

# PROJECT VALUATION REVIEW

1. ESTIMATING CASH FLOWS
2. FINANCING AND INVESTMENT DECISIONS & EXTERNAL FUNDS NEEDED
3. DETERMINING INCREMENTAL CASH FLOWS
4. THE 4 CENTRAL INPUTS TO CASH FLOW FORECASTS
5. SENSITIVITY ANALYSIS  
Varying the Key Parameters: Some Sensitivity Analysis
6. Some conclusions / generalizations

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## BEYOND THE BASICS

- The key to capital budgeting is not just the mechanics - but rather varying key parameters into cash flow forecasts- ALONG with different discount rates changes the PRESENT VALUE of the cash flows.
- It is in how the assumptions are modeled that many mistakes can be made. This note thus does not focus on discount rates, but rather on the formulation of the cash flows.
- Capital budgeting emphasizes the key role management has in value creation by taking projects and expanding the size of the firm if profitable.

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*Professor G. Phillips - 1*

# **1. PROJECT CASH FLOWS**

## **A. Relevant Cash Flows: WHAT ARE THESE?**

- Relevant cash flows are those that come into or out of being because a project is undertaken, thus we are interested in incremental cash flows.
- Incremental cash flows - Any and all changes in the firm's future cash flows that are a direct consequence of taking the project.

## **B. The Stand-Alone Principle**

Viewing projects as "mini-firms" with

- their own assets,
- revenues and
- costs

Allows us to evaluate the investments separate from the other activities of the firm.

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# **ESTIMATING CASH FLOWS**

## **PRO FORMA FINANCIAL STATEMENTS AND PROJECT CASH FLOWS**

### **A. Getting Started: Pro Forma Financial Statements**

Treat the project as a mini-firm:

1. PROFORMAS: Start with pro forma (forecasted) income statement and balance sheet (don't include interest).
- The proforma income statement forecasts sales, costs and thus profit for the life of the project.
  - The proforma balance sheet answers 2 primary questions:
    1. The amount of assets needed to generate forecasted sales.
    2. The amount of external capital needed to finance the assets

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## B. PROJECT CASH FLOWS:

Goal is to Identify & Value Cash Flows

From the pro forma statements, compute:

### 3 COMPONENTS TO INCREMENTAL CASH FLOWS

- B1.** Cash flows from assets (Change for additions)
- B2.** INVESTMENTS
- B3.** NET TERMINAL VALUE

Note: The above can be used to value an entire firm as well as an incremental project.

Again: key is to only include cash flows associated with project or firm you are attempting to value.

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## B1. CASH FLOWS FROM ASSETS

For any period estimate:

- (1) sales,
- (2) costs and thus the profit margin,
- (3) capital spending (i.e. factory expansion) and also
- (4) net working requirements:

**Cash flow from assets =**

- + operating cash flow
- incremental capital spending / economic depreciation
- change in net working capital

where operating cash flow =

- + earnings before interest and taxes (EBIT)
- + depreciation
- taxes

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## Cash Flows and A Simple Income Statement:

SALES

- Cost of Goods Sold (CGS)
- Selling, General and Admin. Expense
- Depreciation

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= EBIT

- Taxes
- + Depreciation

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= Operating Cash Flow

A Proforma income statement is merely the forecast of the income statement (not adding back depreciation, subtracting interest) into the future for the relevant number of years.

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## B2. ESTIMATING INVESTMENT COST:

1. Cost of acquiring Investment / Installing It.
2. Additions to Net Working Capital:
  - + Cash
  - + AR
  - + Inventory
  - A/P
  - TAXES PAYABLE
3. NET PROCEEDS from SALE of Existing Assets.
4. TAX EFFECTS associated with Sales and Purchases.
  - Tax write-offs
  - Capital gains
  - tax on depreciation recapture
  - Investment Tax Credit

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## B3. ESTIMATING TERMINAL VALUE

2 alternatives:

1. Salvage or shut down business
2. Sell business as a going concern to a new owner

### 1. SALVAGE VALUE / SHUT DOWN

- I. SALE AMOUNT
- ii. RECAPTURE WORKING CAPITAL
- iii. TAX EFFECTS - GAIN VS BOOK VALUE

### 2. SALE OF BUSINESS AS GOING CONCERN

- i. PV OF FUTURE BUSINESS (Perhaps a multiple of earnings at that date OR use an Annuity Formula using last periods cash flow.)

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### **An Example: Fairways Driving Range**

Two friends are considering opening a driving range for golfers. Because of the growing popularity of golf, they estimate such a range could generate:

- rentals of 20,000 buckets at \$3 a bucket the first year, and
- rentals will grow at 750 buckets a year thereafter.

Equipment requirements include:

- ball dispensing machine \$2,000, ball pick-up vehicle \$8,000, tractor \$8,000
- All the equipment is 5-year ACRS property, and is expected to have a salvage value of 10% of cost after 6 years.
- Stocking a small shop selling tees, visors, gloves, towels, sun-block, etc., plus a checking account for the business make:

Net working capital \$3,000 to start, growth of 5% per year.

- Annual fixed operating costs are expected as follows:
- Expenditures for balls and baskets, initially \$3,000, are expected to grow at 5% per year. Fixed Costs: Lease on the land + Upkeep = \$53,000 per year.
- The relevant tax rate is 20% and the required return is also 15%.

Project is to be evaluated over a 6 year life: **Should they proceed?**

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## Pro forma income statement

Year	1	2	3	4	5	6
<b>Revenues</b>	<b>\$60,000</b>	<b>\$62,250</b>	<b>\$64,500</b>	<b>\$66,750</b>	<b>\$69,000</b>	<b>\$71,250</b>
<b>Variable costs</b>	<b>3,000</b>	<b>3,150</b>	<b>3,308</b>	<b>3,473</b>	<b>3,647</b>	<b>3,829</b>
<b>Fixed costs</b>	<b>53,000</b>	<b>53,000</b>	<b>53,000</b>	<b>53,000</b>	<b>53,000</b>	<b>53,000</b>
<b>Depreciation</b>	<b>3,600</b>	<b>5,760</b>	<b>3,456</b>	<b>2,074</b>	<b>2,074</b>	<b>1,036</b>
<b>EBIT</b>	<b>400</b>	<b>340</b>	<b>4,736</b>	<b>8,203</b>	<b>10,279</b>	<b>13,385</b>
<b>Taxes</b>	<b>80</b>	<b>68</b>	<b>947</b>	<b>1,641</b>	<b>2,056</b>	<b>2,677</b>
<b>Net income</b>	<b>320</b>	<b>272</b>	<b>3,789</b>	<b>6,562</b>	<b>8,223</b>	<b>10,708</b>

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## Depreciation on \$18,000 of equipment

Year	ACRS %	Depreciation	Book Value
<b>1</b>	<b>20.00%</b>	<b>\$3,600</b>	<b>\$14,400</b>
<b>2</b>	<b>32.00%</b>	<b>5,760</b>	<b>8,640</b>
<b>3</b>	<b>19.20%</b>	<b>3,456</b>	<b>5,184</b>
<b>4</b>	<b>11.52%</b>	<b>2,074</b>	<b>3,110</b>
<b>5</b>	<b>11.52%</b>	<b>2,074</b>	<b>1,036</b>
<b>6</b>	<b>5.76%</b>	<b>1,036</b>	<b>0</b>

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## Projected increases in net working capital

Year	Net WC	Increase in WC
0	\$3,000	\$3,000
1	3,150	150
2	3,308	158
3	3,473	165
4	3,647	174
5	3,829	182
6	4,020	-4,020

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## Projected cash flows

Year	EBIT	+ Depreciation	- Taxes	= Operating CF
1	\$400	\$3,600	\$80	\$3,920
2	340	5,760	68	6,032
3	4,736	3,456	947	7,245
4	8,203	2,074	1,641	8,636
5	10,279	2,074	2,056	10,297
6	13,385	1,036	2,677	11,744

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## Total cash flow

Year	+ Operating CF	- Increase in WC	+ Capital spending	= Total CF
0	\$0	\$3,000	-\$18,000	-\$21,000
1	3,920	150	0	3,770
2	6,032	158	0	5,874
3	7,245	165	0	7,080
4	8,636	174	0	8,462
5	10,297	182	0	10,115
6	11,744	-4,020	+1,440	17,204

And the final NPV = ? ; The IRR = ?;

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## 2. Financing and Investment Decisions

- Use of Proformas to gauge future funds needed for a given set of cash flow projections (for a given set of assumptions).
  1. Begin with Asset side of balance sheet
  2. Update Asset side of balance sheet to reflect new investment and new cash balances.
  3. Go to income statement. Get retained earnings for an “initial financial structure”
  4. Use Assets = Liabilities + Equity identity to figure out new liabilities and equity needed.
  5. Return to Step 3 to determine any changes to retained earnings based on new Liabilities and Equity (L & E).
  6. Iterate between steps 3 and 4 until no chg. in Liab & Equity

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## Example: Estimating Funds Needed

- Assume that you are going to invest \$100,000 in equipment for a new juice kiosk in a mall. You project the following sales and expenses.
  - You anticipate adding a new kiosk next year. (Hopefully going public in 5 years time with many kiosks)
  - Operating and lease expenses of 50,000 per kiosk, per year.
  - Advertising & overhead of \$10,000 per kiosk, per year.
  - Equipment can be depreciated at straight line of 20% for 5 years.
  - You have a tax rate of 33%, and have arranged a bank loan of \$50,000 at a 10% rate of interest. A friend also invests \$50,000 and expects 10% dividend each year. You put in \$20,000 cash for Net Working Capital
  - Forecast the cash flows and external funds needed for 2 years, assuming 1 kiosk added now, and one kiosk added next year.

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## Get ASSETS on Balance Sheet

- Remember, depreciation is a Source of Cash

<u>Assets</u>	<u>Yr 1</u>	<u>Yr 2</u>	<u>Liabilities</u>	<u>Yr 1</u>	<u>Yr 2</u>
Cash	??	??	Bank Loan: initial 50,000	??	??
Equip. Gross	100,000	200,000	<u>Equity</u>		
- Acc. Depreciation	-20,000	-60,000			
Equipment Net	80,000	140,000			
			Equity Invest.	70,000	??
			Retained Earnings	5,000	initial 10,000
Total Assets	??	??	Total L+E	??	??

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- Next go to Income Statement - Get Retained Earnings

	<u>Year 1</u>	<u>Year 2</u>
SALES	100,000	200,000
- Cost of Goods Sold (CGS)	50,000	100,000
- Selling, General and Admin. Expense	10,000	20,000
- Depreciation	20,000	40,000
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= EBIT	20,000	40,000
- Interest	5,000	?
- Taxes (33.33% or 1/3rd)	5,000	
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= Net Income	10,000	
- Dividend Payments	5,000	
= Retained Earnings	5,000	

- Note the difference between cash flows and profit

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## Update retained earnings, debt, equity Yr. 2

- REPEAT STEPS, iterating between income statement and balance sheet until CONSISTENT.

<u>Assets</u>	<u>Yr 1</u>	<u>Yr 2</u>	<u>Liabilities</u>	<u>Yr 1</u>	<u>Yr 2</u>
Cash	??	??	Bank Loan: initial 50,000	??	??
Equip. Gross	100,000	200,000			
- Acc. Depreciation	-20,000	-60,000	<u>Equity</u>		
Equipment Net	80,000	140,000	Equity Invest.	70,000	??
			Retained Earnings	5,000	initial 10,000
Total Assets	??	??	Total L+E	??	??

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### **3. ADVANCED CASH FLOWS: INCREMENTAL IS**

#### **KEY**

- **KEY QUESTION:**  
What' the result if the firm doesn't take the project?
- **Specific Items to Consider:**

#### **A. Sunk Costs**

- Sunk cost - A cash flow already paid or already promised to be paid.  
Obviously, these costs should not be included in the incremental flows of a project.

example: Allocated Overhead:

- Conclusion: Ignore sunk costs unless adding new overhead in proportion to expenditure.

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**B. Transfer Pricing:** need market prices.

#### **C. Opportunity Costs**

- Opportunity cost - Any cash flows lost or foregone by taking one course rather than another.
- These apply to any asset or resource that has value if sold rather than used.

#### **D. Side Effects: CANNIBALIZATION / SALES CREATION**

- With multi-line firms, projects often affect one another - sometimes helping, sometimes hurting.
- Erosion - Revenues gained by a new project at the expense of the firm's other existing products or services.
  - Example: Every time Kellogg's brings out a new oat cereal it probably causes some erosion of existing product sales.
  - Qualification: If another firm would (or could) produce this product any sales erosion should be ignored - "water over the dam."

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### E. Net Working Capital

- New projects often require incremental investments in cash, inventories, and receivables that need to be included in cash flows (if they are not offset by changes in payables, such as taxes or accounts payable.)
- Later, as projects end, this investment is often recovered.

### F. Financing Costs

- Do not include any interest or principal on debt or any dividends or other financing costs in computing cash flows.
  - The discount rate will take care of that.
  - Financing costs represent the diversion of cash flows to providers of capital as a result of the financing decision.
- This is the **BIGGEST DIFFERENCE** between financial forecasting and project/firm valuation.

### G. After-Tax vs. Before-Tax Cash Flows

- Use after-tax cash flow - not accounting earnings.

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## 4. The 4 Central Inputs to Cash Flow Forecasts

1. Initial Sales, S.
  2. Rate of Growth in Sales, g (KEY: Consult with marketing gurus.
  3. The After-Tax Profit Margin,  $p = \frac{EBIAT}{SALES}$
  4. Capital Intensity,  $a = \frac{FA + NWC}{SALES}$
- Capacity Utilization and Fixed vs. Variable Cost important.

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- Using these four inputs we can express the Cash Flows from Assets as:

$$CF = \left[ \frac{EBIAT}{SALES} - \left( \frac{FA + NWC}{SALES} * \frac{g}{1 + g} \right) \right] * SALES$$

- Where CF = (Free) Cash Flow from Assets
- EBIAT = Earnings before interest, after tax
- FA = Fixed Assets
- NWC = Net Working Capital
- g = growth rate in sales.
- Dividing both sides by SALES we get:

$$\frac{CF}{SALES} = \left[ \frac{EBIAT}{SALES} - \left( \frac{FA + NWC}{SALES} * \frac{g}{1 + g} \right) \right]$$

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- This formula highlights the following economic points (some obvious):

1. Cash Flows increase with profit margins:  $p = \frac{EBIAT}{SALES}$
2. Cash Flows decrease with capital intensity of assets:  $a = \frac{FA + NWC}{SALES}$
3. Cash flows decrease with growth: g.

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## **5. Varying the key parameters:**

### **Sensitivity Analysis**

These effects and the sensitivity analysis should highlight several questions that one may want to ask about valuations:

1. How sensitive is value to changes in:
  - discount rate
  - growth rate of sales
  - capital intensity ratio
  - profitability ratios
2. Given a current valuation level, what levels of the key variables must exist to warrant the valuation, given a certain discount rate -
  - Will the company be able to sustain its profit margins?
  - Do the growth rates make sense, given the growth rate of the economy, the industry and the company's market share
  - Are the capital intensity ratios sensible, given the company's strategy and comparable ratios in the industry?

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## **6. Some conclusions / generalizations**

- It is not appropriate to value earnings, per se.
  - You must take into account fixed assets and working capital required to support the sales and generate the earnings.
- Discounted cash flow analysis is not short term.
  - The Value depends on the discount rate used to value the future cash flows. It properly takes into account long term cash flows.
- Consider economic questions which emphasize change in assessing a company's performance.

Ask questions such as:

  - Operating strategies: Has the company lowered price to gain a future payoff (Airlines?)
  - Are there future scale economies as a large portion of cost is fixed?

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