is looking at this expansion as a 5-year prospect. After five years it would most likely retreat from this town.

The economic life of this project is five years. Management expects to expand into this market for only five years, leaving when a competitor enters.

> Williams' managers have researched the expansion and determined they the building needed could be built for $400,000 and that it would cost $100,000 to buy the cash registers, shelves, and other equipment necessary to start up this outlet.

The initial outlay for the building and equipment is $500,000. There are no set-up charges, so we can assume that all other initial investment costs are included in these figures.

> Under MACRS, the building would be classified as 31.5-year property and depreciated using the straight-line method with no salvage value. This means that $\frac{1}{31.5}$ of the $400,000 is depreciated each year. Also under MACRS, the equipment would be classified as 5-year property.

The depreciation expense for each year is:

Year	Depreciation on the building	Depreciation on the equipment	Total depreciation expenses
1	$12,698	$20,000	$21,698
2	12,698	32,000	44,698
3	12,698	19,200	31,898
4	12,698	11,520	24,218
5	12,698	11,520	24,218
Total	$63,490	$94,240	

The tax bases of the building and equipment at the end of the fifth year are:

$$\text{Tax basis of building} = \$400{,}000 - 63{,}490 = \$336{,}510$$

and

$$\text{Tax basis of equipment} = \$100{,}000 - 94{,}240 = \$5{,}760$$

> The Williams 5 & 10 Company expects to sell the building for $350,000, and the equipment for $50,000, after five years.

The sale of the building is a cash inflow of $350,000 at the end of the fifth year. The building is expected to be sold for more than its book value, creating a taxable gain of $350,000 – $336,510 = $13,490. The tax on this gain is $4,047.

The sale of the equipment is a cash inflow of $50,000. The gain on the sale of the equipment is $50,000 – $5,760 = $44,240. The tax on this gain is 30% of $44,240, or $13,272.

> Williams extends no credit on its sales and pays for all its purchases immediately. The projections for sales and expenses for the new store for the next five years are:

Year	Sales	Expenses
2000	$200,000	$100,000
2001	300,000	100,000
2002	300,000	100,000
2003	300,000	100,000
2004	50,000	20,000

The change in revenues, ΔR, and the change in cash expenses, ΔE, correspond to the sales and costs figures.

> The new store would require $50,000 of additional inventory. Since all sales are in cash, there is no expected increase in accounts receivable.

The increase in inventory is an investment of cash when the store is opened: a $50,000 cash outflow. That's the amount Williams has to invest to maintain inventory while the store is in operation. When the store is closed in five years, there is no need to keep this increased level of inventory. If we assume that the inventory at the end of the fifth year can be sold for $50,000, that amount will be a cash inflow at that time. Since this is a change in working capital for the duration of the project, we include this cash flow as part of the asset acquisition (initially) and its disposition (at the end of the fifth year). We will classify the change in inventory as part of the investment cash flows.

The tax rate is a flat 30%, and there are no tax credits associated with this expansion. Also, capital gains are taxed at the ordinary tax rate of 30%.

Once we know the tax rate, we can calculate the cash flows related to acquiring and disposing of assets and the cash flow from operations.

We can calculate the cash flows from operations as:[1]

Year	Change in revenues (ΔR)	Change in expenses (ΔE)	Change in depreciation (ΔD)	Change in income after taxes $(\Delta R - \Delta E - \Delta D)(1 - \tau)$	Change in operating cash flow $(\Delta R - \Delta E - \Delta D)(1 - \tau) + \Delta D$
2001	$200,000	$100,000	$21,698	$54,811	$76,509
2002	300,000	100,000	44,698	108,711	153,409
2003	300,000	100,000	31,898	117,671	149,569
2004	300,000	100,000	24,218	123,047	147,265
2005	50,000	20,000	24,218	4,047	28,265

Or, equivalently, we can calculate the incremental operating cash flows from the new store as:

Year	Change in revenues (ΔR)	Change in expenses (ΔE)	Change in revenues and expenses after taxes $(\Delta R - \Delta E)(1 - \tau)$	Change in depreciation tax-shield ($\Delta D\tau$)	Change in operating cash flow $(\Delta R - \Delta E)(1 - \tau) + \Delta D\tau$
2001	$200,000	$100,000	$70,000	$6,509	$76,509
2002	300,000	100,000	140,000	13,409	153,409
2003	300,000	100,000	140,000	9,569	149,569
2004	300,000	100,000	140,000	7,265	147,265
2005	50,000	20,000	21,000	7,265	28,265

The pieces of this cash flow puzzle are put together in Exhibit 1, which identifies the cash inflows and outflows for each year, with acquisition and disposition cash flows at the top and operating cash flows below. Investing $550,000 initially is expected to result in cash inflows during the following five years. Our next task, which we take up in Section II, is to see whether investing in this project as represented by the cash flows in this time line will increase the owners' wealth.

[1] Remember that the changes in working capital have been classified along with acquisition and disposition cash flows.

Exhibit 1: Estimated Incremental Cash Flows from the Williams 5 & 10 Expansion

	End of year					
	Initial	2001	2002	2003	2004	2005
Investment cash flows						
Purchase and sale of building	–$400,000					+$350,000
Tax on sale of building						–4,047
Purchase and sale of equipment	–100,000					+50,000
Tax on sale of equipment						–13,272
Change in working capital	–50,000					+50,000
Investment cash flows	–$550,000					+$432,681
Change in operating cash flows						
Change in revenues, ΔR		+$200,000	+$300,000	+$300,000	+$300,000	+$50,000
Less: Change in expenses, ΔE		–100,000	–100,000	–100,000	–100,000	–20,000
Less: Change in depreciation, ΔD		–32,698	–44,698	–31,898	–24,218	–24,218
Change in taxable income		+$67,302	+$155,302	+$168,102	+$175,782	+$5,782
Less: taxes, $\tau(\Delta R - \Delta E - \Delta D)$		–20,191	–46,591	–50,531	–52,735	–1,735
Change in income after tax, $(1 - \tau)(\Delta R - \Delta E - \Delta D)$		+$47,111	+$108,711	+$117,671	+$123,047	+$4,047
Add: Depreciation, ΔD		+32,698	+44,698	+31,898	+24,218	+24,218
Change in operating cash flows, ΔOCF		+$79,809	+$153,409	+$149,569	+$147,265	+$28,265
Net cash flows	–$550,000	+$79,809	+$153,409	+$149,569	+$147,265	+$460,946