

The Case of the Unanswered Questions

The setting

It is January 1, 2001. You have worked for several years at Boston Electronics. Yesterday, the CEO informed you that she would be retiring, effective immediately, and the Board of Directors has appointed you the new CEO. After a brief celebration, you arrive at work today ready to accept your new responsibilities. You are immediately confronted with a number of investment and financing decisions.

Task 1

Your first priority is to understand the company's financial condition. You have collected the following information, and you estimate that Boston Electronics' cost of capital is 10%.

Boston Electronics Projected income statements (\$ million)

Year	2000	2001	2002	2003	2004
Sales	587.1	610.2	650.0	689.0	730.3
Cost of goods sold	358.1	378.3	409.5	434.1	460.1
Selling and admin.	64.6	67.1	71.5	75.8	80.3
Depreciation	88.1	91.5	97.5	103.4	109.6
EBIT	76.3	73.2	71.5	75.8	80.3
Taxes	25.9	24.9	24.3	25.8	27.3
Interest	0	0	0	0	0
Net income	50.4	48.3	47.2	50.0	53.0

Projected balance sheets (\$ million)

Assets					
Accts receivable	58.7	61.0	65.0	68.9	73.0
Inventory	17.9	18.9	20.5	21.7	23.0
Property, plant, equip.	411.0	427.1	455.0	482.3	511.2
Total assets	487.6	507.1	540.5	572.9	607.3
Liabs and equity					
Accts payable	48.9	50.9	54.2	57.4	60.9
Equity	438.7	456.2	486.3	515.5	546.4
Total liabs and equity	487.6	507.1	540.5	572.9	607.3

(A copy of this data is included on the last page of the exam; feel free to tear off that sheet for reference on the following questions.)

- (a) The income statement looks pretty good, but you realize that cashflows matter more. What are the firm's projected cashflows for 2001 – 2004? Specifically, what are the cashflows from operations and how much is the firm spending each year on new property, plant, and equipment?

(Note: Capital expenditures = $PP\&E_t - PP\&E_{t-1} + \text{depreciation}_t$)

- (b) Cashflows that the firm doesn't use for new investment are called 'free cashflows.' You decide to pay this cash as dividends each period. What is the firm's expected payout ratio in years 2001 – 2004?

- (c) You project that the payout ratio and ROE for 2004 will be maintained indefinitely into the future. If so, how quickly will the firm grow? How much is the firm worth today?

(Note: $ROE_t = \text{net income} / \text{beginning of period book equity}$)

- (d) You decide that the firm's payout ratio might be too high – that it might be a good idea to reinvest more of the firm's earnings in new assets. If you decrease the payout ratio by 10%, how will this affect the firm's growth rate and stock price? (Either a quantitative or a qualitative answer is fine, but you should support your answer.)

Task 2

Boston Electronics is broken up into regional divisions. The manager of the Northwest division gives you a proposal to expand aggressively in Canada. Although this would require an investment in a new factory, he says that the increase in profits would be worth it. Do you agree?

The manager has made the following projections. The new factory would cost \$60 million (immediate cashflow) and will be depreciated over 5 years beginning in 2001. The firm can depreciate the factory, for both tax and accounting purposes, using straight-line depreciation. The salvage value of the factory will be \$10 million. Marketing and selling expenses will be \$8 million per year. Sales are expected to be \$40 million in 2001, jumping to \$70 million in years 2002 – 2005. Cost of good sold will be \$25 million in 2001 and \$35 million in 2002 – 2005. Inventory will be zero and the tax rate is 34%.

Should you proceed with the project? If so, how much will it add to firm value?

Task 3

If you proceed with the expansion into Canada, you will need to raise cash to finance the new factory. Boston Electronics currently has no debt in its capital structure, but you think that debt financing might be an attractive way to raise money. You collect the following data from The Wall Street Journal.

U.S. Treasury STRIP yields

Maturity	Jan 2001	Jan 2002	Jan 2003	Jan 2004	Jan 2005
Yield	5.40%	5.70%	5.95%	6.15%	6.30%

(a) If the expectations hypothesis is accurate, what do the bond yields tell you about future inflation and short-term interest rates? Be explicit: what are the expected one-year spot rates for 2002 – 2005?

(b) You were considering selling 5-year bonds to match the 5-year life of the Canada project. However, after looking at the STRIP yields, your CFO suggests that short-term borrowing might be a better alternative. He suggests, for example, that the firm could borrow \$60 million for one year and then repay the loan with new borrowing (repeating for all five years). Should you reward the CFO for his clever insight or fire him? Why?

Task 3, cont.

- (c) Suppose you decide to issue 3-year bonds (assume annual coupon payments). You estimate that your firm would have a AA bond rating. This implies that you could borrow at about 1% above the yield on government bonds for all maturities. At what price could you sell a 3-year bond with a face value of \$1000 and a coupon rate of 6%?
- (d) You consider the possibility of borrowing in Canada rather than the U.S. The Wall Street Journal reports that Canadian interest rates are roughly 1% lower than those in the U.S. In general terms (not numbers), how should this information affect your financing decision?

Formula sheet

$$\text{NPV} = \text{CF}_0 + \frac{\text{CF}_1}{(1+r)} + \frac{\text{CF}_2}{(1+r)^2} + \frac{\text{CF}_3}{(1+r)^3} + \frac{\text{CF}_4}{(1+r)^4} + \dots$$

$$\text{PV of an annuity} = C \times \left[\frac{1}{r} - \frac{1}{r(1+r)^T} \right]$$

$$\text{PV of a perpetuity} = \frac{C}{r}$$

$$\text{PV of a growing perpetuity} = \frac{C}{r-g}$$

$$1 + \text{real rate of interest} = (1 + \text{nominal rate}) / (1 + \text{inflation rate})$$

$$\text{real CF}_t = \frac{\text{nominal CF}_t}{(1 + \text{inflation rate})^t}$$

$$\text{EAR} = [1 + \text{APR} / k]^k - 1$$

$$\text{Bond price (general)} = \frac{C}{(1+r_1)} + \frac{C}{(1+r_2)^2} + \frac{C}{(1+r_3)^3} + \frac{C}{(1+r_4)^4} + \dots + \frac{C + \text{FV}}{(1+r_T)^T}$$

$$\text{Bond price (semiannual coupons)} = \text{Coupon} \times \left[\frac{1}{r/2} - \frac{1}{r/2(1+r/2)^{2T}} \right] + \frac{\text{FV}}{(1+r/2)^{2T}}$$

$$\text{Spot rate: } (1+r_t)^t = (1+r_1) \times (1+f_2) \times (1+f_3) \times \dots \times (1+f_t)$$

$$\text{Forward rate: } 1+f_t = \frac{(1+r_t)^t}{(1+r_{t-1})^{t-1}}$$

$$\text{Duration} = \frac{\text{PV}(\text{CF}_1)}{\text{Price}} \cdot 1 + \frac{\text{PV}(\text{CF}_2)}{\text{Price}} \cdot 2 + \frac{\text{PV}(\text{CF}_3)}{\text{Price}} \cdot 3 + \dots + \frac{\text{PV}(\text{CF}_T)}{\text{Price}} \cdot T$$

$$\% \text{ change in price} \approx - \text{Duration} \times \frac{\text{change in } r}{1+r}$$

$$\text{Stock price} = \frac{\text{Div}_1}{(1+r)} + \frac{\text{Div}_2}{(1+r)^2} + \frac{\text{Div}_3}{(1+r)^3} + \frac{\text{Div}_4}{(1+r)^4} + \dots$$

$$\text{Stock price} = \frac{\text{Div}}{r} = \frac{\text{EPS}}{r}$$

$$\text{Stock price} = \frac{\text{Div}_1}{r - g}$$

$$\text{Stock price} = \frac{\text{EPS}}{r} + \text{NPVGO}$$

$$\text{DY} = \frac{\text{Div}}{\text{Price}} = r - g$$

$$\text{P/E} = \frac{1}{r} \times \left[\frac{\text{price}}{\text{price} - \text{NPVGO}} \right]$$

$$\text{M/B} = \frac{\text{payout}}{(r / \text{ROE}) - \text{plowback}}$$

$$\text{Plowback ratio} = \text{Reinvestment} / \text{Earnings}$$

$$\text{Growth} = g = \text{ROE} \times \text{plowback ratio}$$

Boston Electronics

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