

## Marketing Arithmetic

Strategic Marketing  
Dr. R. J. Fontenot

## Marketing Arithmetic Key Concepts

- Stats are hip
- Finding Historical Census Data
- Budgeting
- Important Financial Documents
- Calculating Trends
- Breakeven Analysis
- Markups & Markdowns
- Stock-turn Rate
- Make or Buy & Volume Base Decisions
- Graphical Representations & Stimulation

## Historical Census Data: Secondary Data Source

The screenshot shows the U.S. Census Bureau website interface. At the top, there's a navigation bar with 'SEARCHES' and 'Data Finders'. Below that, a large banner displays 'U.S., 301,040,705' with a population clock. The main content area is divided into several sections: 'People & Households', 'Business & Industry', 'Geography', and 'Newsroom'. Each section contains links to various data sources and reports. A sidebar on the left lists 'New on the Site' and 'Data Tools'. The bottom of the page features a 'Special Topics' section with a link to 'AMERICAN COMMUNITY SURVEY'.

## Budgeting

- Two major types of budgets comprise the master budget:
  - Operating budgets** - summarize the level of activities such as sales, purchasing, and production
  - Financial budgets** - identify the expected financial consequences of the activities summarized in the operating budgets

(Atkinson, Kaplan, Matsumura, and Young 2006)

## Budgeting

- Periodic budgeting is typically performed once per budget period—usually once a year
- The length of the budget period reflects the competitive forces, skill requirements, and technology changes that the organization faces

(Atkinson, Kaplan, Matsumura, and Young 2006)

## Important Financial Documents

- Income Statement**
  - Indicate how **net revenue** is transformed into **net income aka the bottom line**
  - Shows stakeholders the profitability of the company during a determined the period of time
- Balance Sheet**
  - A snapshot of the financial status of an organization at a point in time

(Horngren, Sundem, and Stratton 2005)

## Important Financial Documents

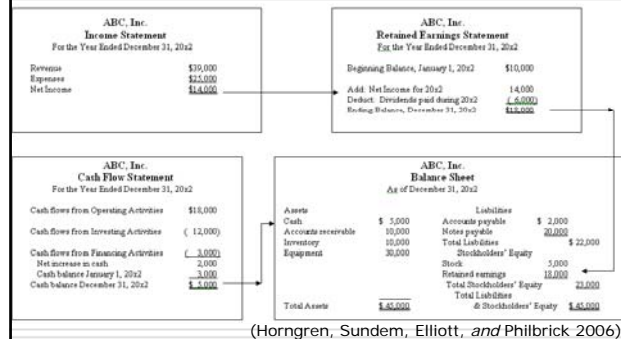
□ **Cost of Goods Sold**

□ **Cash Flow Statement**

1. Cash inflows from cash sales and collections of receivables
2. Cash outflows
  - For flexible resources acquired and consumed in the short term
  - For capacity resources acquired and consumed in the intermediate and long term
3. Results of financing operations

(Atkinson, Kaplan, Matsumura, and Young 2006)

## Flow of Financial Records



(Horngren, Sundem, Elliott, and Philbrick 2006)

## Income Statement (simple)

**Income Statement Summary**

Income statement of a business entity in general appears as follows

	Amounts in \$
Sales	XXXX
Less: Cost of Goods sold	XX
Gross Profit	XXX
Less: Expenses	XX
Profit before interest and tax	XXX
Less: Interest	X
Profit before tax	XXX
Less: Tax	X
Net Profit	XX
Less: Dividends	X
Retained Earnings	XX

(NetTel 2004)

## Income Statement (Detailed)

PERIOD ENDING	31-Dec-05	31-Dec-04	31-Dec-03
<b>Total Revenue</b>	<b>6,138,560</b>	<b>3,189,223</b>	<b>1,465,934</b>
Cost of Revenue	2,577,088	1,457,653	625,854
<b>Gross Profit</b>	<b>3,561,472</b>	<b>1,731,570</b>	<b>840,080</b>
Operating Expenses			
Research Development	599,510	225,632	91,228
Selling General and Administrative	854,684	664,746	406,388
Non Recurring	90,000	201,000	-
<b>Operating Income or Loss</b>	<b>2,017,278</b>	<b>640,192</b>	<b>342,464</b>
Income from Continuing Operations			
Total Other Income/Expenses Net	125,175	10,904	6,121
Earnings Before Interest And Taxes	2,142,453	651,096	348,585
Interest Expense	776	862	1,931
Income Before Tax	2,141,677	650,234	346,654
Income Tax Expense	676,280	251,115	241,006
Net Income From Continuing Ops	1,465,397	399,119	105,648
<b>Net Income</b>	<b>1,465,397</b>	<b>399,119</b>	<b>105,648</b>

## Balance Sheet

The following is the Balance sheet format for a business entity.

<i>Intangible Assets</i>		XXX
Goodwill		
<i>Tangible Fixed Assets</i>		
Building	XXXX	
Less: Accumulated Depreciation	X	
<b>Net Book Value</b>	XX	
Motor vehicle	XXXX	
Less: Accumulated Depreciation	X	
<b>Net Book Value</b>	XX	
Furniture and Fixtures	XXXX	
Less: Accumulated Depreciation	X	
<b>Net Book Value</b>	XX	
<b>Total Fixed Assets</b>		XXX
<i>Current Assets</i>		
Cash	XX	
Account receivables	XX	
Marketable securities	XX	
Stocks	XX	
<b>Total Current Assets</b>	XXX	
Less: Current Liabilities		
Account payables	XX	
Accrued expense	XX	
Short term loan	XX	
<b>Total Current Liabilities</b>	XX	
<b>Net Working Capital</b>		X
<b>Total Assets Employed</b>		XXXX
<i>Financed By:</i>		
Long Term Loan	XXXX	
Equity	XXXX	
<b>Total Liability &amp; Owner's Equity</b>		XXXX

(NetTel 2004)

## Cost of Goods Sold

1) *Manufacturing firms*

Direct Materials:		
Opening Stock		XXX
Add Purchases	XXXX	
Carriage inwards	XX	
Less Returns outward	X	XXX
Materials available for use		XXX
Less Closing stock		XX
Raw materials used		XXX
Direct labour		XX
Direct Expenses		XX
Prime Cost		XXX
<b>Manufacturing Overhead:</b>		
Indirect materials	XX	
Indirect labour	XX	
Light & power	X	
Other factory expenses	XX	XXX
Current factory cost	XX	XXXX
Add Opening work in progress		XX
Total Factory Costs		XXXX
Less Closing work in progress		XX
Cost of goods manufactured		XXXX
Add Opening stock finished goods		XXX
Goods available for sale		XXXX
Less Closing stock finished goods		XX
<b>Cost of Goods Sold</b>		XXXX

(NetTel 2004)

## Cash Flow Statement

<i>Cash Flows from Operations</i>		
<b>Net Profit</b>		<b>XXX</b>
<i>Add: Any deducted non-cash item</i>		
Depreciation	XX	
Loss on disposal	XX	
Decrease in current assets	XX	
Increase in current liabilities	XX	XXX
<i>Less: any added non-cash item</i>		
Gain on disposal	(XXX)	
Increase in current assets	(XXX)	
Decrease in current liabilities	(XXX)	(XXX)
<b>Net Cash flows from Operations</b>		<b>XXX</b>
<i>Cash Flows from Investment</i>		
Proceeds from disposal of assets	XXX	
Dividend received	XX	
Purchase of assets	(XXX)	
<b>Net Cash flows from Investment</b>		<b>XXX</b>
<i>Cash Flows from Financing</i>		
Dividends paid	(XXX)	
Issuance of stocks	XXX	
Increase in notes payable	X	
Increase in long term debt	XX	
<b>Net Cash flows from Financing</b>		<b>XXX</b>
Increase in Cash and Marketable Securities		XXX
Beginning Cash and Marketable securities		XX
Ending Cash and Marketable securities		XX
Change in Actual Cash Balance		XXX

(NetTel 2004)

## Calculating Trends

Two essential ingredients:  
(1) a change score; and (2) a choice of divisors.

**a. Percentage Growth**  
Formula =  $(n - (n-1))/(n-1)$

1990	1991
n-1	n
\$300	\$450
(\$450-\$300)/\$300 = 50%	

**b. Percentage vs. A Year Ago**  
Formula =  $(n - (n-1))/n$

1990	1991
n-1	n
\$300	\$450
(\$450-\$300)/\$450 = 33.3%	

## Breakeven Analysis

$$\text{BE volume} = \frac{\text{Total Fixed Cost}}{\text{Fixed Cost Contribution/unit}}$$

or

$$\text{BE} = \frac{\text{Total Fixed Cost}}{\text{Selling Price} - \text{variable cost/unit}}$$

**Example:** Toaster Manufacturer

Price = \$20

Variable Cost = \$10

Total Fixed Cost = \$300,000

$$\frac{\$300,000}{\$20 - \$10} = 30,000 \text{ toasters to breakeven}$$

$$\frac{\$300,000}{\$20 - \$10}$$

## Markups

**Definition** - The dollar amount added to the cost of goods per unit to get the selling price.

Markup is intended to cover selling and administrative expenses and provide a profit.

A markup is a common cost-plus pricing technique.

Typically, markup means percentage of selling price.

## Markups

**Example:** Women's Clothing

Cost of Dress = \$25

Selling Price = \$75

$$\frac{\$ \text{Markup}}{\text{Selling Price}} = \frac{\$50}{\$75} = 67\% \text{ markup on selling price}$$

Markups can be expressed as percentage of cost, too.

$$\frac{\$ \text{Markup}}{\text{Cost}} = \frac{\$50}{\$25} = 200\% \text{ markup on cost}$$

## Markups

*If markup percentage is based on costs, it is always a higher number than if based on selling price.*

Typical supermarket markups (percentage of selling price):

9% on baby food

14% on tobacco products

20% on bakery goods

27% on dried foods and vegetables

37% on spices and extracts

50% on greeting cards

## Markdowns

Definition - A retail price reduction.

$$\text{Markdown \%} = \frac{\text{\$Markdown}}{\text{\$Original Selling Price}}$$

Example: Women's Clothing

Markdown in dollars = \$15  
 Original Selling Price = \$75  
 $\frac{\$15}{\$75} = 20\%$  Markdown

## Markdowns

In general, it is assumed that markdowns reflect business errors:

- wrong merchandise
- overstocking
- style changes
- seasonality
- damaged or soiled merchandise
- original price too high

Hence, the firm is forced to mark the price down.

## Stock-turn Rate

Definition - The number of times the average inventory is sold during a year.

There are several methods of computing the stock-turn rate. I prefer the "units" method:

$$\frac{\text{Sales in Units}}{\text{Average Inventory in Units}}$$

Example: Liquor Store

Unit Sales = 20,000 cases  
 Average inventory = 1,000 cases  
 $\frac{20,000}{1,000} = \text{Stock-turn rate of } 20 \text{ times}$

*High stock-turn rates are desirable.*

## Make-or-Buy Example

Nantucket Nectars Company  
 Cost of Making 12-ounce Bottles

	Total Cost for 1,000,000 bottles	Cost per bottle
Direct material	\$ 60,000	\$ .06
Direct labor	20,000	.02
Variable overhead	40,000	.04
Fixed overhead	<u>80,000</u>	<u>.08</u>
Total costs	\$200,000	\$ .20

(Horngren, Sundem, and Stratton 2005)

## Make-or-Buy Example

Another manufacturer offers to sell Nantucket the same part for \$.18.

If the company buys the part, \$50,000 of fixed overhead would be eliminated.

Should Nantucket make or buy the part?

(Horngren, Sundem, and Stratton 2005)

## Relevant Cost Comparison

	Make		Buy	
	Total	Per Bottle	Total	Per Bottle
Purchase cost			\$180,000	\$ .18
Direct material	\$ 60,000	\$ .06		
Direct labor	20,000	.02		
Variable overhead	40,000	.04		
Fixed OH avoided by not making	<u>50,000</u>	<u>.05</u>	<u>0</u>	<u>0</u>
<b>Total relevant costs</b>	<b>\$170,000</b>	<b>\$ .17</b>	<b>\$180,000</b>	<b>\$ .18</b>
Difference in favor of making	\$ 10,000	\$ .01		

(Horngren, Sundem, and Stratton 2005)

### Example of Volume Basis Decision

	Old Machine	New Machine
	100,000	100,000
Variable cost per unit	\$1.50	\$1.00
Variable costs	\$150,000	\$100,000
Straight-line depreciation	0	20,000
Total relevant costs	\$150,000	\$120,000
Unit relevant costs	\$1.50	\$1.20

(Horngren, Sundem, and Stratton 2005)

### Example of Volume Basis Decision

Assume that a new \$100,000 machine with a five-year life can produce 100,000 units a year at a variable cost of \$1 per unit, as opposed to a variable cost per unit of \$1.50 with an old machine.

Is the new machine a worthwhile acquisition?

(Horngren, Sundem, and Stratton 2005)

### Example of Volume Basis Decision

It appears that the new machine will reduce costs by \$.30 per unit.

However, if the expected volume is only 30,000 units per year, the unit costs change in favor of the old machine.

(Horngren, Sundem, and Stratton 2005)

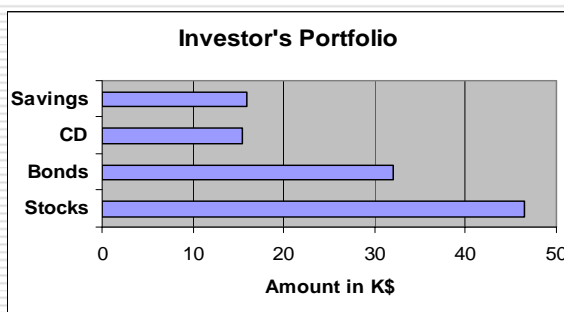
### Graphical Representations

#### □ Categorical vs. Quantitative data

- Categorical
  - Bar charts
  - Pie Charts
  - Pareto Diagram
- Quantitative
  - Histograms
  - Pie Charts
  - Line Graph

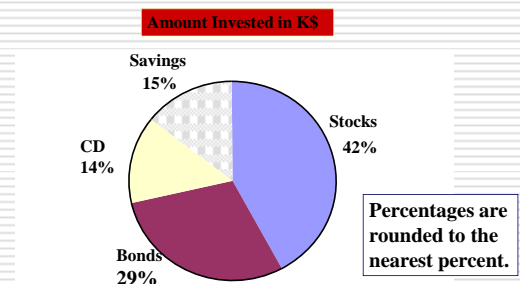
### Bar Chart

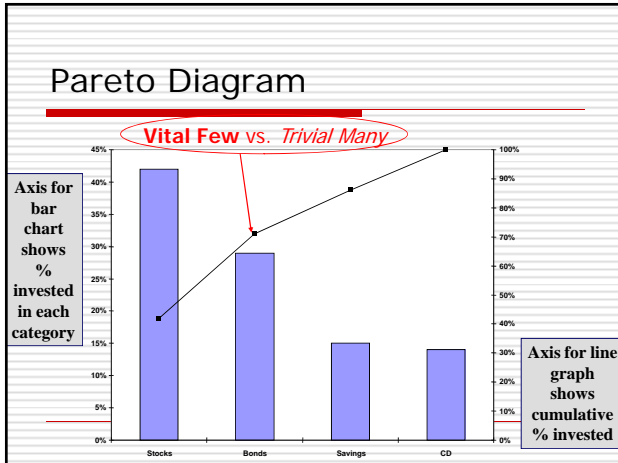
(for an Investor's Portfolio)



### Pie Chart

(for an Investor's Portfolio)





### Principles of Graphical Excellence

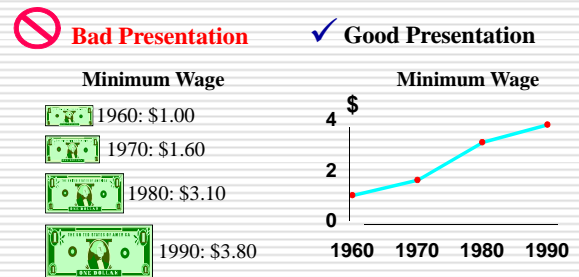
- Presents data in a way that provides substance, statistics and design
- Communicates complex ideas with clarity, precision and efficiency
- Gives the largest number of ideas in the most efficient manner
- Almost always involves several dimensions
- Tells the truth about the data

### Errors in Presenting Data

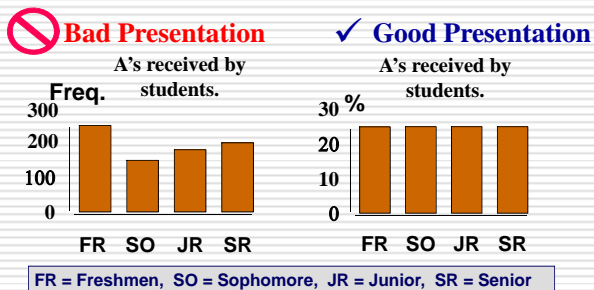
- Using "chart junk"
- Failing to provide a relative basis in comparing data between groups
- Compressing the vertical axis
- Providing no zero point on the vertical axis



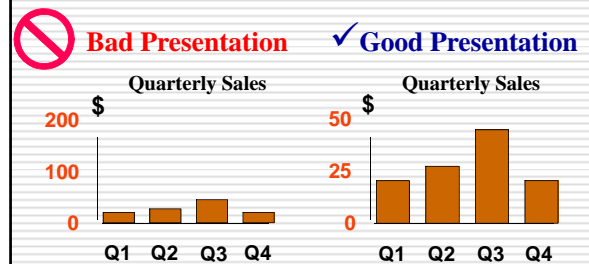
### "Chart Junk"



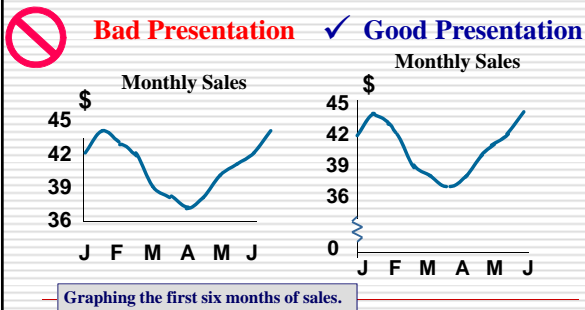
### No Relative Basis



### Compressing Vertical Axis



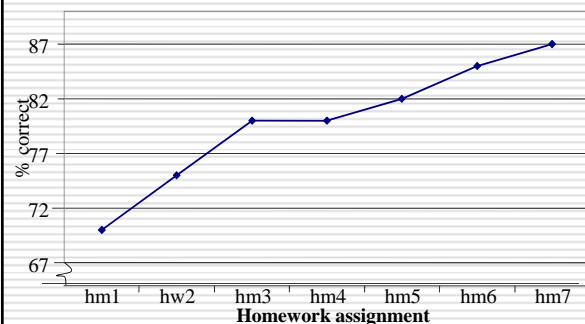
### No Zero Point on Vertical Axis



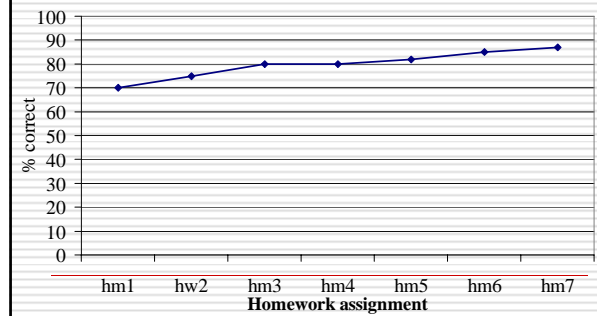
### "How to Statisticulate"

- Graphs are used to summarize data, persuasively
  - Some people don't realize what they're doing wrong
  - Others don't care and/or have an agenda beyond getting you to read the article
- Some methods of summarizing more inherently misleading, e.g., Percentages and percentiles
- Experienced researchers look at the actual statistics before believing graphs

### An Impressive Improvement: A Grade-and-a-half Increase



### How to Hide the Change

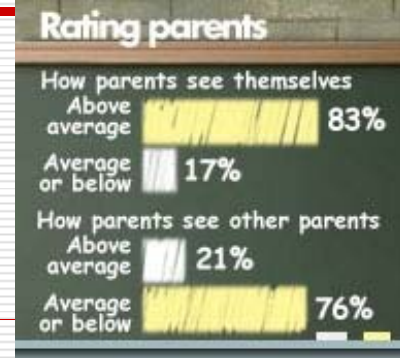


### Good Example of a Pie Chart



Source: USA Today Jan 15, 2004

### Perspective



Source USA Today Jan 28, 2004