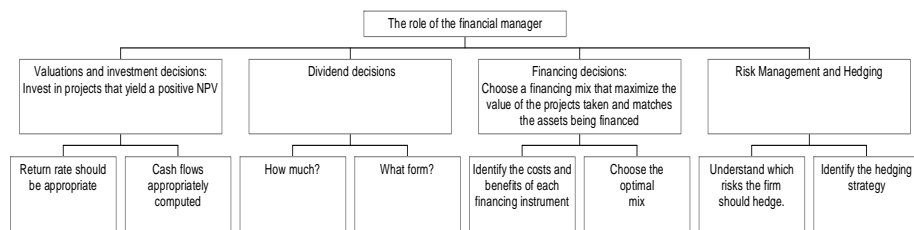


Lecture 3: Corporate Valuation

Corporate finance



The investment decision:
invest in project with positive NPV

$$NPV = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}$$

- Choose the appropriate discount rate (lecture 2)
- Compute expected cash flow (today)

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Structure of the lecture

- Free Cash flows definition(s)
- Pro forma statements
- Terminal value
- NPV calculation

Focus on corporate valuation

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Free Cash flows definition(s)

Free cash flow to firm	Free cash flow to equity
Sales	Sales
- Costs (operating costs)	- Costs (operating costs)
- Depreciation and Amortization	- Depreciation and Amortization
- Taxes	-Taxes
+Depreciation and Amortization	+Depreciation and Amortization
- Capital Expenditure	- Capital Expenditure
- Change in Working Capital	- Change in Working Capital
- Increase in other assets	- Increase in other assets
- Decrease in other liabilities	- Decrease in other liabilities
=Free cash flow of the firm	=Free cash flow of the firm
	-Interest expenses
	- Preferred dividends
	- Principal repayments
	+Proceeds with new debt issues
	=Free cash flow to equity

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Free Cash flow definitions Alternate approach

Claimholder	Cash flow to claimholder	Discount rate
Equityholders	Shareholder distribution -change in additional paid in capital	Cost of equity
Debtholders	Interest expenses+ Principal repayments- New debt issues	Cost of debt
Preferred stockholders	Preferred dividends	Cost of preferred stocks
Total	Free cash flow to equity +Interest expenses + Principal repayments - New debt issues + Preferred dividends	Weighted average of capital (lecture 9)

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Free Cash flow definitions An example

Au Bon Pain Free cash flow calculations



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Pro formas

Pro formas are prediction of the firm's future financial statements (balance sheet, income statement and cash-flows statements)

How to make pro-formas

- Important to be consistency with accounting rules
- How to make assumptions
 - » Sales growth rates
 - » Ratio analysis
 - » Plug or how you close your model
 - » Most common mistakes

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How to make pro formas Consistency with accounting rules

- Review your accounting notes. Basic accounting rules need to be satisfied (e.g. $A=L+E$)
- Interaction between income statement and balance sheet. Balance sheet changes because of:
 - (1) Acquisition or disposition of assets or liability
 - (2) Result's from the firm operations $RE_t=(NI_t - Div_t) + RE_{t-1}$Example: In 1996, ABP lost \$4.365 million (NI) and paid no dividends. Therefore RE ↓ \$4.365M from \$26,345M to \$21,980M. Had ABP paid a dividend, RE would have been reduced even more. This change in equity (a liability) must be offset by a change in assets.

[AuBon Pain 1996 financial statements](#)



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How to make pro formas Assumptions

- Practical suggestions:
 - Use spreadsheets
 - (sensitivity analysis) interaction among items in the balance sheet, the income statement and the cash-flow statement through formulas that relate spreadsheet cells.
 - Solving mutual dependencies in a spreadsheet is relatively easy.
 - [Example](#)
 - Sales growth rates
 - Ratio analysis
 - Plug or how you close your model

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How to make pro formas Assumptions

- Sales growth rates
- Ratio analysis
 - percent of sales
 - $COGS_{(t=1)} = (COGS_t / SALES_t) * SALES_{(t+1)}$
 - Days inventory

$$Days\ Inventory = \frac{Inventory}{\$CoGS\ per\ Day} = \frac{Inventory}{CoGS / 365} = \frac{Inventory \times 365}{CoGS}$$
 - Days receivable

$$Days\ Receivable = \frac{Avg.\ AR}{\$Credit\ Sales\ per\ Day} = \frac{Avg.\ AR}{Sales / 365} = \frac{Avg.\ AR \times 365}{Sales}$$
 - Days payable

$$Days\ Payable = \frac{Accounts\ Payable}{\$Purchases\ per\ Day} = \frac{AP}{CoGS / 365} = \frac{AP \times 365}{CoGS}$$

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How to make pro formas Assumptions

- **Example of using Days Ratios:**
 - First, calculate a historical Days Ratio:

$$Days\ Receivable_t = \frac{Avg.\ AR_t}{\$Credit\ Sales\ per\ Day_t} = \frac{Avg.\ AR_t}{Sales_t / 365} = \frac{Avg.\ AR_t \times 365}{Sales_t}$$

- Now, use the historical Days Ratio and your sales projection to project future Accounts Receivable:

$$AR_{t+1} = \frac{Days\ Receivable_t * Sales_{t+1}}{365}$$

- Example [AU Bon Pain Proforma assumptions](#)



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How to make pro formas Assumptions

- Plug – or how to close the model $A=L+E$
 - In modeling terms, the plug indicate how you assign the cash generated by the firm to the elements of the closing balance sheet.
 - In financial terms, the answer to this question indicates how the firm ultimately finances its activities
- You can choose any of the the following to close your model
 - Debt-sometimes called Bank Plug
 - negative is good
 - Circularity: Amount to borrow depends on change in RE, change in RE depends on NI, which depends on the interest expense, which depends on debt balance...
 - Cash
 - it is negative of debt
 - Equity

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Pro forma -Debt plug

Income Statement	1997	1998 Pro-Forma	
Sales		10,000	
COGS+operating expense		8,000	
Interest expense		$.1 \times (\text{PLUG}_t + 300)/2$	Assume interest expense equals 10% of average loan balance
Net income before taxes		$2,000 - .1 \times (\text{PLUG}_t + 300)/2$	
Tax		$.34[2,000 - .1 \times (\text{PLUG}_t + 300)/2]$	Assume 34% tax rate
Net income after tax		$.66[2,000 - .1 \times (\text{PLUG}_t + 300)/2]$	
Dividends		50	Given
Δ Retained earnings		$.66[2,000 - .1 \times (\text{PLUG}_t + 300)/2] - 50$	
Balance Sheets			
<i>Assets</i>			
Total Assets	1,800	3,000	From ratios
<i>Liabilities</i>			
Bank loan	300	PLUG _t	
Other liabilities	1,000	1,500	From ratios
Total liabilities	1,300	PLUG _t + 1,500	
Retained earnings	500	$500 + \Delta \text{Retained earnings}$	
Total liabilities and equity	1,800	PLUG_t + 1,500 + 500 + ΔRetained earnings	

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Pro forma - Debt Plug

•Bottom line is two equations in two unknowns. Excel can solve.

$$\bullet A = L + E \Rightarrow 3,000 = \text{PLUG} + 1500 + 500 + \Delta \text{RE}$$

$$\bullet \Delta \text{RE} = \text{NI-Div} \Rightarrow \Delta \text{RE} = .66[2,000 - .1 \times (\text{PLUG}_t + 300)/2] - 50$$

Solve for PLUG and Δ Retained Earnings:

$$\text{PLUG} = -\$269 \text{ and } \Delta \text{RE} = \$1269$$



[See spreadsheet](#)

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Example, ABP Pro- forma assumptions



Au Bon Pain 1996 Income Statement		
		<i>Pro-Forma Assumptions</i>
Revenues	236,934	Increase \$5 million/year
Costs of food and paper products	85,631	29% of sales
Restaurant operating expenses	115,364	40% of sales
Depreciation and Amortization	16,195	13% of prior year's PP&E
General and Administrative Charges	14,979	6% of sales
Non-recurring charge	4,435	0% of sales
Operating Income	330	
Interest Expense	5,140	.10 x Avg. Debt Outstanding
Other Expenses	2,473	1% of sales
Income before taxes	(7,283)	
Provision (benefit) for income taxes	(2,918)	34% tax rate
Net income (loss)	(4,365)	

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Pro- forma assumptions



Au Bon Pain Balance Sheet, Dec. 28, 1996		Pro-Forma Assumptions	
ASSETS			
Current Assets			
Cash and Equivalents	2,579	1%	of +
Accounts Receivable	7,730	12 days	receiv
Inventories	8,997	38 days	inven
Prepaid Expenses	2,553	1%	of +
Refundable Income Taxes	4,540		
Deferred Income Taxes	1,675	1%	of PI
Total Current Assets	27,874		
Property, Plant and Equipment	121,733	PP&E, -Depr. + Cap.	
Other Assets:			
Notes Receivable	2,291		
Intangible Assets	32,657	14%	of +
Deposits and Other	11,039	5%	of +
Total Other Assets	45,987		
Total Assets	195,594		
Liabilities and Stockholders' Equity			
Current Liabilities			
Accounts Payable	11,141	47 days	pay
Accrued Expenses	13,335	42 days	expe
Current maturities of long-term debt	702	Consolidate in PI	
Total current liabilities	25,178		
Long-term debt, less current maturities	49,736	Consolidate in PI	
Convertible subordinated notes	30,000	30,000 con	
Total liabilities	104,914		
Stockholders' Equity			
Paid-in capital	68,700	\$68,700 constant (no equity iss	
Retained earnings	21,980	No dividends until bank loan	
Total stockholders' equity	90,680		
Total liabilities and stockholders' equity	195,594		

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Pro- formas for ABP



Exhibit 5 - Au Bon Pain Pro-Forma Income Statements					
	1996	1997	1998	1999	2000
Au Bon Pain Pro-Forma Statements of Operations					
Revenues	246,934	241,934	246,934	251,934	256,934
Costs of food and paper products	85,631	70,101	71,611	73,061	74,511
Restaurant operating expenses	115,564	96,774	98,774	100,774	102,774
Depreciation and amortization	16,195	16,272	16,771	17,202	17,576
General and administrative charges	14,979	15,295	15,611	15,927	16,243
Non-recurring charge	4,435	0	0	0	0
Operating income	330	43,432	44,168	44,970	45,830
Other expenses	2,473	2,525	2,577	2,630	2,682
Interest expense (10% Avg. Debt Outstanding)	5,140	6,928	4,881	5,449	3,000
Taxable income	(7,283)	33,979	36,710	38,901	40,148
Income taxes	(2,918)	11,552	12,681	13,259	13,650
Net income (loss)	(4,365)	22,426	24,028	25,674	26,498
Retained earnings - beginning	26,345	21,980	44,406	68,634	81,189
Less shareholder distributions	0	0	0	13,128	23,116
Retained earnings - ending	21,980	44,406	68,634	81,189	84,571

Exhibit 6 - Au Bon Pain Pro-Forma Balance Sheets					
	1996	1997	1998	1999	2000
Au Bon Pain Pro-Forma Year-End Balance Sheets					
Assets					
Current Assets					
Cash and equivalents	2,579	2,633	2,688	2,742	2,797
Accounts receivable	7,730	7,954	8,118	8,283	8,447
Inventories	8,997	7,304	7,455	7,606	7,757
Prepaid expenses	2,553	2,403	2,452	2,502	2,552
Refundable income taxes	4,540	0	0	0	0
Deferred income taxes	1,675	1,726	1,771	1,826	1,883
Total current assets	27,874	22,021	22,485	22,943	23,395
Plant, property and equipment	121,733	125,461	128,690	131,488	133,912
Other Assets:					
Notes receivable	2,291	0	0	0	0
Intangible assets	32,657	33,346	34,035	34,724	35,414
Deposits and other	11,039	11,277	11,505	11,733	11,971
Total other assets	45,987	44,618	45,439	46,462	47,384
Total assets	195,594	192,100	196,715	200,893	204,692
Liabilities and Shareholders' Equity					
Current liabilities:					
Accounts payable	11,141	9,034	9,221	9,408	9,595
Accrued expenses	13,335	11,136	11,366	11,596	11,826
Current maturities of long-term debt	702	0	0	0	0
Total current liabilities	25,178	20,170	20,587	21,004	21,421
Bank loan (PLU/G)	0	28,823	8,794	0	0
Long-term debt less current maturities	49,736	0	0	0	0
Convertible subordinated notes	30,000	30,000	30,000	30,000	30,000
Total liabilities	104,914	78,993	59,381	51,004	51,421
Stockholders' equity					
Paid-in capital	68,700	68,700	68,700	68,700	68,700
Retained earnings	21,980	44,406	68,634	81,189	84,571

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Calculate free cash flows (1998) AuBon Pain



- **From pro formas**
 - Financing needs=8,794
 - Shareholders distribution=0
 - Interest payments=4,881
 - Principal payments=20,030
 - **Free Cash Flows**
 - **Total Firm FCF** = Revenue - Costs - Depreciation - Taxes + Depreciation - Capital Expenditures - \uparrow Other Assets - \uparrow NWC
 - $FCF_{[1998]} = 44,168 - 2,577 - 12,481 + 16,771 - 20,000 - (45,540 - 44,618) - [(22,485 - 20,587) - (22,021 - 20,170)] = 24,912$

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Your turn

- Martin Marietta
- Group of Six
- Financing needs, FCF
- Assumptions (sensitivity analysis)



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Terminal values

- **Liquidation Value.**
- **Multiples.** The basic approach is to multiply projected earnings by a “multiple” obtained from comparable firms to arrive at a terminal value. Examples of multiples include [P/E], [Firm Value/EBITDA].
- **Perpetual Growth.** This is the preferred approach. The present value of a growing perpetuity is given by the following formula:

$$\text{Terminal value}_t = \frac{E(\text{free cash flow}_{t+1})}{(r - g)}$$

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Terminal value - ABP example

- In the 2000 fiscal year, ABP will have a (predicted) cash flow to equity of \$23,116 million.
 - Assume a perpetual growth rate of 4% and a discount rate of 13% (= 6.0 + .82*8.5), the terminal value in year-end 2000 dollars is:

$$\text{Terminal value} = \frac{(23,116)(1.04)}{.13 - .04} = \$267 \text{ million}$$

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The NPV calculation

$$NPV = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}$$

- ABP example:

$$NPV \text{ of equity} = \frac{0}{(1.13)} + \frac{13,120}{(1.13)^2} + \frac{23,116}{(1.13)^3} + \frac{267,000}{(1.13)^3} = \$211M$$

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What have we learned?

- Definition of free cash flows
 - To the firm, or to shareholders?
- Forecasting futures free cash flows
 - Importance of assumptions
 - Consistency of the model (change in retained earnings affects balance sheet, and plug closes the model)
- Terminal values

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