Profitability Analysis

7

Lecture

Lecture 7: Agenda

Profitability analysis

- **Analyzing Revenues**
  - Analyzing profitability
  - Revenues sources
  - Persistence of revenues
  - Key revenues relations
- **Analyzing Cost Of Sales**
  - Measuring Gross Profit
  - Analyzing Gross Profit
  - Interpreting Gross Profit
- **Analyzing Expeneses**
  - Selling
  - Depreciation
  - Maintenance
  - General and Administrative
  - Financing
  - Income tax

Analyzing Profitability

Focus of Profitability Analysis

- Is a key part of financial statement analysis
- Emphasis is on the income statement
- Operating results are the primarily purpose of a company and play an important role in determining company value, solvency and liquidity

Profitability analysis helps address questions such as:

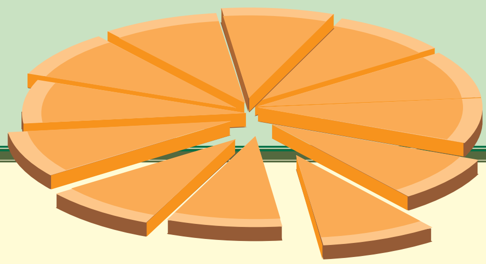
- What is a company’s relevant income measure?
- What is the quality of income?
- What income components are important for forecasting?
- How persistent are income and its components?
- What is a company’s earning power?

Analyzing Revenues

Revenue Sources

Analysis of revenues (sales) helps address questions such as:

- What are the major sources of revenue?
- How persistent are revenue sources?
- How are revenues, receivables, and inventories related?
- When is revenue recorded?
- How is revenue measured?



Analyzing Revenues

Revenue Sources

- Knowledge of major sources of revenues is important to profitability analysis
- Each market and product line often has its own growth pattern, profitability, and future potential
- Common-size analysis of revenues shows the percent of each major class of revenue to its total
- Graphical analysis is a useful tool to interpret the sources of revenues

Analyzing Revenues

Revenue Sources

Diversified Companies present special challenges

- **Different** segments usually experience varying rates of **profitability, risk, and growth**
- **Asset** composition and **financing** requirements of segments often vary
- Separate analysis and evaluations can aid in **risk** and **return assessment**
- **Income forecasting** benefits from forecasts by segments
- Must separate and **interpret** the **impact** of **individual segments**

Analyzing Revenues

Revenue Sources

Information disclosed for each segment:

(1) sales—both intersegment and to unaffiliated customers
(2) operating income—revenues less operating expenses
(3) identifiable assets
(4) capital expenditures
(5) depreciation, depletion, and amortization

Similar disclosures are required for international operations and export sales (except capital expenditures and depreciation)

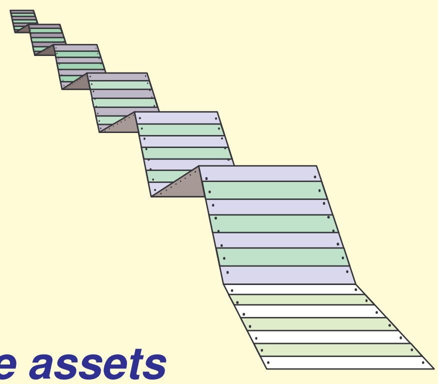
Revenues from a single customer are disclosed if they comprise 10 percent or more of total revenues

Analyzing Revenues

Revenue Sources

Useful applications of segment data include:

- *Analysis of sales growth*
- *Analysis of asset growth*
- *Analysis of profitability*
  - *- operating income to sales*
  - *- operating income to identifiable assets*



Analyzing Revenues

Persistence of Revenues

Persistence (stability and trend) of revenues is important to profitability analysis

Analysis tools for assessing persistence in revenues include:
(1) trend percent analysis
(2) evaluation of Management's Discussion and Analysis

Analyzing Revenues

Persistence of Revenues--Trend Percent Analysis

Revenues for a prior period are set equal to 100 percent

Revenues for other periods are compared to it

Revenue trends by segments are often:

- Correlated
- Compared to industry norms
- Compared to competitors

Analyzing Revenues

Persistence of Revenues--Trend Percent Analysis

Other related measures:

- *(Auto)correlations* of revenues across periods
- Assess sensitivity of revenues to business conditions
- Customer analysis—concentration, dependence, and stability
- Revenues' concentration or dependence on one segment
- Revenues' reliance on sales staff
- Geographical diversification of markets

Analyzing Revenues

Persistence of Revenues--MD&A

Management's Discussion and Analysis (MD&A) is often useful in analysis of persistence in revenues

- Aids in understanding and evaluating period-to-period changes
- Report on changes in revenue components
- Discloses uncertainties affecting or likely to affect revenues
- Explains growth in revenues to prices, volume, inflation, or new product introduction
- Reports some **forward-looking information**
- **Discusses trends and forces not evident from financial statements**

Analyzing Costs of Revenues

Measuring Gross Profit

Gross profit, or gross margin, is measured as revenues less cost of sales

All other costs must be recovered from gross profit

Gross profit must finance essential future-directed discretionary expenditures (i.e. R&D, marketing, advertising, etc.)

Analyzing Costs of Revenues

Measuring Gross Profit

Gross profits vary across industries depending on factors such as:

- Competition
- Capital investment
- Level of costs that must be recovered from gross profit

Analyzing Costs of Revenues

Analyzing Gross Profit

Analysis of gross profit directs attention at the factors explaining <u>variations</u> in:

- Sales
- Costs of sales

Analyzing Costs of Revenues

Analyzing Gross Profit

Analysis Statement of Changes in Gross Profit

Step 1. **Focus on year-to-year change in volume assuming unit selling price (cost per unit sold) is unchanged—Volume change is multiplied by the constant unit selling price (cost per unit sold) to yield change in sales (cost of sales)**

Step 2. **Focus on year-to-year change in selling price (cost per unit sold) assuming volume is constant--Change in selling price (cost per unit sold) is multiplied by the constant volume to yield change in sales (cost of sales)**

Step 3. **Focus on *joint* changes in volume and unit price (cost per unit sold)—Volume change is multiplied by the change in unit selling price (cost per unit sold) to yield net change in sales (cost of sales)**

Step 4. **Steps 1 to 3 explain the net change in sales.**

Analyzing Costs of Revenues

Analyzing Gross Profit

Analysis Statement of Changes in Gross Profit—Illustration

	Year Ended December 31		Year-to-Year Change	
Item	***Year 1***	***Year 2***	***Increase***	***Decrease***
1. Sales ($ millions)	$657.6	$687.5	$ 29.9	
2.Cost of sales ($ millions)	237.3	245.3	8.0	
3.Gross profit ($ millions)	$420.3	$442.2	$ 21.9	
4.Units sold (in millions)	215.6	231.5	15.9	
5.Sales price per unit (1 ÷ 4)	$ 3.05	$ 2.97		$ 0.08
6.Cost per unit (2 ÷ 4)	1.10	1.06		0.04

Analyzing Costs of Revenues

Analyzing Gross Profit

Analysis Statement of Changes in Gross Profit
Year 2 versus Year 1

Analysis of Variation in Sales	
1. Change in volume of products sold:	
Change in volume (15.9) × Year 1 unit selling price ($3.05)	**$ 48.5**
2..Change in selling price:	
Change in selling price ($0.08) × Year 1 sales volume (215.6)	**(17.2)**
	$ 31.3
3. Combined change in sales volume (15.9) and unit price ($0.08)	**(1.3)**
Increase in net sales	**$ *30.0****
Analysis of Variation in Cost of Sales	
1. Change in volume of products sold:	
Change in volume (15.9) × Year 1 cost per unit ($1.10)	**$ 17.5**
2. Change in cost per unit sold:	
Change in cost per unit ($0.04) × Year 1 sales volume (215.6)	**(8.6)**
	$ 8.9
3. Combined change in volume (15.9) and cost per unit ($0.04)	**(0.6)**
Increse in cost of sales	**$ 8.3***
Net variation in gross profit	**$ *21.7****

*** Differences are due to rounding.**

Analyzing Costs of Revenues

Interpreting Changes in Gross Profit

Changes in gross profit are often driven by one or more of the following factors:

- Increase (decrease) in sales volume
- Increase (decrease) in unit selling price
- Increase (decrease) in cost per unit

Analyzing Expenses

Tools for Analysis of Expenses

- *Common-size analysis*

Common-size income statements express expenses in terms of their percent relation with revenues

Traced over several periods or compared with competitors

- *Index number analysis*

Index number analysis of income statements expresses income and its components in an index number related to a base period

Highlights relative changes across time

Changes in expenses are readily compared with changes in both revenues and related expenses

- ***Operating ratio analysis***

Operating ratio measures the relation between operating expenses (or its components) and revenues

Equals **cost of goods sold plus other operating expenses divided by net revenues**

Interest and taxes are normally excluded from this measure due to its focus on operating efficiency (expense control) and not financing and tax management

Useful for analysis of expenses within and across companies

Analyzing Expenses

Selling Expenses

Analysis of selling expenses focuses on three areas:

- Evaluating the relation between key selling expenses and revenues
- Assessing bad debts expense
- Evaluating the trend and productivity of future-directed marketing expenses

Analyzing Expenses

Depreciation Expense

Relation of depreciation to gross plant and equipment helps reveal changes in the composite rate of depreciation—this is useful in evaluating depreciation levels and in detecting adjustments (smoothing) to income:

$$\frac{\text{Depreciation expense}}{\text{Depreciable assets}}$$

It is often useful to compute this ratio by asset categories

Analyzing Expenses

Maintenance and Repairs Expense

Maintenance and repairs expense:

- Varies with investment in plant and equipment and with the level of productive activity
- Affect costs of sales and other expenses
- Comprise both variable *and* fixed costs
- Do not vary directly with sales

Analyzing Expenses

General and Administrative Expenses

Most are fixed—such as rent and salary

Tendency for increases, especially in prosperous times

Analysis of G&A should focus on:

- Trend in these expenses
- Percent of revenues they consume

Analyzing Expenses

Financing Expenses

- Most are fixed—exception is variable-rate interest
- Most creditor financing is eventually refinanced and not removed
- Interest expense often includes amortization of a premium or discount

Analyzing Expenses

Financing Expenses

Average effective interest rate:

$$\frac{\text{Total interest incurred}}{\text{Average interest-bearing indebtedness}}$$

Useful tool for:

- Analysis of the cost of borrowed money
- Credit standing
- Comparisons across years and companies
- Assessing sensitivity to interest rate changes

Analyzing Expenses

Income Tax Expenses

Effective Tax Rate (ETR)

$$\frac{\text{Income tax expense}}{\text{Income before income taxes}}$$

ETR (also called *tax ratio*) reflects relation between the income tax accrual and pre-tax income