Chapter10_preview

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1. **Explain the following terms:**

- **Volatility**: A measure of how much the return of a security or portfolio fluctuates. It is often represented by the standard deviation of returns.
- **Common Risk & Independent Risk**:
  - **Common Risk** (Systematic Risk): Affects all stocks simultaneously due to market-wide events (e.g., interest rate changes).
  - **Independent Risk** (Idiosyncratic Risk): Unique to individual firms and unrelated across stocks; can be eliminated through diversification.
- **Firm-Specific Risk vs. Systematic Risk**:
  - **Firm-Specific Risk**: Arises from events unique to a company (e.g., management decisions); also called idiosyncratic or diversifiable risk.
  - **Systematic Risk**: Market-wide risk due to macroeconomic factors; cannot be diversified away.
- **Risk Premium & Market Risk Premium**:
  - **Risk Premium**: The extra return investors require for taking on risk compared to the risk-free rate.
  - **Market Risk Premium**: The expected excess return of the market portfolio over the risk-free rate:

$$\text{Market Risk Premium} = \mathbb{E}[R_{\text{Mkt}}] - r_f$$

- **Efficient Portfolio**: A portfolio that contains only systematic risk and cannot be further diversified without reducing expected return.
- **Market Portfolio**: A theoretical portfolio containing all assets in the market; often assumed to be efficient and used as a benchmark in CAPM.

2. **Why is the risk premium of diversifiable risk zero?**

Because diversifiable (firm-specific) risk can be eliminated through diversification, investors are not compensated for bearing it. If there were a premium, investors could earn a return without taking actual risk, creating arbitrage opportunities—which markets eliminate.

3. **Define the beta of a security:**

Beta (β) is the sensitivity of a security's return to the return of the market portfolio. Formally, it represents the expected % change in a security's return for a 1% change in the market return.

4. **How can you use a security's beta to estimate its cost of capital?**

Using the **Capital Asset Pricing Model (CAPM)**:

$$r_i = r_f + \beta_i \cdot (\mathbb{E}[R_{\text{Mkt}}] - r_f)$$

Where:

- r_i = cost of capital for the security
- r_f = risk-free rate
- β_i = beta of the security
- $\mathbb{E}[R_{\text{Mkt}}] - r_f$ = market risk premium.

#5 (p.297)

After looking at the projections of the HomeNet project, you decide that they are not realistic. It is unlikely that sales will be constant over the four-year life of the project. Furthermore, other companies are likely to offer competing products, so the assumption that the sales price will remain constant is also likely to be optimistic. Finally, as production ramps up, you anticipate lower per unit production costs resulting from economies of scale. Therefore, you decide

to redo the projections under the following assumptions: Sales of 50,000 units in year 1 increasing by 50,000 units per year over the life of the project, a year 1 sales price of $260/unit, decreasing by 10% annually and a year 1 cost of $120/unit decreasing by 20% annually. In addition, new tax laws allow 100% bonus depreciation (all the depreciation expense occurs when the asset is put into use, in this case immediately).

a. Keeping the other assumptions that underlie Table 8.1 the same, recalculate unlevered net income (that is, reproduce Table 8.1 under the new assumptions, and note that we are ignoring cannibalization and lost rent).

Year	Sales ($000s)	Cost of Goods Sold ($000s)	SG&A ($000s)	R&D ($000s)	Depreciation ($000s)	EBIT ($000s)	Taxes @ 20% ($000s)	Unlevered Net Income ($000s)
0	0	0	0	15000	8000	-23000	0	-23000
1	13000	6000	2800	0	0	4200	840	3360
2	23400	9600	2800	0	0	11000	2200	8800
3	31590	11520	2800	0	0	17270	3454	13816
4	37908	12288	2800	0	0	22820	4564	18256
5	0	0	0	0	0	0	0	0

- Sales volume increases 50,000 units per year.
- Price declines 10% annually.
- Cost per unit declines 20% annually.
- 100% bonus depreciation in year 0 ($1.5M).
- SG&A remains constant at $2.8M per year.
- R&D expense of $15M only in year 0.
- 20% corporate tax rate.

b. Recalculate unlevered net income including lost rent and assuming that each year 20% of sales comes from customers who would have purchased an existing Cisco router for $100/unit and that this router costs $60/unit to manufacture

Year	Sales ($000s)	COGS ($000s)	Gross Profit (	SG&A ($000s)	R&D ($000s)	Depreciation	EBIT ($000s)	Tax @20% (	Unlevered Net Income	Cannibalized Units	Lost Profit from Cannibalization	Adjusted EBIT ($	Adjusted Tax @20% (	Adjusted Unlevered Net Income
0	0	0	0	0	15000	1500	-16500	3300	-19800	0	0	-16500	3300	-19800
1	13000	6000	7000	2800	0	0	4200	840	3360	10000	400	3800	760	3040
2	23400	9600	13800	2800	0	0	11000	2200	8800	20000	800	10200	2040	8160
3	31590	11520	20070	2800	0	0	17270	3454	13816	30000	1200	16070	3214	12856
4	37908	12288	25620	2800	0	0	22820	4564	18256	40000	1600	21220	4244	16976

- 20% of yearly sales are assumed to replace existing Cisco routers.
- Each cannibalized unit represents a lost profit of $40 ($100 – $60).
- The lost profit is subtracted from EBIT before tax is calculated.