



FIN 503-MANAGERIAL FINANCE

Ch1-4-11 – Quick Review

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Chapter 1

The Financial Manager and the Firm

1. Define Corporate Finance and explain the three basic questions Financial Managers must answer?

Corporate finance is the division of a company that deals with financial and investment decisions. So, is primarily concerned with maximizing shareholder value through long-term and short-term financial planning and the implementation of various strategies.

Corporate finance activities range from capital investment decisions to investment banking.

The three basic questions are:

- **Capital Budgeting:** decide which long-term assets to acquire
 - What long-term investments or projects should the business take on?
 - How long is the company planning to manage its investments?
- **Financing:** decide how to pay for short-term and long-term assets
 - How should we pay for our assets?
 - Should we use debt or equity?
- **Working Capital:** decide how to manage short-term resources and obligations
 - How do we manage the day-to-day finances of the firm?
 - What is the ideal working capital required for day to day operation?

2. What are the three major forms of business organization? Explain the Advantages and Disadvantages?

- **Sole Proprietorship:**
 - ⇒ Owned by a single person who is financially responsible for the actions and obligations of the business

Advantages	Disadvantages
▪ easiest to create ▪ easiest to control ▪ easiest to dissolve ▪ right to all profit	▪ owner's personal assets at risk ▪ owner's unlimited liability for firm obligations ▪ equity only from owner or business profit ▪ business income taxed as personal income ▪ difficult to transfer ownership

- **Partnership**
 - ⇒ A business owned by more than one person; one or more of them financially responsible for the actions and obligations of the business

Advantages	Disadvantages
▪ limited protection of owners' personal assets ▪ owners' limited liability for firm obligations ▪ more sources of equity ▪ more sources of expertise	▪ shared control ▪ shared profit ▪ harder to dissolve

- **Corporation**
 - ⇒ A business owned by more than one person; none of them financially responsible for the actions and obligations of the business. The corporation is responsible for its obligations and actions.

Advantages	Disadvantages
▪ protects personal assets ▪ no shareholder liability for business ▪ easiest to change ownership ▪ greatest access to sources of funds	▪ most difficult and expensive to establish ▪ dilutes individual control over the firm ▪ overall higher taxes on income for shareholders

3. What is the goal of financial management?

The long-term objective of financial management is ultimately to help the company maximize profits. In order to do that, a financial manager needs to focus on smaller, more specific goals of financial management: planning, cost containment, cash flow management and legal compliance.

4. Discuss how agency conflicts affect the goal of maximizing shareholder value.

Conflict of interest between principal and agent, an agency relationship exists between **stockholders (principals)** and the firm's **hired management (agents)**.

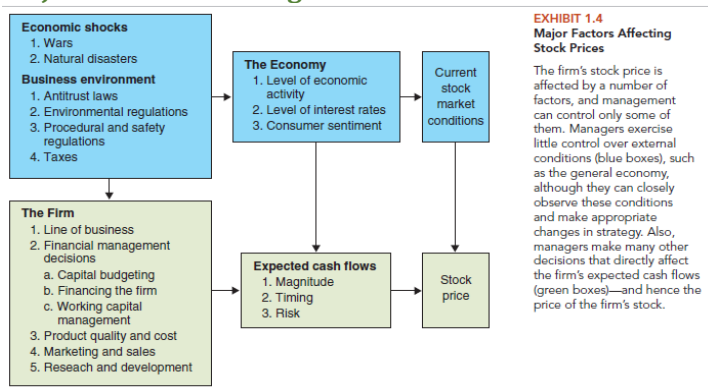
Shareholders own the corporation, but managers control the firm's assets and may use them for their own benefit.

Agency problem **reduces** the value of the share as managers don't want their company to be bid for a takeover due to the job security issue. This principle and agent conflict can be **minimized** by using contracts and laws. This would make the agents legally committed to the stockholders.

5. What is the difference between a primary market and a secondary market?

The secondary market involves buying and selling securities between other investors, while the primary market involves investors buying the securities from the issuing companies. Investors and traders engage in market activity through different exchanges, such as the New York Stock Exchange and Nasdaq.

Major Factors Affecting Stock Prices



Ethics in Corporate Finance

• What are Ethics?

• Ethics

⇒ society's standards for judging whether an action is right or wrong

• Business Ethics

⇒ society's standards for acceptable behavior applied to business and financial markets

• Examples of Ethical Conflict in Business

○ Agency Cost

⇒ employee's unacceptable use of employer's computer

○ Conflict of Interest

⇒ mortgage contract which a home-buyer is unlikely to fulfill but earns a mortgage broker more money

○ Information Asymmetry

⇒ seller knows about prior damage to the vehicle but the potential buyer does not

• Business Behavior

⇒ Regulation and market forces are not enough to maintain integrity in the marketplace

⇒ Business norms must be based on ethical beliefs, customs, and practices

• Consequences of Unethical Behavior

- Inefficiency in the economy and costs to society

- High legal and social costs

- Problems such as the recent financial crisis in the U.S.

• Ethical behavior

⇒ Sometimes, it is difficult to judge whether behavior is ethical or not

- Was the manager too careful?
- Did the manager take too much risk?
- Was it an honest mistake?
- Was it against policy, but well-intentioned?

Chapter 4

Long-Term Financial Planning and Growth

What are elements of Financial Planning

- **Investment in new assets** - Determined by **capital budgeting** decisions
- **Degree of financial leverage** - Determined by **capital structure** decisions
- **Cash paid to shareholders** - Determined by **dividend policy** decisions
- **Liquidity requirements** - Determined by **net working capital** decisions

Financial Planning Process

The time period used in the financial planning process is called the **planning horizon**.

Planning Horizon

Divide decisions into **short-run** decisions (usually next 12 months) and **long-run** decisions (usually 2 – 5 years).

Aggregation

Combine **capital budgeting** decisions into one large project.

Assumptions and Scenarios

- Make **realistic** assumptions about important variables
- Run several scenarios where you vary the assumptions by **reasonable amounts**
- Determine, at a **minimum, worst case, normal case, and best case scenarios**

Role of Financial Planning

- **Examine interactions**
Help management see the interactions between decisions
- **Explore options**
Give management a systematic framework for exploring its opportunities
- **Avoid surprises**
Help management identify possible outcomes and plan accordingly
- **Ensure feasibility and internal consistency**
Help management determine if goals can be accomplished and if the various stated (and unstated) goals of the firm are consistent with one another.

Explain financial planning and describe financial planning model?

Financial planning means is the process of estimating the capital required and determining its competition. It is the process of framing financial policies in relation to procurement, investment and administration of funds of an enterprise.

1. Sales Forecast

Many cash flows depend directly on the level of sales (often estimated using sales growth rate)

2. Pro Forma Statements

Setting up the plan using projected financial statements allows for consistency and ease of interpretation

3. Asset Requirements

The additional assets that will be required to meet sales projections

4. Financial Requirements

The amount of financing needed to pay for the required assets

5. Plug Variable

Determined by management deciding what type of financing will be used to make the balance sheet balance

6. Economic Assumptions

Explicit assumptions about the coming economic environment

What is the amount of external financing need, assuming the company is operating at full capacity? Assume sale grow at 10% and Dividend payout Rate = 50%.

Tasha's Toy Emporium Income Statement, 2009		
	Current	Pro Forma
Sales	5,000	$5,000 \times (1 + 0.10) = 5,500$
Less: costs	-3,000	$-3,000 \times (1 + 0.10) = -3,300$
EBT	2,000	$(5,500 - 3,300) = 2,200$
Less: taxes (40% of EBT)	-800	$(2,200 \times 40\%) = 2,200 \times 0.40 = -880$
Net Income	1,200	$EPT - \text{taxes} = 2,200 - 880 = 1,320$
Dividends	600	$1,320 \times 50\% = 660$
Add. To RE	600	$NI - \text{Dividends} = 1,320 - 660 = 660$

Tasha's Toy Emporium – Balance Sheet					
	Current	Pro Forma		Current	Pro Forma
Assets			Liabilities & Owners' Equity		
Current Assets			Current Liabilities		
Cash	500\$		A/P	900\$	$900 \times 1.10 = 990$
A/R	2,000		N/P	2,500	2,500
inventory	3,000		Total	3,400	3,490
Total	5,500	$5,500 \times 1.10 = 6,050$	LT Debt	2,000	2,000
Fixed Assets			Owners' Equity		
Net PP&E	4,000	$4,000 \times 1.10 = 4,400$	CS & APIC	2,000	2,000
Total	9,500	10,450	RE	2,100	$2,100 + 660 = 2,760$
			Total	4,100	
			Total & LE	9,500	10,250

EFN	$= (T.A - T.L\&E)$ $= 10,450 - 10,250 = 200m \text{ ----- } (+200)$
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Plug Variable	Will increase by 200m $LT \text{ Debt} + 200 = 2,000 + 200 = 2,200$
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$IGR (\text{Internal Growth Rate}) = \frac{ROA \times b}{1 - (ROA \times b)}$ $ROA = \frac{\text{Net Income}}{T.A} = \frac{1,320}{10,450} = 0.126$ $b (\text{Retention ratio}) = 1 - \frac{\text{Dividend}}{\text{Net Income}} = \frac{660}{1,320} = 0.5$ $IGR (\text{Internal Growth Rate}) = \frac{ROA \times b}{1 - (ROA \times b)} = \frac{0.126 \times 0.5}{1 - (0.126 \times 0.5)} = 0.067 = 6.7\%$

$SGR (\text{Sustainable Growth Rate}) = \frac{ROE \times b}{1 - (ROE \times b)}$ $ROE = \frac{\text{Net Income}}{T.E} = \frac{1,320}{(CS + RE)} = \frac{1,320}{(2,000 + 2,760)} = 0.277$ $b (\text{Retention ratio}) = 1 - \frac{\text{Dividend}}{\text{Net Income}} = \frac{660}{1,320} = 0.5$ $SGR (\text{Sustainable Growth Rate}) = \frac{ROE \times b}{1 - (ROE \times b)} = \frac{0.277 \times 0.5}{1 - (0.277 \times 0.5)} = 0.161 = 16.1\%$

Growth and External Financing

What is the purpose of long-range planning?

- At low growth levels, internal financing (retained earnings) may exceed the required investment in assets
- As the growth rate increases, the internal financing will not be enough, and the firm will have to go to the capital markets for money
- Examining the relationship between growth and external financing required is a useful tool in long-range planning

The Internal Growth Rate

- **How much the firm can grow assets** using retained earnings as the only source of financing.
- **How present company need to** increase assets by use only one source in capital.

Using the information from Tasha's Toy Emporium

- $ROA = 1200 / 9500 = .1263$
- $B = .5$

$$ROA = \frac{\text{Net Income}}{T.A}$$

$$\text{Retention Ratio (B)} = 1 - \frac{\text{Dividend}}{\text{Net Income}}, \quad B = \frac{\text{Net Income} - \text{Dividend}}{\text{Net Income}},$$

B = 1 - Dividend payout ratio

$$\begin{aligned} \text{Internal Growth Rate} &= \frac{ROA \times b}{1 - ROA \times b} \\ &= \frac{.1263 \times .5}{1 - .1263 \times .5} = .0674 \\ &= 6.74\% \end{aligned}$$

This firm could **grow assets at 6.74%** without raising additional external capital.

Relying solely on **internally generated funds** will increase equity (retained earnings are part of equity) and **assets** without an increase in debt.

Consequently, **the firm's leverage** will decrease over time. If there is an optimal amount of leverage, then the firm may want to borrow to maintain that optimal level of leverage. This idea **leads** us to the **sustainable growth rate**.

The Sustainable Growth Rate

- **How much the firm can grow** by using internally generated funds and issuing debt to maintain a constant debt ratio.

Using the information from Tasha's Toy Emporium

- $ROE = 1200 / 4100 = .2927$
- $B = .5$

$$ROE = \frac{\text{Net Income}}{T.E}$$

$$\begin{aligned} \text{Sustainable Growth Rate} &= \frac{ROE \times b}{1 - ROE \times b} \\ &= \frac{.2927 \times .5}{1 - .2927 \times .5} = .1714 \\ &= 17.14\% \end{aligned}$$

**** Note that no new equity is issued.**

The **sustainable growth rate** is substantially higher than the **internal growth rate**.

This is because we are **allowing** the company to **issue debt** as well as **use internal funds**.

What are the major determinants of growth?

- **Profit margin** – operating efficiency
- **Total asset turnover** – asset use efficiency
- **Financial leverage** – choice of optimal debt ratio
- **Dividend policy** – choice of how much to pay to shareholders versus reinvesting in the firm

What is the percentage of sales approach?

- Some items vary directly with sales, while others do not
- **Income Statement**
 - Costs may vary directly with sales - if this is the case, then the profit margin is constant
 - Depreciation and interest expense may not vary directly with sales – if this is the case, then the profit margin is not constant
 - Dividends are a management decision and generally do not vary directly with sales – this influences additions to retained earnings
- **Balance Sheet**
 - Initially assume all assets, including fixed, vary directly with sales
 - Accounts payable will also normally vary directly with sales
 - Notes payable, long-term debt and equity generally do not vary directly with sales because they depend on management decisions about capital structure
 - The change in the retained earnings portion of equity will come from the dividend decision.

Major Manuscripts, Inc. has sales of \$132,000, net income of \$2,376, total assets of \$20,590, and total equity of \$14,510. The firm paid \$950 in dividends and maintains a constant dividend payout ratio.

1. What is the firm's internal rate of growth?

$$\begin{aligned}\text{IGR (Internal Growth Rate)} &= \frac{ROA \times b}{1 - (ROA \times b)} \\ ROA &= \frac{\text{Net Income}}{T.A} = \frac{2,376}{20,590} = \mathbf{0.115} \\ b \text{ (Retention ratio)} &= 1 - \frac{\text{Dividend}}{\text{Net Income}} = \frac{950}{2,376} = \mathbf{0.6} \\ \text{IGR (Internal Growth Rate)} &= \frac{ROA \times b}{1 - (ROA \times b)} = \frac{0.115 \times 0.6}{1 - (0.115 \times 0.6)} = \mathbf{0.074 = 7.4\%}\end{aligned}$$

2. What is the firm's Sustainable rate of growth?

$$\begin{aligned}\text{SGR (Sustainable Growth Rate)} &= \frac{ROE \times b}{1 - (ROE \times b)} \\ ROE &= \frac{\text{Net Income}}{T.E} = \frac{2,376}{14,510} = \mathbf{0.164} \\ b \text{ (Retention ratio)} &= 1 - \frac{\text{Dividend}}{\text{Net Income}} = \frac{950}{2,376} = \mathbf{0.6} \\ \text{SGR (Sustainable Growth Rate)} &= \frac{ROE \times b}{1 - (ROE \times b)} = \frac{0.164 \times 0.6}{1 - (0.164 \times 0.6)} = \mathbf{0.109 = 10.9\%}\end{aligned}$$

XYZ has the following financial information for 2009:

- Sales = \$2M, Net Inc. = \$0.4M, Div. = \$0.1M
- C.A. = \$0.4M, F.A. = \$3.6M
- C.L. = \$0.2M, LTD = \$1M, C.S. = \$2M, R.E. = \$0.8M

1) What is the sustainable growth rate?

$$ROE = \frac{\text{net income}}{\text{shareholders' equity}} = \frac{\$0.4M}{(\$2M + \$0.8M)} = 0.1429$$

$$b \text{ (Retention ratio)} = 1 - \frac{\text{dividends}}{\text{net income}} = 1 - \left(\frac{0.1M}{0.4M}\right) = 1 - 0.25 = \mathbf{0.75}$$

$$\text{SGR (Sustainable Growth Rate)} = \frac{ROE \times b}{1 - (ROE \times b)} = \frac{0.1429 \times 0.75}{1 - (0.1429 \times 0.75)} = \mathbf{0.12}$$

2) If 2010 sales are projected to be \$2.4M, what is the amount of external financing needed, assuming XYZ is operating at full capacity, and profit margin and payout ratio remain constant?

$$\text{Profit margin} = \frac{\text{net income}}{\text{sales}} = \frac{\$0.4M}{\$2M} = 0.2$$

$$\begin{aligned}\text{Projected net income} &= \text{profit margin} \times \text{projected sales} \\ &= 0.2 \times \$2.4M = \$0.48M\end{aligned}$$

$$\begin{aligned}\text{Projected addition to retained earnings} &= \text{projected net income} \times (1 - \text{payout ratio}) \\ &= \$0.48M \times (1 - 0.25) = \$0.48M \times 0.75 = \$0.36M\end{aligned}$$

$$\% \text{ change in sales} = \frac{(\$2.4M - \$2M)}{\$2M} = 20\%$$

$$2009 \text{ total assets} = C.A + F.A = \$0.4M + \$3.6M = \$4M$$

$$\text{Projected total assets} = \$4M \times 20\% = \mathbf{\$4.8M}$$

$$\text{Projected C.L.} = \$2M \times 20\% = \$0.24M$$

$$\begin{aligned}\text{Projected R.E.} &= 2009 \text{ R.E.} + \text{projected addition to R.E.} \\ &= \$0.8M + \$0.36M = \$1.16M\end{aligned}$$

$$\begin{aligned}\text{Projected liabilities and owners' equity} &= \text{projected C.L.} + \text{LTD} + \text{C.S.} + \text{projected R.E.} \\ &= \$0.24M + \$1M + \$2M + \$1.16M = \mathbf{\$4.4M}\end{aligned}$$

$$\begin{aligned}\text{External Financing needed (EFN)} &= \text{projected assets} - \text{projected liabs. and OE} \\ &= \$4.8M - \$4.4M = \mathbf{\$0.4M}\end{aligned}$$

Chapter 11

Project Analysis and Evaluation

A positive NPV is a good start – now we need to take a closer look

There are two primary reasons for a positive NPV:

- (1) we have constructed a good project
- (2) we have done a bad job of estimating NPV.

The following are project characteristics associated with positive NPVs.

- 1) Economies of scale
- 2) Product differentiation
- 3) Cost advantages
- 4) Access to distribution channels
- 5) Favorable government policy

How we do Risk Analysis in capital budgeting?

Risk Analysis in Capital Budgeting. To compare and contrast the deterministic and probabilistic methods as a tool for capital budgeting. The method usually used in capital budgeting is to calculate a “best estimate” based on the available data and use it as an input in the evaluation model.

Explain forecasting risk and why is it important to the analysis of capital expenditure project? That methods can be used to reduce this risk?

Forecasting risk – how sensitive is our NPV to changes in the cash flow estimates; the more sensitive, the greater the forecasting risk

Exp: Installation of a new machine - Wrong productivity forecasting, wrong demand forecasting might lead to the wrong NPV.

Forecasting risk is important to the analysis of capital expenditure project because of the part that those projects can be accepted which are free from projected cash flow errors

Methods can be used to reduce the risk are:

1. **Scenario Analysis**
2. **Sensitivity Analysis**
3. **Simulation Analysis**

What happens to NPV		
Scenario Analysis	Sensitivity Analysis	Simulation Analysis
What happens to the NPV <u>under different cash flow scenarios</u>? • Best case – high revenues, low costs • Worst case – low revenues, high costs • Measure of the range of possible outcomes <u>Best case and worst case are not necessarily probable</u>, but they can still be possible	What happens to NPV when we change one variable at a time This is a subset of scenario analysis where we are looking at the effect of specific variables on NPV The greater the volatility in NPV in relation to a specific variable, the larger the forecasting risk associated with that variable, and the more attention we want to pay to its estimation	Simulation is really just an <u>expanded sensitivity and scenario analysis</u> Monte Carlo simulation can estimate thousands of possible outcomes <u>based on conditional probability distributions and constraints for each of the variables</u> The output is a probability distribution for NPV with an estimate of the probability of obtaining a <u>positive net present value</u> The simulation only works as well as the information that is entered, and very bad decisions can be made if care is not taken to <u>analyze the interaction between variables</u>
New Project Example The initial cost is \$200,000, and the project has a 5-year life. There is no salvage. Depreciation is straight-line, the required return is 12%, and the tax rate is 34%. • The base case NPV is 15,567		

Summary of Scenario Analysis

Scenario	Net Income	Cash Flow	NPV	IRR
Base case	19,800	59,800	15,567	15.1%
Worst Case	-15,510	24,490	-111,719	-14.4%
Best Case	59,730	99,730	159,504	40.9%

Summary of Sensitivity Analysis

Scenario	Unit Sales	Cash Flow	NPV	IRR
Base case	6,000	59,800	15,567	15.1%
Worst case	5,500	53,200	-8,226	10.3%
Best case	6,500	66,400	39,357	19.7%

Making a Decision

- If the majority of your scenarios have **positive NPVs**, then you can feel **reasonably comfortable about accepting the project**
- If you have a crucial variable that leads to a **negative NPV** with a small change in the estimates, then you may **want to forego the project**

Break-Even Analysis (no Profit, no loss)

Define cash Break-Even? And what are the three types of break-even analysis, and how should each be used?

Common tool for analyzing the **relationship between sales volume and profitability**

There are three common break-even measures:

1. Accounting Break-even, Where NI = 0

$$Q = (FC + D) / (P - v)$$

2. Cash Break-even, Where OCF = 0

$$Q = (FC + OCF) / (P - v) \quad (\text{ignoring taxes})$$

3. Financial Break-even, Where NPV = 0

$$\text{Cash BE} < \text{Accounting BE} < \text{Financial BE}$$

Example: Costs

- There are **two types** of costs that are important in breakeven analysis: **variable and fixed**
 - **Total variable costs = quantity * cost per unit**
 - Fixed costs are constant, regardless of output, over some time period
 - **Total costs = fixed + variable = FC + vQ**

Average vs. Marginal Cost

- **Average Cost**
 - $TC / \# \text{ of units}$
 - Will decrease as # of units increases
- **Marginal Cost**
 - The cost to produce one more unit
 - Same as variable cost per unit

Example: What is the average cost and marginal cost under each situation in the previous example

- Produce 1,000 units: Average = $18,000 / 1000 = \$18$
- Produce 5,000 units: Average = $78,000 / 5000 = \$15.60$

Using Accounting Break-Even

- Accounting break-even is often **used** as an early stage screening number
- If a project cannot break-even on an accounting basis, then it is **not going to be a worthwhile project**
- Accounting break-even gives managers **an indication** of how a project will impact accounting profit

Accounting Break-Even and Cash Flow

- We are more **interested** in cash flow than we are in **accounting numbers**
- As long as a firm has **non-cash deductions**, there will be a **positive cash flow**
- If a firm just breaks even on **an accounting basis**, **cash flow = depreciation**, NPV will generally be **< 0**

What is the degree of operating leverage

Operating leverage is the **relationship between sales and operating cash flow**

- Degree of operating leverage measures this relationship
 - The higher the DOL, the greater the variability in operating cash flow
 - The higher the fixed costs, the higher the DOL
 - DOL depends on the sales level you are starting from
- $DOL = 1 + (FC / OCF)$

Capital Rationing and What is the difference between hard rationing and soft rationing?

- **Capital rationing** occurs when a firm or division has limited resources
 - **Soft rationing** – the limited resources are temporary, often self-imposed
 - **Hard rationing** – capital will never be available for this project
- The profitability index is a useful tool when a manager is faced with soft rationing

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1. The Coffee Express has computed its fixed costs to be \$0.34 for every cup of coffee it sells given annual sales of 212,000 cups. The sales price is \$1.49 per cup while the variable cost per cup is \$0.63. How many cups of coffee must it sell to break-even on a cash basis?

Cash Break-even, Where $OCF = 0$

$$Q = \frac{FC + OCF}{P - v}$$

FC per cup = \$0.34

Annual sales = 212,000 cups

P = \$1.49

v = \$0.63

$\therefore FC = (\$0.34 \times 212,000)$

$$Q_{\text{cash break-even}} = \frac{(\$0.34 \times 212,000) + 0}{1.49 - 0.63} = 83,814 \text{ cups}$$

2. Wexford Industrial Supply is considering a new project with estimated depreciation of \$26,000, fixed costs of \$79,000, and total sales of \$187,000. The variable costs per unit are estimated at \$11.80. What is the accounting break-even level of production?

Accounting Break-even, Where $NI = 0$

$$Q = \frac{FC + D}{P - v}$$

D = \$26,000

FC = \$79,000

Total sales = \$187,000, sales price is Q

v = \$11.80

$$Q_{\text{accounting break-even}} = (\$79,000 + \$26,000) / [(\$187,000/Q) - \$11.80]$$

$$105,000 = Q[(\$187,000/Q) - 11.80]$$

$$105,000 = 187,000 - 11.80Q$$

$$Q = (187,000 - 105,000) / 11.80$$

$$Q = 6,949 \text{ units}$$

3. Cantor's has been busy analyzing a new product. Thus far, management has determined that an OCF of \$218,200 will result in a zero net present value for the project, which is the minimum requirement for project acceptance. The fixed costs are \$329,000 and the contribution margin per unit is \$216.40. The company feels that it can realistically capture 2.5 percent of the 110,000-unit market for this product. The tax rate is 34 percent and the required rate of return is 11 percent. Should the company develop the new product? Why or why not?

OCF = \$218,200
 NVP = 0
 FC = \$329,000
 (P-v) = \$216.40
 Total market = 110,000 unit

$$Q = \frac{FC + OCF}{P - v}$$

$Q_{\text{financial break-even}} = (\$329,000 + \$218,200) / \$216.40 = 2,528.65 \text{ units}$
 Expected sales = $110,000 \times 2.5\% = 2,750 \text{ units}$.

--When 2,528.65 units < 2,750 units, the project should be accepted because the expected level of sales is greater than the financial break-even quantity.

4. Tucker's Trucking is considering a project with a discounted payback period just equal to the project's life. The projections include a sales price of \$38, variable cost per unit of \$18.50, and fixed costs of \$32,000. The operating cash flow is \$19,700. What is the break-even quantity?

FC = \$32,000
 OFC = \$19,700
 P = \$38
 v = \$18.50

$$Q = \frac{FC + OCF}{P - v}$$

$Q_{\text{financial break-even}} = (\$32,000 + \$19,700) / (\$38 - \$18.50) = 2,651 \text{ units}$

5. Consider the following project A new product requires an initial investment of \$5 million and will be depreciated to an expected salvage of zero over 5 years. The price of the new product is expected to be \$25,000, and the variable cost per unit is \$15,000. The fixed cost is \$1 million.

- What is the accounting break-even point each year?
 $\text{Depreciation} = 5,000,000 / 5 = 1,000,000$
 $Q = (1,000,000 + 1,000,000) / (25,000 - 15,000) = 200 \text{ units}$
- What is the operating cash flow at the accounting break-even point (ignoring taxes)?
 $OCF = (S - VC - FC - D) + D$
 $OCF = (200 \times 25,000 - 200 \times 15,000 - 1,000,000 - 1,000,000) + 1,000,000 = 1,000,000$
- What is the cash break-even quantity?
 $OCF = [(P - v)Q - FC - D] + D = (P - v)Q - FC$
 $Q = (OCF + FC) / (P - v)$
 $Q = (0 + 1,000,000) / (25,000 - 15,000) = 100 \text{ units}$

NPV

6. What is the net present value of a project with the following cash flows if the required rate of return is 12 percent?

Year	Cash Flow
0	-\$42,398
1	13,407
2	21,219
3	17,800

$$NPV = CF_0 + \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3}$$

$$NPV = -\$42,398 + \frac{\$13,407}{(1+0.12)^1} + \frac{\$21,219}{(1+0.12)^2} + \frac{\$17,800}{(1+0.12)^3} = -\$842.12$$

7. You are reviewing a new project and have estimated the following cash flows:

Year 0: CF = -165,000

Year 1: CF = 63,120; NI = 13,620

Year 2: CF = 70,800; NI = 3,300

Year 3: CF = 91,080; NI = 29,100

Average Book Value = 72,000

What are the NPV of a project if the required rate of return is 12%.

$$NPV = CF_0 + \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3}$$

$$NPV = -165,000 + \frac{63,120}{(1+0.12)} + \frac{70,800}{(1+0.12)^2} + \frac{91,080}{(1+0.12)^3}$$

$$NPV = 12,627.41 > 0 \text{ (accept)}$$