



Printing Industries of America



2017-2018

Lessons from Industry Profit Leaders

Vol. I

Management Guide to
the Dynamic Ratios

2017-18 Printing Industries of America Ratios

Volume 1 — Management Guide to Ratios

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The Printer's Guide to Strategic Management, Productivity and Profits

Information compiled from the
2017 Printing Industries of America
Financial Ratio Survey

Published By:
Printing Industries of America, Inc.
301 Brush Creek Road
Warrendale, PA 15086
Phone (800) 910-4283
Website: www.printing.org

Edited and Prepared By:
MARGOLIS PARTNERS, LLC
Certified Public Accountants
601 S. Henderson Rd. Ste. 201
King of Prussia, PA 19406
Phone (610) 667-4310
Website: www.MARGOLISPARTNERS.com

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Welcome to the 2017 Dynamic Ratios!

2017 is the 96th year in which Printing Industries of America, Inc. has collected and published detailed financial ratio information for members of the graphic arts community. The data presented each year provides a detailed and comprehensive picture of the financial status of the major segments of the graphic arts industries in the U.S. and Canada. It allows individual firms to compare their annual performance with that of many other similar firms, including those which earn above-average profits. Dynamic Ratio results are published annually. They are summarized as follows:

- Management Guide to the Dynamic Ratios
- All Printers by Sales Volume and Geographic Area
- All Printers by Product Specialty
- Sheetfed Printers by Sales Volume and Geographic Area
- Web Offset Printers and Combination Offset Web/
Sheetfed Printers
- Printers with Sales Over \$22,000,000
- Printers with Sales Under \$4,000,000
- Digital Printers
- Commercial and Advertising Printers

For a more complete composite picture of your company's performance relative to the industry as a whole, several books could be used in your analysis, such as one of the overview volumes, e.g. **All Printers by Sales Volume and Geographic Area**, and one that addresses your particular business segment or production process, e.g. **Commercial and Advertising Printers** or **Digital Printers**, respectively. Additionally, such analysis is facilitated by participating in the Dynamic Ratio Study each year and ordering a **Customized Financial Analysis** that compares a participant's ratios to those of companies which are similar in sales volume, produce the same products, and use the same manufacturing process.

For the second year in a row, we have added section 3 which contains median and quartile values. A median is defined as the middle number in a series of numbers. Therefore, at least half the reporting firms are as small as or smaller than the median, and at least half are as large as or larger than the median. Identifying and reporting the median eliminates the skewing in the values reported when the distribution is asymmetric.

A quartile is essentially a division of data into four defined intervals based upon the values of the data and how they compare to the entire set. These sections would each contain 25% of the entire population. We have identified the value of the end of the first and the third quartiles. The use of these quartiles identifies 50% of the survey participants who fall in the center of the item's distribution. By using this data, management can get a better understanding of where their company stands among their competitors.

MARGOLIS PARTNERS LLC

Dear Member of the Graphic Arts Community:

Margolis Partners LLC is pleased to have participated with Printing Industries of America, Inc. and the graphic arts community in compiling these dynamic ratios for our 55th consecutive year. This longevity is an unprecedented alliance between two entities whose purpose is to serve the printing industry. Margolis Partners is proud of this affiliation and its reputation as an expert in the industry.

The importance of sharing this type of information among members of the graphic arts community cannot be overemphasized. Such a comparative analysis enhances the health of both individual firms and the graphic arts industry as a whole. Consequently, we urge that all firms utilize these ratios in making effective and profitable financial decisions.

One of the best tools available in the dynamic ratio study arsenal is the CFA (Customized Financial Analysis). The CFA is a customized report that compares your firm's financial data and ratios to the published, and sometimes unpublished, dynamic ratios results for that year. This is an important assessment of your firm's overall positioning with firms of comparative size in the industry. This tool may be separately ordered through Printing Industries of America, Inc. or Margolis Partners LLC.

Margolis Partners LLC is known as a premier source of profit-enhancing consulting services for the U.S. graphic arts industry. Our firm publishes articles, white papers and studies offering unique insight that can make a difference for graphic arts businesses. With topics ranging from profit planning, MIS system analyses and value added concepts, the firm provides printers with the tools needed to shape their future.

We are here to lend our expertise. We understand industry changes. We stay in tune with you. We take our responsibility seriously to help you produce and orchestrate top-notch performance and profitability.

A partial list of our services is noted below:

<i>Mergers and Acquisitions</i>	<i>Value Added Principal Management</i>	<i>Tax Services</i>
<i>Profit Planning</i>	<i>Financial Consulting</i>	<i>Auditing and Accounting</i>
<i>Company Valuation</i>	<i>Sales Compensation</i>	<i>Training and Education</i>
<i>Succession Planning</i>	<i>Cost Accounting Systems</i>	<i>Accounting and Bookkeeping Services</i>

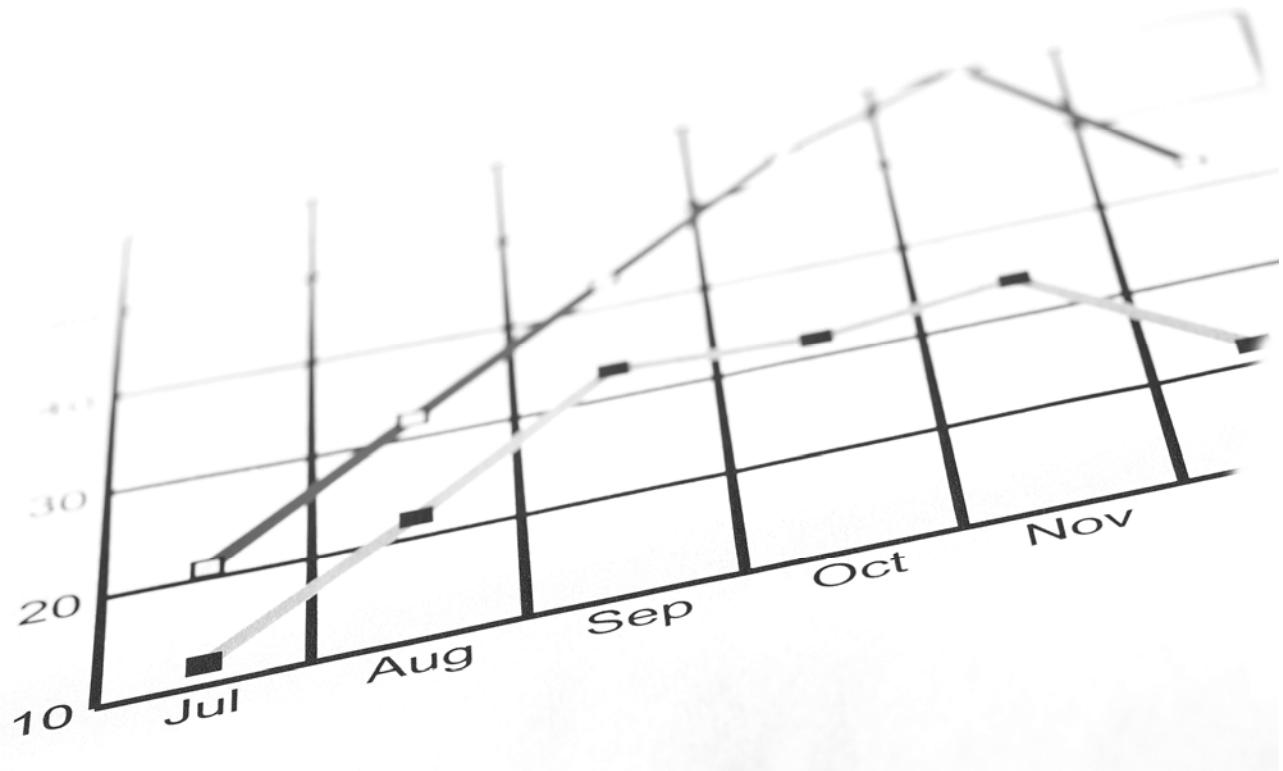
We help build strong printing companies. Contact us today!



Margolis Partners LLC

Section 1

Background on the Ratio Studies



About This Guide

Every year Printing Industries of America, Inc. distributes over 7,000 financial questionnaires to member graphic arts companies in the United States and Canada. The completed questionnaires comprise a large database that is the basis for Volumes 2 through 9 of the Printing Industries of America Dynamic Ratio Study. This book, Volume 1, is a **Management Guide** to these Dynamic Ratio Studies.

This guide will tell you what the Dynamic Ratio Studies are, who should use the studies, and how the ratios are computed. It will also describe how to use the Dynamic Ratio Studies effectively; how to define and relate the 2017 ratio results to your operations; and provides an in-depth analysis of the concept of Value Added and its use in the Dynamic Ratio Studies. All of the ratios are discussed including Report on Operations, the Balance Sheet, Interrelated Ratios in the Significant Facts section, and the Return on Investment calculation.

Use and enjoy this guide. Use it as a reference guide. It is your tool to enhance your competitive edge in a highly competitive industry.

What are the Dynamic Ratio Studies

The Printing Industries of America dynamic Ratio Studies are a compilation of detailed financial information from hundreds of printing and related graphic arts firms. They include information about assets, liabilities, working capital, salaries, sales and profits. All of this data has been converted into statistical ratios. Transferring dollar amounts to ratios or percentages allows different companies to be measured by the same standards. In mathematical terms, "each similar ratio has a common denominator". A discussion on why ratios are the best method to measure companies is in the chapter on "How the Dynamic Ratios are Computed".

The Dynamic Ratio Studies supply the graphic arts industry with ratios that are the standards for comparative financial analysis. These ratios or standards enable the printing manager to determine his or her company's position within the printing industry. Printing managers can better understand different facets of their company and take a different financial view of their firm, ultimately arriving at important management decisions concerning their operations. Using the information from the Dynamic Ratios, managers can decide which of their company's policies to maintain, which to eliminate, and which to improve so that they can increase profits.

The Dynamic Ratio Studies are organized into nine different studies, each in a separate booklet. Having individual booklets enables managers to compare their firm's financial operations with other companies who have similar manufacturing processes, product specialties, sales volume or geographic areas. The studies also allow comparison to the industry's Profit Leaders. Each category or specialty is divided into two parts: "All Firms" and "Profit Leaders". All Firms are all the participants within that category; Profit Leaders are the average of the common size percentages of those firms whose profits are above the upper quartile point.

The 8 booklets are:

- All Printers by Sales Volume and Geographic Area
- All Printers by Product Specialty
- Sheetfed Printers by Sales Volume and Geographic Area
- Web Offset Printers and Combination Offset Web/Sheetfed Printers
- Printers with Sales Over \$22,000,000
- Printers with Sales Under \$4,000,000
- Digital Printers
- Commercial and Advertising Printers

Comparing your financial data to "All Firms" and "Profit Leaders" can identify a company's strengths and weaknesses. The Dynamic Ratio Studies help answer questions such as:

- Are my expenses too high in relation to sales?
- Is there too little or too much inventory in stock?
- Am I producing enough value-added sales?
- Can we meet our debts as they mature?
- Are our accounts receivable collected promptly?
- Should we increase our selling prices?
- How can we increase our profits?

The value of the Dynamic Ratio Studies to printing companies depends on how effectively they are used. The purpose of this management guide is to help managers make the fullest use of the Dynamic Ratio Studies in analyzing and interpreting relevant financial information.

Who Should Use the Ratio Studies

Ratio analysis is a simple common-sense operation. Ratio analysis of financial statements is critical to the management of any company, especially graphic arts companies and other manufacturing firms. It allows management to evaluate company operations and, by the use of these Dynamic Ratio Studies, compare their firm to industry standards.

Management has much to gain by using the Dynamic Ratio Studies. Management's job is to continuously monitor the state of their company. Although no single ratio by itself is enough to change management policies or operating procedures, analysis and comparison to other financial indicators may point to deviations from management's goals or expectations.

Others may be interested in the Dynamic Ratio Studies. Bankers may want to compare their customers to industry standards. Economists may look at the Studies for profit or growth trends. Industry leaders and spokespersons may see operating trends of interest to industry groups. Accountants can use the ratios to do the analytical review required in the preparation of financial statements. Vendors who supply the industry with goods and services can judge markets and opportunities available to their companies.

Anyone who is remotely connected to the graphic arts industry can use some part of the Dynamic Ratio Studies. After all, the Dynamic Ratio Studies are the standard guideline by which managers can evaluate their company's operations in comparison to other companies in the graphic arts industry.

How the Ratios Are Computed

The Dynamic Ratio Studies use a method that avoids distortion of the data by companies with very large or very small dollar amounts. To compute the percentages in the Dynamic Ratio Studies, each company's ratios or percentages are first calculated. These percentages are assigned equal weight like all of the other firms' calculated percentages. All of the firms' percentages are then added and divided by the number of firms in that category. This method, called "Equal-Weighting," eliminates the distortion created by the "Self-Weighting" method where the dollars are added first, and then a percentage or ratio is calculated.

In the following examples there are computations of Company A's, Company B's and Company C's factory payroll percentage (as based on Sales). Using the Equal-Weighting Method the ratio of factory payroll to sales is 22.33%. As you can see, 22.33% is the average of each of the companies' ratios. No one company can distort the ratio more than any other company. Using the Self-Weighting Method (average 14.44%), Company C would dominate the ratio, since it has the largest dollar amounts. If Company C was an unusual or different company, and the Self-Weighting method was used, a distortion in the Dynamic Ratios could occur.

Equal-Weighting Method				
Company	Sales Dollars	Factory Payroll Dollars	Company's Factory Payroll as a Percent of Sales	
A	\$ 1,000,000	\$ 300,000	30 %	
B	2,000,000	500,000	25	
C	15,000,000	1,800,000	12	
Total of Each Firm's Ratio			67 %	

Average using Equal-Weighting Method:

Total of Each Firm's Ratio of 67% ÷ 3 Firms = 22.33%

Self-Weighting Method			
Company	Sales Dollars	Factory Payroll Dollars	Company's Factory Payroll as a Percent of Sales
A	\$ 1,000,000	\$ 300,000	30 %
B	2,000,000	500,000	25
C	15,000,000	1,800,000	12
Total Dollars	<u>\$ 18,000,000</u>	<u>\$ 2,600,000</u>	Not Used

Average using Self-Weighting Method:

$$\text{Total Factory Payroll of } \$2,600,000 \div \text{Total Sales of } \$18,000,000 = 14.44\%$$

The objective of the Dynamic Ratio Studies is to give each company an equal position in establishing Industry Standards. The Equal-Weighting Method is a valid statistical approach which establishes ratios that give the industry an excellent basis for comparison.

Throughout the study, you will see ratios separated into two columns, "All Firms" and "Profit Leaders". For example, Chapter 1 of Volume 2, "All Printers by Sales Volume and Geographic Area", has a sales volume category or size, from \$4,000,000 to \$6,600,000. This category is separated further into "All Firms" and "Profit Leaders".

"All Firms" encompasses every firm that is in that category. Within the "All Firms" column, a calculation has been done on each printer with sales from \$4,000,000 to \$6,600,000. The category also includes a column for "Profit Leaders," whose description follows.

Profit Leaders Criterion

The term "Profit Leaders" describes those firms whose profits are above the upper quartile point based on profits as a measure of value added.

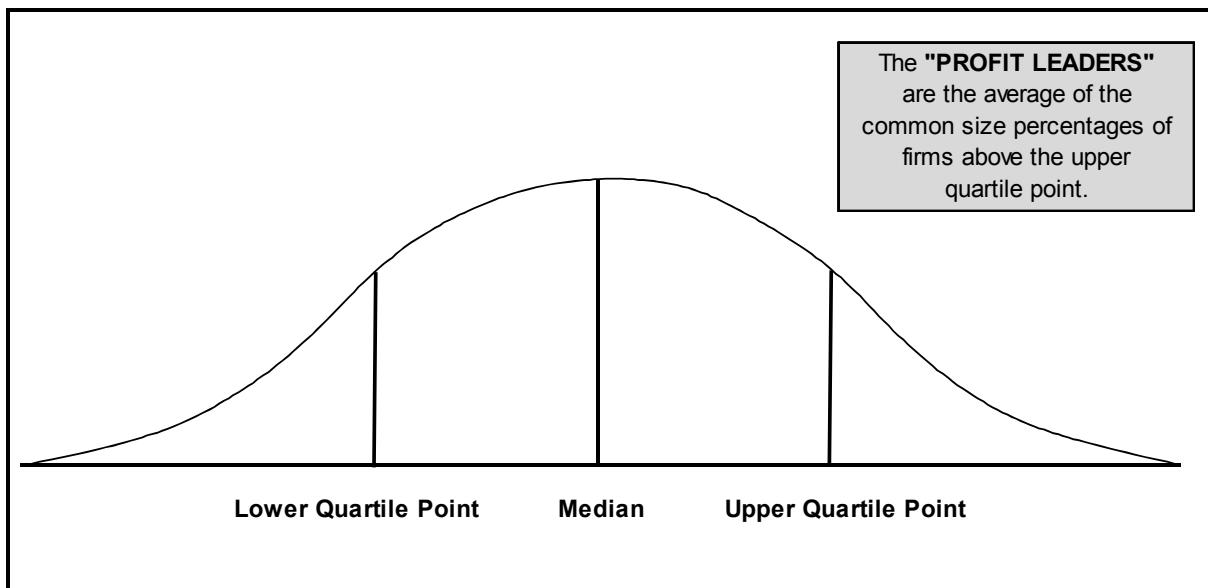
For years, the Dynamic Ratio Studies had used a certain calculation of ratios for "Profit Leaders" for other firms to compare themselves with, and to strive to achieve. After years and years of struggling with the concept of which firms should be classified as "Profit Leaders" and where should the cutoff be, the methods of classifying and measuring these firms in the studies were changed in 1992. Prior to 1992, "Profit Leaders" were defined as "those firms that earned 8% or greater pre-tax profits on sales". In general, this stratum produced the desired results of ratios indicative of superior profit performance. However, over the years we had to defend this classification as the industry and the economy changed.

After researching to find when we first began using the 8% criteria as the identification of "Profit Leaders", we discovered that the *Dynamic Ratio Studies* (including 1992) had been in existence for seventy-one years. They were first published in 1922 from the results of the year 1921. The oldest ratio study that we have is the 1932 *Ratios for Printing Management*. In that year's study, the criteria for "Profit Leaders" changed to 6% or more profit because of the decline of profits during the depression years (1930–1932). Therefore, we know that the designation of companies with 8% or more profit as "Profit Leaders" existed in 1929 and before. The 8% rule worked well for over 60 years; but there was a need for a comprehensive method that would solve the weaknesses previously mentioned and would serve the printing industry more efficiently.

As previously stated, we had used profit as a percentage of sales to measure profitability in the selection process of "Profit Leaders". We believe that firms should be compared by their percentage of profits based on the value added they manufacture. The first change that was made was to select the "Profit Leaders" not by their profits as a percentage of sales, but by their profits as a percentage of value added. Since we settled on a basis for measuring a profitable printer, we had to decide on a method of calculating the ratios for "Profit Leaders". Fortunately, statistics and the science of presenting data had advanced over the years and we were able to use the measures of central tendency to accurately determine the "Profit Leaders".

The change that was instituted in 1992 defines "Profit Leaders" as those firms whose profits are above the upper quartile point based on profits as a measure of value added. The median divides the distribution into two equal parts. The quartiles divide it into four equal parts. By selecting the upper quartile, we allowed the data for the top 25% of the participating firms to be averaged together, to give all printers purposeful results to strive towards.

It may have taken 71 years, but we now have "Profit Leaders" ratios and related significant facts that are more meaningful. The formula is able to compensate for recessions and expansions. If the economics of an aspect of the industry warrants a lower or higher profit standard, this upper quartile technique produces the desired results. After all, there are significant differences between a hand bindery and a web press printing plant, and we have a method for determining "Profit Leaders" that is flexible to the financial differences presented. We have a "Profit Leaders" ratio that, provided there are at least twenty firms in the category, would then designate five firms to be the "Profit Leaders".



Median Values

On page 6 we discussed "How the Ratios Are Computed", calculating the Mean Values using the Equal-Weighting Method. The Dynamic Ratio Study also uses median values in reporting certain Interrelated Ratios (ratios defined in section 2, starting on page 59). A median value is defined as the middle number in a series of numbers. Therefore at least half the reporting firms are as small as or smaller than the median, and at least half are as large as or larger than the median. Using the median eliminates the skewing in the values reported when the distribution is asymmetric. We believe that the use of the median, for certain significant facts, provides the reporting of the appropriate values for the responding companies.

Lessons from Industry Profit Leaders

Welcome to the Printing Industries of America Dynamic Ratios—Lessons from Industry Profit Leaders. The objective of the manager is to make good, reasoned business decisions; the goal is to increase the company's profit. Analysis of a firm's financial ratios is a vital management tool that gives management the ability to understand their company. It gives management the opportunity to learn more about the company's past, present, and projected future operations. Comparing your financial ratios to industry profit leaders can add even more insight.

There are different types of ratio analyses. The following is a brief description of the various types of analysis:

1. Trend Analysis

This method examines the change in a firm's ratios over a period of time. The purpose would be to discover any patterns that may suggest problems and allow time for changes to correct the problem.

2. Industry Comparisons

This method is the one proposed by the Dynamic Ratio Studies. It suggests that a company's ratios be compared to the industry standards, which represent your competition.

3. Common-Size Analysis

This method, used in the Dynamic Ratio Studies, turns your basis for comparison into a common size. For example, total sales would be set at 100%, and all other items would be calculated and categorized as a percentage of sales. In the Dynamic Ratio Studies, we do this with Sales, Value Added, Total Assets, and other less common items, so we can compare them easily. This conversion from dollars to common size ratios allows companies to monitor the relationship of the numbers, even when they are constantly changing.

4. Integrated Analysis

This method involves an analytical review of the ratios. The result of the review is to obtain a complete evaluation of the company's operations and financial position.

Using ratio analysis is a process one must work through systematically to obtain the most informative results. The basic steps in ratio analysis and the Dynamic Ratio Study are:

1. Set-up
2. Comparison
3. Analysis

Each of these steps is discussed in detail.

1. Set-Up

The first step in ratio analysis is building a framework to collect and record your data. The accumulation of financial data is usually done with a general ledger accounting system. Designing a proper chart of accounts to work within your General Ledger is of the utmost importance. If your Chart of Accounts is well designed, you can easily extract all the information necessary to compare your firm's performance with that of the industry's profit leaders.

A Chart of Accounts is a set of account headings that is designed specifically for each firm. It is patterned after each firm's organizational structure and, when collecting cost information for cost control and hourly cost rates, the Chart of Accounts will reflect the cost or profit centers.

A proper Chart of Accounts for a graphic arts company is similar to the makeready of a printing job. When one has the proper Chart of Accounts, business transactions are recorded and accumulated in a way that simplifies the preparation of meaningful financial information. Often the operating statements of a printer cannot be properly evaluated. Simple financial data such as the cost of Paper, Other Chargeable Materials, Outside Services, Production Payroll or Expenses cannot be determined from the operating statement. Administrative and Selling Expenses cannot be isolated. This critical information is missing because these printers do not have a Chart of Accounts that separates and accumulates transactions according to management needs.

A Chart of Accounts need not be vast and complex; the makeready involved depends on the size and structure of your individual company. Three major objectives should be accomplished by a printer's chart of accounts.

- Make it easy for your company to prepare proper and accurate financial statements.
- Enhance your company's ability to compare your financial information to industry standards—The Printing Industries of America Dynamic Ratio Study.
- Set up financial data in a way that will allow you to calculate accurate cost rates.

Charts of Accounts are not like shirts or suits that can be purchased off the rack and fit with only a little adjusting. If your Chart of Accounts is not designed for a printing firm, and specifically your printing firm, it will not be particularly useful. The more "tailor-made" your chart of accounts is—designed for your firm and your needs—the more value it will provide.

A Chart of Accounts controls every company's financial system. Each account should be broken down into detailed headings so as much information as is necessary or relevant can be recorded. In broad terms, Charts of Accounts have similar formats listing assets owned (cash, etc.), debts owed, income received (sales), and expenses. Specific accounts, however, are determined by the specific business or industry that the company is in.

The basic principles involved in setting up a proper and useful Chart of Accounts are:

- A. Your Chart of Accounts should define and measure those categories of transactions that need to be monitored and tracked. For example, most printers should have materials broken down into Paper, Ink, Plates, Other Chargeable Materials, and Outside Services.
- B. Base your Chart of Accounts on your company's organizational structure. Organize the Chart of Accounts according to your company's major operations (production, administrative, selling) by department (prepress, press, bindery) and by cost center (prepress, digital press four-color press, six-color press, folder, stitcher, hand bindery, etc.).
- C. How complex your Chart of Accounts is depends on the size of your company and the products and processes involved.

The Printing Industries of America Dynamic Ratio Study's Chart of Accounts is used in the Dynamic Ratios Studies and is an excellent chart of accounts for most printers.

Let us work through the process by following the basic principles in setting up a good Chart of Accounts.

A. Define and measure those categories of transactions that need to be monitored and tracked. You would start, for example, by asking yourself "I want to know..."

- How much cash do I have on hand?
- What do my customers owe me?
- How much machinery and equipment do I own?
- How much do I owe my bankers?
- How much do I owe my vendors?
- What were my sales for the year?
- Can I get the detail of my "cost of goods sold"?
(Materials, Production Payroll, Production Expenses)
- What is the cost of my company's profession fees?
- What are my sales expenses?

The result of your defining exercise could be the following major groups or classifications:

- Assets
- Liabilities
- Shareholders/owners' equity
- Sales
- Materials
- Production payroll
- Production expenses
- Administrative expenses
- Selling expenses
- Other income and expense

Following through with a more detailed analysis, let us examine material costs, a component of production overhead. An account called Materials would satisfy some printers. If our objective is to be able to analyze, we need to do more. The Dynamic Ratio Study divides Materials into three major categories:

Materials	
Paper	\$ XXX
Other chargeable materials	XXX
Outside services	<u>XXX</u>
Total Materials	<u>\$ XXX</u>

These categories can be broken down further to the types of Other Chargeable Materials (raw materials) and Outside Services. Your Chart of Accounts could be broken down as follows:

Materials:

- Purchases—Paper
- Purchases—Ink
- Purchases—Plates
- Purchases—Other chargeable materials
- Outside services—Prepress
- Outside services—Printing
- Outside services—Bindery and finishing
- Outside services—Other

B. List Account Classifications

Listing your account classifications is the next step in developing your Chart of Accounts. Since one of our objectives is to be able to compare your operation to the Dynamic Ratio Studies, we will use the Printing Industries of America Dynamic Ratio Study's Standard Classification of Accounts as a guide. Simultaneously we will want a Chart of Accounts that meets your other needs and whose structure is similar to your organizational chart. The following page has a sample Chart of Accounts that could be used by many printing firms, and if modified, by almost all graphic arts firms.

Sample Chart of Accounts

Current Assets	Shareholders' Equity	Administrative Expenses
Cash in Bank	Common Stock	Bad Debts
Cash on Hand	Preferred Stock	Collection Expenses
Accounts Receivable	Paid-In Capital	Contributions
Allowance for Doubtful Accounts	Retained Earnings	Data Processing Expense
Other Receivables	Dividends Paid	Depreciation—Administrative
Inventory	Treasury Stock	Dues and Subscriptions
Work in Process		Employees' Benefits—Administrative
Paper		Office Salaries
Other Chargeable Materials and Departmental Supplies		Office Supplies and Expenses
Prepaid Expenses		Officer's Life Insurance
Insurance		Officers' Salaries
Interest		Payroll Taxes—Administrative
Officers' Life Insurance		Postage
Taxes and Other		Professional Fees
Loans and Exchanges		Taxes—Business
		Telephone
Fixed Assets	Cost of Product Produced	Selling Expenses
Land	Materials	Advertising
Building and Improvements	Purchases	Commissions—Outside
Machinery and Equipment	Paper	Depreciation—Selling
Furniture and Fixtures	Ink	Employees' Benefits—Selling
Vehicles	Toner	Gifts and Flowers
Accumulated Depreciation and	Plates	Payroll Taxes—Selling
Amortization	Click Charges	Sales Office Salaries
	Other Materials	Sales Salaries—Executive
Liabilities	Outside Services	Sales Salaries and Commissions
Notes Payable	Prepress	Sales Expenses
Accounts Payable	Printing Services	Travel and Entertainment
Employees' Federal Withholding Tax	Bindery	Vehicle Expenses
Employees' and Accrued FICA and Medicare	Other	
Employees' Local Tax Withheld	Purchase Discounts	Interest Expense
Accrued State Unemployment Tax	Scrap Income	Interest Expense
Accrued Federal Unemployment Tax		
Sales Tax Collected	Production Payroll	Other Income—Expense
Estimated State and Federal Income Taxes Payable	Direct Wages	Interest Income
Accrued Expenses	Indirect Labor	Gain or Loss on Sale of Fixed Assets
Business Taxes	Packing, Shipping and Delivery	Other Income
Interest	Supervision	Other Expense
Payroll	Employees' Benefits—Factory	Provision for State and Federal Income Taxes
Vacation Payroll	Payroll Taxes—Factory	
Other		
	Production Expenses	
	Equipment Rentals	
	Factory Depreciation	
	Factory Supplies and Expenses	
	Heat, Light, and Power	
	Postage and Freight	
	Real Estate Taxes	
	Rent	
	Repairs and Maintenance	
	Building	
	Equipment	
	Vehicle Expenses	

As an example, we will use an expense—Payroll—to illustrate the process. Start by identifying each employee's job function. Then organize the job functions, based on your organizational chart, into production employees, administrative employees and selling employees. Organize payroll related expenses, such as payroll taxes and employee benefits, in the same manner.

Identifying the job functions of production employees is not difficult, but it does take some planning. Let us assume that your payroll records have identified 14 production employees. The positions used here do not necessarily reflect the proportions of indirect to direct wages as would be found in a standard operation and are for illustration purposes only. These job functions are:

Job Position of Production Employees

1. Plant Manager
2. Shipping Clerk
3. Digital Press Operator
4. Graphic Designer
5. Estimator
6. First Pressman
7. Second Pressman
8. Prepress Operator
9. Truck Driver
10. Customer Service Representative
11. Cutter Operator
12. Stitcher/Folder Operator
13. Hand Binder #1
14. Hand Binder #2

Now, match each job with the corresponding cost center in the organizational chart. Please note that estimators and customer service representatives should be charged to indirect labor as their work cannot be directly charged to a particular job. The same applies to shipping clerks or truck drivers. Their proper classification is indirect labor since they are responsible for general production duties. The Dynamic Ratio Study's Standard Classification of Accounts itemizes these wages as:

- a. General Production Salaries and Wages
- b. Packing, Shipping, and Delivery Wages

Based on our identification of functions and segregation of duties as well as our requirement to be able to compare the data to the industry standards, the following is our illustrative result.

Production Jobs Matched with Corresponding Cost Center		
Executive Salaries	Direct Wages	Indirect Wages
Plant Manager	Prepress Graphic Designer Prepress Operator	General Factory Wages Estimator Customer Service Representative
	Digital Press Digital Press Operator	Packing, Shipping, and Delivery Wages Shipping Clerk Truck Driver
	Offset Press First Pressman Second Pressman	
	Bindery Cutter Operator Stitcher/Folder Operator Hand Binder (2)	

Accumulating individual employee's wages by department for the Production Payroll section of the statement of income would result in:

Production Payroll	
Executive salaries	\$ XXX
Direct wages	XXX
General production wages	XXX
Packing, shipping and delivery wages	XXX
Payroll taxes	XXX
Employee benefits	XXX
<hr/>	
Total Factory Payroll	\$ XXX

This concludes our example of production payroll. Other expenses and revenues should be similarly identified, separated, and charted according to the proper cost centers in your organizational chart. The result will be an organized Chart of Accounts from which you can draw information for meaningful financial statements.

2. Comparison

There must be some common denominator that will enable us to compare the financial information in your Chart of Accounts with the Dynamic Ratio Studies. When dollars are converted into percentages, you have a common denominator called "common size" statements. While dollar amounts will be different for each firm, "common size" statements or percentages are comparable. This is because each company's percentage base for comparison is identical—100% of Sales, 100% of Value Added, or 100% of Total Assets.

The next step in effectively analyzing your firm's financial information is the comparison phase. Since there is no method for dollar comparison, you must convert the dollar amounts identified by your accounting system to percentages. The percentages or ratios will then have a common denominator (i.e., sales = 100%). When your financial information is converted using a single common denominator, it is called a "common size" statement (dollars to percentages).

You are then ready to compare your costs and profits with industry standards. Since your firm's objective is high profits, we suggest you compare your firm with the Dynamic Ratio Studies Profit Leaders.

In Example 1, there is an excellent comparison of a company to the Industry Profit Leaders. We can see that the company's cost of Outside Services was \$433,000, but we are unable to conclude whether these costs are high, low or average. However, when Outside Services are converted to the "common size" percentage, of 8.66% based on sales, it becomes very meaningful. Comparing this to the target range set by the Dynamic Ratio Study's Profit Leaders, which is 6.12% of sales, we can calculate that the difference is 2.54%.

Example 1—Report on Operations

Industry Profit Leaders <i>(From \$4,000,000 to \$6,600,000)</i>				
	<u>Your Company</u>			Difference
	Common Dollars	Common Size or %	Common Size or %	More or (Less)
Sales or Value of Product Produced	\$ 5,000,000	100.00 %	100.00 %	
Factory Cost of Product				
Materials				
Paper	1,107,000	22.14	16.82	5.32 %
Other chargeable materials	268,000	5.36	6.06	(0.70)
Outside services	433,000	8.66	6.12	2.54
Total Materials	1,808,000	36.16	29.00	7.16
Factory Payroll	1,300,500	26.01	22.48	3.53
Factory Expenses	639,000	12.78	13.04	(0.26)
Total Factory Cost of Product	3,747,500	74.95	64.52	10.43
Gross Profit	1,252,500	25.05	35.48	(10.43)
Administrative and Selling Expenses				
Administrative expenses	644,000	12.88	13.80	(0.92)
Selling expenses	371,500	7.43	11.41	(3.98)
Total Administrative and Selling Expenses	1,015,500	20.31	25.21	(4.90)
Income Before Interest Expense	237,000	4.74	10.27	(5.53)
Interest expense	99,500	1.99	0.71	1.28
Operating Income	137,500	2.75	9.56	(6.81)
Other income (expense)	35,000	0.70	(0.20)	0.90
Income Before Income Taxes	\$ 172,500	3.45 %	9.36 %	(5.91)%

Pick Your Categories for Comparison

Your "common size" statements or percentages can be compared with other firms in many different ways. You may compare your percentages with those of "All Firms" in a particular category such as sales volume or product specialty, or only with the "Profit Leaders" in those categories. The illustration on the following page, "Categories for Comparison," lists the possible categories of comparison. Keep in mind that there may be other outside factors influencing your firm's position in the industry. The Dynamic Ratio Studies suggest what these other relevant factors may be, to help you refine your analysis.

Identify which of the categories listed on the next page reflects your company's operations and compare your results with theirs. You will then be ready for the next, most important, step in the meaningful use of the ratios: ANALYSIS. Analysis will help you identify the problem areas and the profitable areas in your company's operations.

3. Analysis

One reason for analyzing the financial status of your printing business is to determine its overall position in the printing industry. Comparing your company with similar companies enables you to decide which financial operations should be maintained at their current level and which should be improved to reach your profit objectives.

Comparative financial analysis should be broad. It is important to evaluate all the ratios together, not just individually. Your financial analysis should also include an examination of ratios over a period of time, and a comparison of your results with trends in the printing industry.

Evaluate Ratios Collectively, Not Individually

Individual ratio results may pinpoint a problem area in your printing operation or they may highlight a very profitable cost center, but individual ratio results do not provide in-depth financial information. Each ratio should be analyzed with other ratios and facts concerning your company.

For example, in examining your firm's income statement, you may find increases in your percentages for depreciation expense and interest expense, increases that may seem alarming at first. An analysis of the balance sheet, however, may show that such alarm is unwarranted.

Top management may have long-range profit planning goals that should be factored into the analysis. There may have been a plant expansion (increase in assets) funded through debt financing (increase in liabilities). A slow, outdated press may have been replaced by a new, more efficient one. Deeper analysis of the income statement may show that the company's income taxes are lower due to increased depreciation on the new press. Do not take one ratio out of context. Make your analysis broad enough to consider all financial results.

Categories for Comparison

Sales Volume—Ratios and statistics are presented in five categories:

Sales to \$4,000,000*
From \$4,000,000 to 6,600,000
From \$6,600,000 to 8,500,000
From \$8,500,000 to 22,000,000
Sales over \$22,000,000**

* A separate Ratio Book, "Volume 7—Printers With Sales Under \$4,000,000" divides this sales category as follows:

Sales to \$2,000,000
From \$2,000,000 to \$4,000,000

** A separate Ratio Book, "Volume 6—Printers With Sales Over \$22,000,000" divides this sales category as follows:

From \$22,000,000 to \$27,000,000
From \$27,000,000 to \$40,000,000
Sales over \$40,000,000

Product Specialty—The Ratio Studies carry "common size" or percentages for firms with sales in these key market areas:

Commercial Advertising ***	Converters and Label Printers
Magazine and Periodical	Signs and Signage
Direct Mail	Packaging
Book Manufacturers	

*** Separate Ratio Books are provided for each of these.

Process—The Ratio Studies provide comparisons of firms primarily using these processes:

Sheetfed	Web Offset and Combination
Digital Printers	Offset Web/Sheetfed

Separate Ratio Books are provided for each of these processes.

Geographic Area—Significant financial information for comparison can be drawn from companies working in the same economic environment. The Ratio Studies break down geographic areas as follow:

New England and Upstate New York	Chicago
Eastern Pennsylvania, South New Jersey,	West North Central
Maryland and District of Columbia	Plains and Mountain States
Southeast Atlantic	Pacific Southwest
East North Central	Pacific Northwest
South Central	

Observe, Assess, Monitor

Your firm and its operations are not static. Analyzing your ratios over a period may show trends and movements in your expense and profit picture that require some action. If action is taken, monitoring ratios on a regular basis will help show if the action was effective or appropriate.

Trend Analysis

If one of your company's ratios is "out of line," it is possible that there is nothing you can do to improve it. This is especially true if the entire printing industry is suffering a slump in a particular area. Furthermore, if industry trends are showing improvement, any action on your part might be counter-effective.

Trends that are evident in the industry are an increase in depreciation and a corresponding decrease in production payroll. Further trend changes have been increased interest expense and a decrease in sales per dollar of assets employed. Many changes have occurred in your company and in the industry over a range of time.

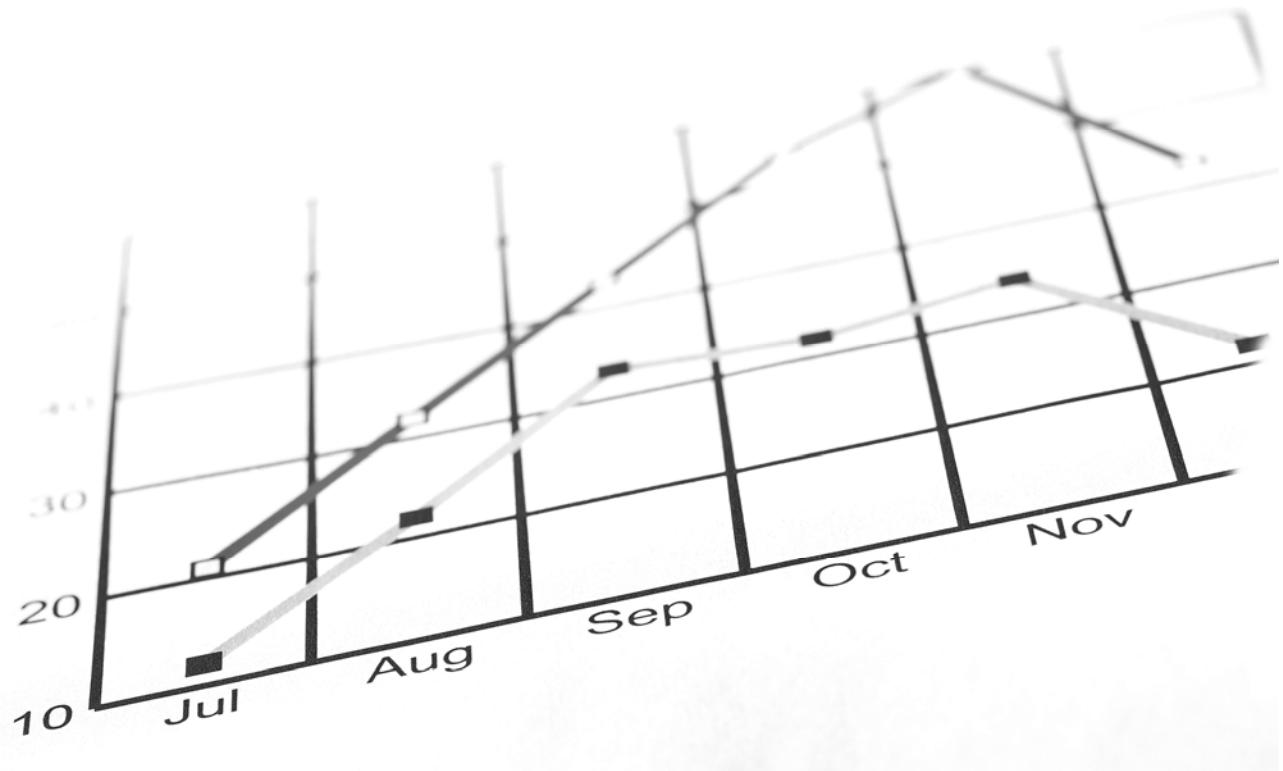
Remember that trends are only clues and should be considered with other concrete facts. Keep in mind that factors out of your control, or the industry's, may cause trends to reverse themselves at any time.

Consistency and Focus

Participate in the Printing Industry of America Dynamic Ratio Study program each year. Get the current year's results and have general and detailed discussions and analysis with your management team. General business studies have shown that those companies that spend countless hours trying to understand their company, its position in the market place, their value proposition, and its profit making formula are those that exceed the pack in profits and longevity.

Section 2

Analysis of the Ratios



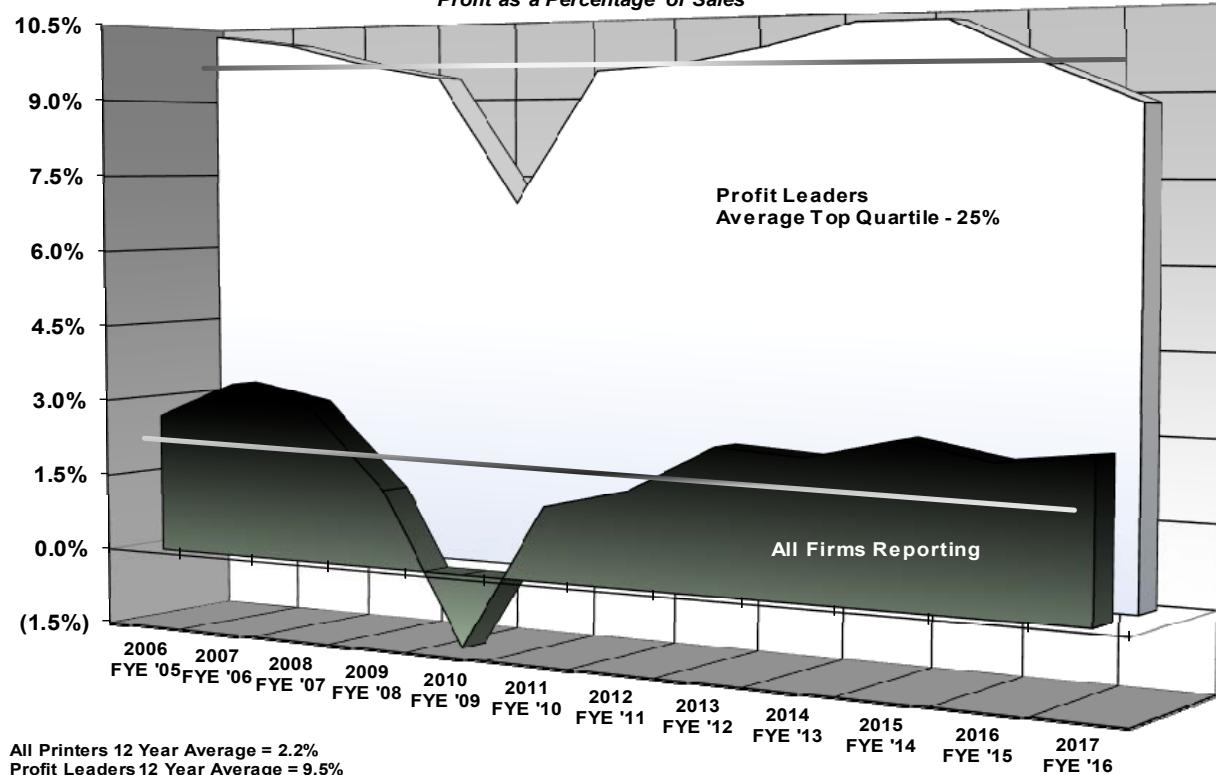
2017 Dynamic Ratios Overview

These Dynamic Ratios present the financial results for the 2016 fiscal year ending ("FYE") of graphic arts companies (reported in this 2017 publication) and are chronologically 6½ to 7½ years after the end of The Great Recession (June 2009). The recession resulted in three years of consecutive declines in profits (FYE 2007-09) for the industry. The 2010 fiscal year was the first full recovery year for the print market. Profits continued to increase for three consecutive years through the FYE 2012, providing a profit of 2.7% on sales before taxes, and then with a minor drop to 2.6% in 2013. Then the 2014 FYE results rose to 3.0%, a good increase in profits over the previous year, proceeded by a dip back to 2.7% with the 2015 FYE results. The FYE results for 2016, compiled and reported in this publication, rose to 2.9%. The trailing 12 year average profit for all printers is 2.2%, the same as last year's average. The 2007-09 recession contributed to the low 12 year industry profitability when compared to the long-term industry profitability which has hovered above 3.0% when averaged for the prior 96 years in which these surveys have been compiled.

This year's increase in profit of 0.2% will be carefully considered, especially after last year's drop of 0.3%. Even with this year's increase in profits to 2.9%, this still puts the industry below the 3.0% long-term profit average. The number of printers participating in the Dynamic Ratio Study who reported losses in the current year was 20%, down significantly from 2015's 25%. In prior years, 27%, 30%, 29%, 33%, and 38% reported losses in years 2014, 2013, 2012, 2011 and 2010, respectively.

Profit Trends 2006–2017

Profit as a Percentage of Sales



Publication Year >	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fiscal Year Ending >	FYE '05	FYE '06	FYE '07	FYE '08	FYE '09	FYE '10	FYE '11	FYE '12	FYE '13	FYE '14	FYE '15	FYE '16
<input checked="" type="checkbox"/> All Printers	2.7%	3.4%	3.1%	1.5%	(1.4%)	1.4%	1.8%	2.7%	2.6%	3.0%	2.7%	2.9%
<input type="checkbox"/> Profit Leaders	10.3%	10.1%	9.7%	9.4%	7.0%	9.5%	9.6%	9.9%	10.3%	10.3%	9.5%	8.8%

The industry's Profit Leaders, those printers in the top 25% of profitability, had profits of 8.8%, down from the previous year's profit of 9.5%. Their performance this year is below this elite group's 12 year average of 9.5%.

Below is a table of the variance between All Printers and Profit Leaders performance, including its 12 year average. Note that when All Printers performance is tabulated, it includes the Profit Leader firms, or another way to say it is, the Profit Leaders are a subset of the All Printers industry wide set. It is interesting that the variance, or spread, between the Profit Leaders and All Printers groups increased during the most recent recession, then diminished in the years immediately following the recessionary period. It should be noted that this year the variance was at its lowest level for the past 12 years, at 5.9%. A conclusion one might reach is that during tough times, the Profit Leaders kept their firms from being pulled down by the economic downturn, leading to a larger divide between the All Printers and Profit Leaders profits. And vice-versa, when the industry is static, the variance drops.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
PL vs. AP Var.	7.6%	6.7%	6.6%	7.9%	8.4%	8.1%	7.8%	7.2%	7.7%	7.3%	6.8%	5.9%	7.3%

Profits and Firm Size

Profit rates generally vary considerably by the size of the firm with larger firms typically earning higher profits as a percent of sales than smaller firms. This year, firms in the lower sales categories (under \$4M, \$4-\$6.6M, and \$6.6-8.5M in sales), saw increases in profits over 2016 (FY 2015), as reported among the "All Firms" categories results. The next larger sales category (\$8.5-\$22M) saw a drop in profits, with firms over \$22M staying the same at 5.2% in profits. Most notably, the group of firms in the \$8.5-\$22M sales category showed resulting profits dropping by more than 50% from its previous year's results. Also noteworthy is firms with sales over \$22M had profits of 5.2% of sales two years in a row, well above the industry average. In fact, this sales category and one other, the sales of \$6.6-\$8.5M category, were above the 12 year industry average of 2.2%.

Profits and Firm Size before tax profit as a % of sales				
Annual Sales	2017		2016	
	All Firms	Profit Leaders	All Firms	Profit Leaders
Less than \$4 million	1.6 %	8.9 %	0.9 %	11.2 %
\$4-\$6.6 million (2016 \$4-\$7.5M)	2.6	9.4	1.4	8.0
\$6.6-\$8.5 million (2016 \$7.5-\$11M)	3.8	9.0	2.9	7.9
\$8.5-\$22 million (2016 \$11-\$22M)	1.2	6.3	2.8	7.1
Over \$22 million	5.2	11.0	5.2	13.2

Profit Leaders at various size categories out-performed the other size groups in the last two years. Profit Leaders with sales over \$22M averaged an overall return on sales of 11.0% and 13.2% over the two year period, the highest level in each year. This year the Profit Leaders with sales of

\$8.5-\$22M reported profits of 6.3% were significantly lower than the 12 year profit leaders average of 9.5% or this year's average of 8.8%, following a similar pattern from last year profits of 7.1%. Again, the Profit Leaders in the over \$22M category had the highest Profit Leaders profit, coming in at 11.0%.

Within each size category the threshold for attaining Profit Leader status changes and the variance between categories can be significant. For example, a printer with a profit on sales of only 3.9% (or greater) was considered a profit leader in the \$8.5-\$22M category, where Profit Leaders averaged a 6.3% return. Yet, printers with sales over \$22M had a higher threshold and needed a profit of 7.7% or greater to be considered a Profit Leader, where the average Profit Leader return was 11.0%.

A Look at Major Cost Items

In this 2017 report (FYE 2016), factory cost of product for printers dropped 0.5% from the previous year to 76.5% of total sales, continuing the trend of lower factory costs for the years 2011 to 2016. Total materials costs (paper, plates, ink, other chargeable materials, and outside services) accounted for 34.4% of total sales. Production payroll increased to 25.5% of printing sales dollars, the highest in the last 7 years. 16.6% of sales were used to pay factory expenses. Administrative and selling expenses comprised 19.8 cents of every sales dollar.

The cost factors, in total, decreased slightly in this reporting period compared to a year earlier. This year, Administrative and selling expenses had the largest increase in cost, 0.2%. Paper costs, a component of total materials, had a large decrease of 0.5% from the prior year with a cumulative drop of 1.2% over 3 years. Administrative and selling expenses increased 0.2% from the prior year. Generally, these cost items are considered stable. Since 2013, where profits have stayed within 0.3% of each other, the trend seems to show material costs dropping while factory labor costs and administrative and selling expenses are increasing.

Major Cost Items	% of Sales Revenue						
	2017	2016	2015	2014	2013	2012	2011
Paper	20.5 %	21.0 %	21.7 %	21.6 %	21.6 %	21.7 %	22.1 %
Total materials	34.4	35.1	35.8	35.5	36.0	35.5	35.2
Production payroll	25.5	25.4	24.7	25.1	24.6	24.8	24.9
Factory expenses	16.6	16.6	16.5	16.9	16.9	17.6	18.0
Total factory cost of product	76.5	77.0	77.0	77.5	77.5	77.9	78.1
Administrative and selling expenses	19.8	19.6	19.4	19.1	19.3	19.6	19.4

Productivity Trends

Productivity as calculated by four measures; sales per employee, sales per factory employee, value added per employee, and value added per factory employee, increased in FYE 2016 (2017's report), for All Printers. The increases in sales per employee and sales per factory employee averaged 0.8%, whereas the value added per employee and value added per factory employee averaged 4.8% over the previous year.

Profit Leaders, as always, had higher productivity rates than All Firms, and all measures experienced increases in productivity during this year too. On average, profit leaders produced, per employee, 11.9% more sales and 8.4% more valued added.

Productivity Measures	Productivity Trends			
	2017		2016	
	All Firms	Leaders	All Firms	Leaders
Sales per employee	\$ 160,457	\$ 179,496	\$ 159,862	\$ 172,204
Sales per factory employee	213,292	244,364	210,632	231,801
Value added per employee	109,695	118,951	104,563	114,388
Value added per factory employee	144,504	158,138	138,040	153,050

Profits and Product Segments

Profit rates always vary by product specialty, sometimes significantly. Of the printing product specialties covered in the survey, the top profit producing segment was Direct Mail showing a 5.04% rate in Profit by Product Specialty. The segment with the largest volume of sales, Commercial and Advertising, had profits increase slightly by 0.11% to 2.20%.

Product Specialty	Profits (Losses) by Product Specialty						
	Profit (Loss) Rates by Year—% of Sales						
	2017	2016	2015	2014	2013	2012	2011
Printing							
Direct Mail	5.04%	4.06%	4.86%	6.15%	2.32%	1.86%	1.26%
Book Printing	3.38	4.30	3.48	2.92	3.57	4.52	6.64
Converters & Label Manufacturers	2.21	6.42	4.22	4.43	4.03	3.22	3.26
Commercial and Advertising	2.20	2.09	2.53	1.74	2.33	1.34	0.63
Package Printing/Manufacturers	n/a	5.94	3.34	6.84	5.56	5.15	4.88
Signs and Signage	n/a	3.08	n/a	n/a	n/a	n/a	n/a
Magazines and Periodicals	n/a	(0.88)	2.76	2.56	2.03	0.54	(0.03)
Forms and Documents	n/a	n/a	5.05	3.33	n/a	5.30	n/a
Quick Printing	n/a	n/a	n/a	9.11	5.62	0.95	3.46
Non-printing							
Binding	n/a	0.88	4.27	3.33	(2.95)	(1.30)	1.15

Sales Breakdown from Processes/Services and Market Segment

For the third year in a row, survey participants reported the proportion of their sales revenues derived from Production Processes/Services Rendered as well and by Market Segments serviced. Now printers can see what a cross section of a printing company looks like from a process/service and market position.

All Printers—Sales Breakdown by Processes/Services and Markets			
Processes/Services Rendered	% of Sales	Market Segment	% of Sales
Sheetfed Offset Printing	50.85 %	Commercial and Advertising Printing	53.40 %
Digital Printing - Toner-Based	17.19	Direct Mail Printing	12.13
Coldset Web Offset Printing	6.08	Converters & Label Manufacturers	6.22
Flexographic	2.75	Book Printing	5.01
Digital Printing - Inkjet High-Speed	2.58	Package Printing/Package Manufacturer	4.37
Heatset Web Offset Printing	2.40	Forms and Document Printing	3.94
Inkjet Wide & Super-Wide-Format	2.03	Signs & Signage	3.71
Prepress/Premedia Services	1.23	Magazine & Periodical Printing	2.28
Other Print Process	2.46	Quick Printing	2.07
Binding	1.97	Financial & Legal Printing	1.39
Graphic Finishing	0.62	Newspaper Printing	0.85
Mailing Service	4.57	Binding and Finishing	0.31
Fulfillment Services	3.70	Greeting Card Printing	0.11
Other Non-Print Ancillary Services	1.57	Other Market	4.21
Total Process/Services Rendered	100.00 %	Total Market Segement	100.00 %

Value Added—Why It's Important

If sales are up but profits are down, something is wrong. Even when sales are level and profits are lower, management has a problem. The problem area, in all probability, is in your Inside Sales, or Value Added. Too often printing managers are unfamiliar with this critical concept and do not realize that this may be the root of their problem.

Value Added Defined

Value Added Sales is the term used to describe the sale of that portion of your product that is manufactured in your company's plant. You calculate it by subtracting the cost of materials and outside purchases from the sales price. Value Added is the value you add to the purchased raw materials and outside services through your manufacturing efforts.

Materials include paper, ink, plates and other chargeable materials that are required to manufacture whatever specific product you are producing. This also applies to outside services such as offset preparation, printing, binding and other outside services. An example of how to calculate value added is as follows:

Value Added Example	
Sales	\$ 100
Less Materials	
Paper	\$ 22
Other Chargeable Materials	6
Outside Services	<u>7</u> <u>35</u>
Value Added	<u><u>\$ 65</u></u>

Value Added Means Manufacturing

The importance of calculating Value Added is that it indicates the amount of manufacturing you produce. Many companies just concentrate on increasing their sales and do not pay attention to what they are manufacturing. It is wrong to think that just because sales are increasing, your profits will also increase. Increased Value Added has a higher correlation to profits than Increased Sales.

To illustrate how Value Added can be a better barometer of whether your inside sales have increased, we present an example of the same job with two scenarios. In one case, the customer supplied the materials and in the other, the customer did not supply materials.

	Most Materials Supplied	No Materials Supplied
Materials Cost	\$ 50	\$ 350
Overhead Recovery/ Inside Costs	<u>650</u>	<u>650</u>
	700	1,000
Profit Markup	<u>100</u>	<u>100</u>
Sales Price	<u>\$ 800</u>	<u>\$ 1,100</u>

It would be misleading to measure these two jobs by just looking at the sales price. Since we know they are the same job, one in which materials were supplied and one in which they were not, the best way to evaluate this job is to calculate Value Added.

	Most Materials Supplied	No Materials Supplied
Sales Price	\$ 800	\$ 1100
Materials	<u>50</u>	<u>350</u>
Value Added	<u>\$ 750</u>	<u>\$ 750</u>

With Value Added the same, it is easy to see that Value Added is a practical way to measure the job. Another way to calculate Value Added is to add the overhead recovery and the profit mark-up.

	Most Materials Supplied	No Materials Supplied
Overhead Recovery	\$ 650	\$ 650
Profit Markup	<u>100</u>	<u>100</u>
Value Added	<u>\$ 750</u>	<u>\$ 750</u>

A simple definition is "Value Added is the dollars for which you have sold your manufacturing". It does not include the materials that you incorporated into the final product, but computes the value you have added to those materials. Calculating Value Added is a better way to measure manufacturing.

Why Use Value Added in the Dynamic Ratio Study

We stated earlier that the better way to measure a single job is to measure Value Added. This approach also applies to the examination of the Statement of Operations. The Profit and Loss Statement has more meaning when its preparation is based on Value Added. Too often printers look to sales as the sole measure of profits. In fact, Value Added is always the better measure.

Both of these results are possible for a printing operation in a given month:

Possible Results for a Printing Operation In a Given Month		
	Result A	Result B
Sales	\$ 125,000	\$ 90,000
Materials	60,000	15,000
Value Added	<u>\$ 65,000</u>	<u>\$ 75,000</u>

This example shows that a month's sales of \$125,000 producing \$65,000 of Value Added is not as good as the lower sales of \$90,000 that provide \$75,000 of Value Added. The lower sales amount, in this case, produces \$10,000 more to cover overhead...and increase profit.

Value Added gives a clearer picture by eliminating the distortion that material costs introduce into the traditional operating statement.

There would be significant differences in ratios, based on sales, in a comparison of operating statements for a short-run sheetfed company and that of a web offset printer. The reason for the differences would be the amount of materials purchased and consumed by the web offset printer, compared to the short-run sheetfed operation and the amount of direct labor incurred.

Comparison of ratios based on sales, as in Example 2, shows that the web offset operation has a 6.43% lower cost for factory payroll (17.75% for web fed as compared to 24.18% for sheetfed). This is because a substantial portion of the sales of the web offset company is materials.

Example 2

	<u>Company S—Sheetfed</u>	<u>Company W—Webfed</u>
	<u>Percent of Sales</u>	<u>Percent of Sales</u>
Sales or Value of Product Produced	<u>\$ 1,000,000</u>	<u>100.00 %</u>
Factory Cost of Product		
Materials		
Paper	197,000	19.70
Other chargeable materials	43,000	4.30
Outside services	88,000	8.80
Total Materials	<u>328,000</u>	<u>32.80</u>
Factory Payroll	241,800	24.18
Factory Expenses	<u>121,800</u>	<u>12.18</u>
Total Factory Cost of Product	<u>691,600</u>	<u>69.16</u>
Gross Profit	<u>308,400</u>	<u>30.84</u>
Administrative and Selling Expenses		
Administrative expenses	115,000	11.50
Selling Expenses	<u>72,500</u>	<u>7.25</u>
Total Administrative and Selling Expenses	<u>187,500</u>	<u>18.75</u>
Income Before Interest Expense	120,900	12.09
Interest expense	<u>18,300</u>	<u>1.83</u>
Operating Income	102,600	10.26
Other income	<u>10,200</u>	<u>1.02</u>
Income Before Income Taxes	<u>\$ 112,800</u>	<u>11.28 %</u>
	<u>\$ 110,000</u>	<u>11.00 %</u>

Comparing the ratios, based only on sales of these two companies, is much like comparing apples and oranges. The true comparison cannot be made until you eliminate the distortion caused by the difference in materials. In this circumstance, the difference in the cost of materials (46.14% for the web fed company as compared to 32.80% for the sheetfed company) is due to the nature of web printing as compared to sheetfed printing, rather than operating efficiencies. Now when we look at Example 3, which is based on Value Added, we see that factory payroll is 32.96% for the web fed company as compared to 35.98% for the sheetfed company, a difference of only 3.02%.

Example 3

	<u>Company S—Sheetfed</u>	<u>Company W—Webfed</u>
	<u>Percent of Value Added</u>	<u>Percent of Value Added</u>
Sales of Value of Product Produced	<u>\$ 1,000,000</u>	<u>\$ 1,000,000</u>
Factory Cost of Product		
Materials		
Paper	197,000	396,400
Other chargeable materials	43,000	35,000
Outside services	88,000	30,000
Total Materials	<u>328,000</u>	<u>461,400</u>
Value Added	<u>672,000</u>	<u>538,600</u>
	<u>100.00 %</u>	<u>100.00 %</u>
Factory Payroll	241,800	177,500
Factory Expenses	121,800	101,300
	363,600	278,800
Gross Profit	<u>308,400</u>	<u>259,800</u>
	<u>45.89</u>	<u>48.23</u>
Administrative and Selling Expenses		
Administrative expenses	115,000	83,700
Selling expenses	<u>72,500</u>	<u>58,000</u>
Total Administrative and Selling Expenses	<u>187,500</u>	<u>141,700</u>
	<u>27.90</u>	<u>26.31</u>
Income Before Interest Expense	120,900	118,100
Interest expense	<u>18,300</u>	<u>18,300</u>
Operating Income	102,600	99,800
Other income	<u>10,200</u>	<u>10,200</u>
Income Before Income Taxes	<u>\$ 112,800</u>	<u>\$ 110,000</u>
	<u>16.79 %</u>	<u>20.42 %</u>

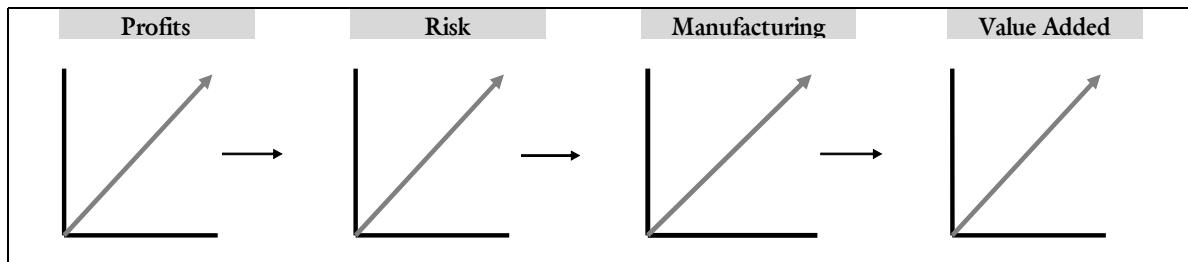
Almost every company's product mix is different. By using Statements of Operations based on Value Added, this product mix difference is eliminated. Value Added is always a better statement with which to evaluate your operations.

Profits and Risk: Manufacturing and Value Added

Every printing company and its management wants to earn profits. Why do we expect these profits? The answer is, because we take a risk by operating our printing company, we therefore expect a profit. Theory states that profits are based on risk. The higher the risk the higher the expected profits should be. The reason we want higher profits for accepting higher risk is that there is a greater chance of losing our investment.

What is the risk in running a printing company? Risk is controlled by many factors, such as the industry's technological complexity, financial requirements, governmental restrictions, competition and general economic conditions. In general, we believe the risk lies in the manufacturing facility. Operating the administrative and sales departments of a company involves much less risk than running a printing company's manufacturing facility. Imagine if your accountants and bookkeepers did not function for two weeks. Besides some internal strife, maybe some late billing and upset vendors, the financial loss probably would be minimal. Compare that to a two-week interruption in your plant where the loss would be substantially greater.

With profits influenced by risk; with risk influenced by the manufacturing facility; and manufacturing measured by Value Added, the obvious conclusion to this roundabout theorem is that the more Value Added a company produces the more profits it should expect.



A basic principle of financial management is that you earn profits from sales of your company's manufacture, or to put it simply, you earn a profit from the work done inside your own plant, not outside. When you ignore this key principle, printing firms lose a valuable tool for earning maximum profits. There may be other reasons, of course, for poor operating performance, but neglect of the Value Added principle is the major and most frequent reason for low profits.

How Value Added Can Control Profit

Value Added, the remainder of sales after the cost of materials, is all you have left to pay your other expenses. These expenses include factory payroll, factory expenses, administrative expenses, selling expenses and interest. When these expenses have been paid, what remains is your profit.

These expenses are, for the most part, fixed costs, and as "overhead" do not vary significantly. This is true when a company's operations remain within a steady range. For example, whether or not you have any work for tomorrow afternoon does not stop your bank from charging you interest on your loans, or your landlord from charging you rent and your payroll stays the same because of management's decision not to send employees home. Management would revise expenditures if there were significant growth or shrinkage in the company's size and operation, but on a weekly or monthly basis, "overhead" remains somewhat constant. With a relatively constant overhead, you want to maximize your Value Added for greater profits. This is different from the basic "cost sheet concept" usually applied in the printing industry.

This example illustrates the effect on operating income when we increase the value added, derived from \$1,000,000 of sales from \$635,600 to \$675,000. We will assume that "overhead" (factory payroll, factory expenses, administrative, selling and interest expenses) will remain the same. We are simplifying this example to prove that within this relevant range these expenses are, in effect, fixed costs.

	Original	After Increase in Value Added
Sales	\$ 1,000,000	\$ 1,000,000
Cost of Materials	364,400	325,000
Value Added	<u>635,600</u>	<u>675,000</u>
"Overhead"	<u>591,000</u>	<u>591,000</u>
Operating Income	\$ 44,600	\$ 84,000

To recap, the objective of your day-to-day management decisions should be to maximize Value Added.

Two Policies to Maximize Value Added

Value Added was previously defined as **Sales less Material Costs**. These two simple components of Value Added are the basis for our policies to increase Value Added. The two policies are as follows:

- Manufacturing policy
- Pricing and Sales policy

The basic idea behind the manufacturing policy is to reduce to a minimum material costs on the sales you do have. The objective of a pricing policy is to bring in or sell the maximum Value Added. This can be done by attracting jobs with high Value Added or converting low Value Added jobs to higher ones.

Manufacturing Policy

Printers often send work out when it can be done in-house. By doing so they have, in essence, paid twice for the work that has been sent out. Once, because they have to pay vendors who perform the service, and again because their costs or overhead include the equipment and manpower to do the job. This is wasteful and often unnecessary.

Do everything inside your plant that you are capable of doing. Do not send out any work for which you have the equipment and capacity to do in-house. Your company policy should be, "**we do all work inside unless it is not at all possible to avoid sending it out**". This has been purposely said three times to emphasize the importance of this concept.

With proper planning, and some pushing and shoving, this policy alone can make the difference between an unprofitable company and a profitable one.

Pricing and Sales Policy

1. Pricing and sales policy - materials mark-up

With an understanding of the Value Added concept, you can focus on materials mark-up to recover overhead. It is essential that materials be priced at their cost plus their proper share of the allocated overhead. Because Value Added is so important to your profitable operation, overhead recovered by materials pricing must be correct. The traditional 5%, 10% or 15% mark-up of materials (so called handling charges) may or may not be correct. You will not know for sure unless material costs are treated as another cost center, just as you have established a press cost center to determine the correct press hourly rate.

Once this is done you will have a cost sheet that contains materials with their proper share of overhead and cost center costs. With this information, you can apply the proper profit mark-up, which is discussed below. Profit mark-ups will vary as the relationship changes between materials and manufacturing.

2. Pricing and sales policy—profit mark-up

Profit mark-ups should take into account the value added concept; the higher the proportion of materials in a job, the higher the profit mark-up should be.

A sound profit mark-up policy is one that achieves and complements the business objectives of your firm. Printing firms should always seek to maximize their Value Added by attracting jobs with high Value Added, and by converting low Value Added jobs to higher ones. Note this general rule: The most desirable jobs are those with higher Value Added. Jobs with a small Value Added are less desirable and should receive a higher mark-up.

There is no neat formula to separate good jobs from poor jobs. What is presented here is an overall principle that you can integrate into your pricing procedures with little effort.

For example, let us look at a "good" job and a "better" job:

	Good Job	Better Job
Materials	\$ 8,000	\$ 2,000
Cost Center Costs	<u>2,000</u>	<u>8,000</u>
Totals	<u><u>\$ 10,000</u></u>	<u><u>\$ 10,000</u></u>

Before a profit mark-up, the Value Added of the "good" job is only \$2,000. Now price this job and include a profit. The "better" job has a Value Added of \$8,000 before a profit mark-up. Now price this job with a profit mark-up.

If you followed the principle presented earlier, your prices should have included a **higher** profit mark-up for materials and cost centers in the "good" job and a **lower** profit mark-up for the "better" job. Why? Because the "better" job contributes more to fixed and variable overhead, and ultimately to profits. This does not mean cutting prices. You should get the best price possible for the "better" job.

Sales Compensation

While it is generally accepted that sales people working on commission are more effective than salaried sales people are, little attention is paid to the types of jobs they bring in. Commissions are usually based on total sales dollars, despite the Value Added component of the sale.

The weakness of this practice becomes clear when you examine sales compensation considering the Value Added concept. Does a sales person have an incentive to bring in high Values Added jobs -- "better" jobs - when he is paid a commission solely on sales volume? No! What reward does a sales person look forward to when he seeks out and closes a high Value Added job? None!

SALES COMMISSIONS SHOULD BE A PERCENTAGE OF VALUE ADDED. Basing sales compensation on Value Added is becoming an increasingly popular policy among printing firms. It already has been adopted by some of the most successful firms in the industry, and for good reason. These sales people and their high Value Added jobs are contributing more to the profitability of their printing company. In these compensation plans, the commission rate on the Value Added in a job is calculated to be the same as the company's commission earned on an average job using an average amount of materials or outside purchases. In other words, the commission rate is higher on Value Added than on sales.

It might appear that sales commissions would be reduced if commissions were based on fewer Value Added dollars, but this is not the case. Commissions would be reduced only for those sales people who sell large amounts of paper and outside services. Those sales people who sell high Value Added jobs, and who received no special recognition for these desirable sales -- those jobs with a significant amount of inside manufacture -- would now receive increased commissions.

The important motivation built into Value Added compensation is, of course, higher earnings for sales people who bring in higher Value Added jobs. The justification is that these jobs pay more of the overhead and produce a greater profit, contributing more to management's objective.

Report on Operations

A General Word About the Dynamic Ratios

The Dynamic Ratios should be viewed as a starting point in the decision making process, and as a powerful tool for more effective, profit-oriented management.

The Dynamic Ratios Studies are especially helpful in deciphering operating results. By comparing one's own company with other companies in the industry, problem areas are easily identifiable. This comparison also allows management to pinpoint those costs and expenses in their operations that should be examined in greater depth.

When variances occur between the objective (high profit standards) and the actual (lower ratios in your firm's operating statement) or, if you find that your firm has better ratios than Industry's Profit Leaders, ask the following questions:

- Why did the costs differ?
- Was the difference adverse or favorable?
- Who or what was responsible for the difference.
- What can or should be done about it?

Sample Analysis of the Operating Statement

The report on operations in Chapter 1 of **Volume 2, All Printers by Sales Volume and Geographic Area** is arranged according to sales as follows:

- All Firms Reporting
- Sales to \$4,000,000
- Sales from \$4,000,000 to \$6,600,000
- Sales from \$6,600,000 to \$8,500,000
- Sales from \$8,500,000 to \$22,000,000
- Sales over \$22,000,000

Within each sales range, the Study provides ratios for "All Firms" and for "Profit Leaders," those firms whose earnings are above the upper quartile point. Achieving ratios similar to those of the "Profit Leaders" should be a printing company's objective. We will direct our comparisons toward that goal.

Pages 47—49 shows a sample "Dynamic Ratio Studies - Report on Operations and Supporting Schedules," for a fictional company, "Printemps". Our fictitious company, Printemps, is a sheetfed offset printer. Its sales are \$7,000,000 for the current year. The columns for the sales range, \$6,600,000 to \$8,500,000 in Chapter 1 of **Volume 2, All Printers by Sales Volume and Geographic Area**, have been abstracted for our comparison.

The next step is to list the dollar amounts in Printemps' operating statement in the same order as the printer's Chart of Accounts. Now we are ready to convert Printemps' dollar figures to percentages of sales. Upon completion, we can compare side-by-side, Printemps' operating results with the Dynamic Ratio Study results.

You should compare your firm's percentages in the same way, item-by-item with the Dynamic Ratio Study results.

In our analysis, we will begin by listing what costs should be included in the various line items on the operating statement. Next, we will compare our fictional company, Printemps, with the results in the Dynamic Ratio Study, discussing the major significant differences. Finally, we will try to analyze what caused the differences and suggest how the situation could be improved in the future.

Sample Comparison

Sales or Value of Product Produced

The Report on Operations starts with sales, the amount you charge for your product. All cost-cutting practices are insignificant if you do not price your company's products intelligently. Printing is a made-to-order product. Every job is different and uses different facilities in your plant for varying periods. You must know your costs. To price your finished job intelligently, you must also have a good system for gathering those costs and formulating a sales price that is competitive and profitable. Printemps' sales are \$7,000,000. Further analysis will help determine how well this firm is pricing its product.

Factory Cost of Product—Materials—Paper

Paper usually represents a printer's largest single cost on a job. Printemps' ratio for paper costs compares as follows:

Factory Cost of Product		
Materials - Paper		
Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance
Paper	18.25%	27.01% (8.76)%

The variance is unfavorable. Printemps is spending more on paper than the Industry Profit Leaders. Some reasons for this might be:

1. Purchasing policies at Printemps need adjustment.
2. Improper control of waste and spoilage. Proper handling of paper is extremely important in all phases of production -- shipment, storage, pressroom, bindery, etc.

3. The type and quality of paper required by the jobs that Printemps produces could have an adverse effect on paper costs, as could product mix.
4. Of course, our selling price could be too low.

The effective manager will investigate these areas to find out where the problem or problems are occurring. If the manager can take corrective action the amount of money being spent on paper will decrease. If the problem is beyond his control and cannot be corrected, he will at least understand the reasons for this high paper cost.

Factory Cost Of Product—Materials—Other Chargeable Materials

This line on the operating statement has a supporting schedule (page 48) and includes the following:

Factory Cost of Product Materials - Other Chargeable Materials			
	Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance
Ink	1.87 %	2.20 %	(0.33) %
Plates	1.01	2.00	(0.99)
Click charges	0.34	1.25	(0.91)
Other Chargeable Materials	1.70	2.32	(0.62)
Total Other Chargeable Materials	<u>4.92</u> %	<u>7.77</u> %	<u>(2.85)</u> %

Once again, Printemps has an unfavorable variance. It may have a general problem with inventory control, which could be affecting all of its material costs. If Printemps has a system of perpetual inventory control, its managers should ask if it is working. Is there enough inventory on hand to prevent costs associated with rush orders? Is the purchasing department operating efficiently? Are prices compared periodically? Another area for inspection might be efficiency or inefficiency in handling materials. Are materials disappearing?

Printemps' has a variance of 0.99% for plates. Printemps does predominantly short-run high-quality color work, which contributes to its above average percentages for plates. Printemps is looking into some new equipment in the direct to plate area that they hope will reduce these costs.

This example of high material costs shows why management should not interpret variances on an isolated basis. You must keep your business in mind and how it operates as you go through your evaluation.

Factory Cost of Product—Materials—Outside Services

Outside Services are costs for work done by a subcontractor. A previous chapter in this guide, "Value Added—Why It's Important" explains why it is beneficial for a printer to keep as much work in-house as possible. Printemps' ratios for Outside Services compare with Industry Profit Leaders as follows:

Factory Cost of Product			
Materials - Outside Services			
	Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance
Prepress	0.16 %	0.39 %	(0.23) %
Printing	3.25	0.22	3.03
Bindery	2.12	3.96	(1.84)
Other Outside Services	2.24	0.40	1.84
Total Outside Services	7.77 %	4.97 %	2.80 %

In the area of outside services, Printemps has a favorable variance of 2.80%.

Printemps does well in Printing and Other Outside Services. However, there is a weakness in its bindery operation. This, again, is partially caused by the type of work that Printemps produces. Many of its jobs call for special types of binding and finishing processes for which they do not have the capability and it would be impractical to acquire the necessary equipment. There is, however, some new folding and stitching equipment that Printemps has looked into acquiring. Purchasing the equipment will enable them to do more binding in-house. They hope this move will improve their Value Added position and increase profits. A proper ROI calculation needs to be completed before the equipment is purchased.

Factory Payroll

Labor costs are always a large percentage of graphic arts sales. This one area can have a drastic effect on your operating statement's results. Even though you may feel like a walnut caught in a nutcracker when dealing with labor costs, there are ways to ensure getting as much benefit as possible from the costs. Let's look at payroll:

Factory Payroll			
	Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance
Salaries - Executive	1.17 %	2.74 %	(1.57) %
Direct Wages	10.72	17.64	(6.92)
General Factory Wages and Salaries	5.94	2.16	3.78
Packing, Shipping, and Delivery Wages	0.77	0.98	(0.21)
Payroll Taxes	1.66	1.68	(0.02)
Employee Benefits	2.70	2.08	0.62
Total Factory Payroll	22.96 %	27.28 %	(4.32) %

Allocating Factory Wages between Direct Wages, General Factory Wages and Packing, Shipping and Delivery Wages is always difficult. Remember, the earnings of employees engaged in Production (specific cost centers) are Direct Wages, whereas General Factory Wages, and Packing, Shipping and Delivery Wages are for work not directly chargeable to jobs. It may also be more meaningful to analyze all Factory Wages combined to get a general picture of how your company compares with the industry's Profit Leaders.

Printemps spends 4.32% more for Factory Payroll than the Industry Profit Leaders. Going down the list, we see that Executive Salaries are high. One reason for this may be that the factory executive is a principal in the business.

Printemps' major difference from the Profit Leaders occurs in Direct Wages. Printemps' manager should review the following checklist to identify possible causes:

1. Is there a good, working system in place for gathering job costs so that job pricing is realistic?
2. Is there too much overtime? Does management know at what point overtime is, or is not, profitable?
3. Are vacations scheduled for slack periods?
4. Does management try to avoid idle time? Do employees wait around because of:
 - poor instruction?
 - no material?
 - no power?
 - no repairman?
5. Is production delayed while management makes decisions?
6. Even worse, is one job taken off the press to get a "rush" job through, thus causing extra non-chargeable time?
7. Do the sales and manufacturing departments work together to decide which jobs have economic priority?

Because labor is so costly, management has to watch it closely and control costs tightly. Printemps is attempting to do this by placing one of the firm's owners on the production floor. This will help keep lines of communication open between management and production, and should promote a more efficient operation of the plant.

Factory Expenses

Our Chart of Accounts classifies Factory Expenses as Fixed and Other. Fixed Expenses are relatively constant regardless of the firm's level of productivity. Printemps' total Fixed Expenses compare as follows:

Factory Expenses		
Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance
Total Fixed Expenses	9.50%	7.64%

While Printemps has a total favorable variance of 1.86% for fixed factory expenses, when we look at the individual accounts in this category, we see some unfavorable variances in the following accounts:

Insurance	(0.36) %
Utilities - heat, light, etc.	(0.20)

There is no obvious explanation for the unfavorable variance in insurance. Among the reasons could be the location of Printemps' plant, possibly in an area of higher risk, resulting in higher insurance rates.

Management should review its insurance policies to see if there is proper coverage and to determine if it is getting the best available rates. Printers should shop for the best price for their insurance coverage, which is a product that varies in cost. Judicious shopping can result in very substantial cost reductions for the same amount of coverage. No insurance policy should be agreed to until several brokers have been contacted for quotes. These policies should be reviewed regularly to see if even better terms could be secured.

Printemps should also be concerned about its cost for utilities. Has there been a recent energy-saving review? Are machines shut down when not in use? Are the heating and air conditioning systems efficient?

Other Factory Expenses vary with the level of production. Control of these expenses is important to increasing profits. In total Printemps' other factory costs are lower than the Profit Leaders. However they should look into the unfavorable variance in factory supplies and expenses in order to improve their bottom line.

Factory Expenses - Other			
	Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance
Factory Supplies and Expense	1.85 %	2.68 %	(0.83) %
Packing, Shipping and Delivery	0.34	0.75	(0.41)
Repairs and Maintenance	2.13	2.21	(0.08)
Other Factory Expenses	0.75	0.14	0.61
Total Other Factory Expenses	5.07 %	5.78 %	(0.71) %

Gross Profit

We have now reached the Gross Profit line in Printemps' Report on Operations. So far in our analysis we have discussed where significant variances appear and possible areas of improvement. The most controllable costs frequently appear above the Gross Profit line. Printemps' Gross Profit percentage is 19.55% compared to 31.53% for the Industry Profit Leaders. When Gross Profit ratios consistently fall below those of Profit Leaders, as is the situation with Printemps, management must examine problem areas closely and prepare for considerable belt tightening. Gross Profit has to be high enough to cover Administrative and Selling Expenses, pay for Interest Expense and provide for a Profit.

Administrative Expenses

Printemps has an average administrative staff. The President is the administrative executive and has kept good control of administrative costs, showing a lower cost than the Industry profit leaders.

Administrative Expenses			
Industry Profit Leaders	Printemps	Favorable (Unfavorable) Variance	
Total Administrative Expenses	12.34%	8.15%	4.19%

Some expenses that can be controlled in the administrative area include office supplies and expenses, postage and telephone. These items should be monitored for effective purchasing and usage.

Bad debts are another area where management can improve results. One way to do this is to establish sound credit and collection policies, and see to it that these policies are followed.

Most administrative expenses are not significantly affected by changes in production or sales. Management should try to determine if, overall, Administrative Expenses can be justified in terms of efficient operations.

Selling Expenses

Printemps' Selling Expenses are also lower than the Industry Profit Leaders.

Selling Expenses		
	Industry Profit Leaders	Favorable (Unfavorable) Variance
Total Selling Expenses	10.29%	6.57%

This variance may not be as favorable as it appears. It may show that Printemps is not spending enough time and money to promote its products and to increase sales. There is one selling executive, three sales people and one sales office person. The President of the company also does some selling.

Interest Expense and Other Income

Printemps compares with the Industry Profit Leaders in this area as follows:

Interest Expense and Other Income		
	Industry Profit Leaders	Favorable (Unfavorable) Variance
Interest Expense	0.77%	2.57% (1.80)%
Other Income	0.95%	0.88% (0.07)%

Printemps' Interest Expense is high. Besides having large long-term notes used to finance equipment, the company has been forced to seek some short-term working capital financing at above average interest rates. It would be wise for Printemps to improve its cash flow so that these short-term notes could be kept to a minimum. Proper planning and billing and collection procedures that are more efficient would help increase cash flow.

Banks are not partners. They are in the business of renting money. A printing firm can improve its profitability by seeking the best possible credit terms, and by regularly reviewing the credit terms available to it among competing lending institutions.

The Bottom Line

We have barely scratched the surface in this brief example. In examining variances, it is often helpful to look at other parts of the Dynamic Ratio Study for more in-depth understanding. For example, when analyzing Direct Wages, an examination of the Significant Facts tables will show average wages per employee in a particular sales range. Managers should examine and analyze the Balance Sheet and Return on Investment with the Operating Statement to get a full picture of a company's performance. Again, compare your company's performance to the Industry Profit Leaders to enhance your analysis.

Once you have compared your results -- all your results -- with industry standards for the current year, and have identified the differences, you have the basis to plan and set objectives for the future. Proper understanding of the Dynamic Ratio Study and diligent commitment on your part should result in improved operations. You already know how well you did last year. The next question is, "How can I do better next year?"

Report on Operations - Sales = 100%

Sales from \$6,600,000 to \$8,500,000					
	All Firms	Profit Leaders	Printemps		
	%	%	\$	%	
Sales or Value of Product Produced	<u>100.00</u>	%	<u>100.00</u>	%	<u>\$ 7,000,000</u>
Factory Cost of Product					
Materials					
Paper	18.58	18.25	1,890,700	27.01	
Other chargeable materials	5.67	4.92	543,900	7.77	
Outside services	7.81	7.77	347,900	4.97	
Total Materials	<u>32.06</u>	<u>30.94</u>	<u>2,782,500</u>	<u>39.75</u>	
Factory Payroll	26.20	22.96	1,909,600	27.28	
Factory Expenses	<u>16.03</u>	<u>14.57</u>	<u>939,400</u>	<u>13.42</u>	
Total Factory Cost of Product	<u>74.29</u>	<u>68.47</u>	<u>5,631,500</u>	<u>80.45</u>	
Gross Profit	<u>25.71</u>	<u>31.53</u>	<u>1,368,500</u>	<u>19.55</u>	
Administrative and Selling Expenses					
Administrative Expenses	10.27	12.34	570,500	8.15	
Selling Expenses	<u>10.90</u>	<u>10.29</u>	<u>459,900</u>	<u>6.57</u>	
Total Administrative and Selling Expenses	<u>21.17</u>	<u>22.63</u>	<u>1,030,400</u>	<u>14.72</u>	
Income Before Interest Expense	4.54	8.90	338,100	4.83	
Interest Expense	<u>0.88</u>	<u>0.54</u>	<u>179,900</u>	<u>2.57</u>	
Other Income (Loss)	3.66	8.36	158,200	2.26	
Other income	<u>0.09</u>	<u>0.64</u>	<u>61,300</u>	<u>0.88</u>	
Income Before Income Taxes	<u>3.75</u>	%	<u>9.00</u>	%	<u>219,500</u>
					%
					<u>3.14</u>

Supporting Schedules - Sales = 100%

**Sales from
\$6,600,000 to \$8,500,000**

	All Firms	Profit Leaders	Printemps	
	%	%	\$	%
Other Chargeable Materials				
Ink	1.58 %	1.87 %	\$ 154,000	2.20 %
Plates	0.96	1.01	140,000	2.00
Click charges	1.34	0.34	87,500	1.25
Other chargeable materials	1.79	1.70	162,400	2.32
Total Other Chargeable Materials	<u>5.67</u> %	<u>4.92</u> %	<u>\$ 543,900</u>	<u>7.77</u> %
Outside Services				
Prepress	0.12 %	0.16 %	\$ 27,300	0.39 %
Printing	1.83	3.25	15,400	0.22
Binding	1.93	2.12	277,200	3.96
Other outside services	3.93	2.24	28,000	0.40
Total Outside Services	<u>7.81</u> %	<u>7.77</u> %	<u>\$ 347,900</u>	<u>4.97</u> %
Factory Payroll				
Salaries - executive	1.67 %	1.17 %	\$ 191,800	2.74 %
Direct wages	13.86	10.72	1,234,800	17.64
General factory salaries and wages	5.22	5.94	151,300	2.16
Packing, shipping, and delivery wages	1.27	0.77	68,500	0.98
Payroll taxes	1.87	1.66	117,600	1.68
Employee benefits	2.31	2.70	145,600	2.08
Total Factory Payroll	<u>26.20</u> %	<u>22.96</u> %	<u>\$ 1,909,600</u>	<u>27.28</u> %
Factory Expenses				
Fixed Expenses				
Depreciation - real estate	0.12 %	0.19 %	\$ 19,600	0.28 %
Depreciation - other	3.96	5.33	294,700	4.21
Taxes - real estate	0.32	0.27	13,300	0.19
Taxes - other	0.24	0.12	11,200	0.16
Insurance	0.57	0.56	64,400	0.92
Building rent	2.21	1.10		
Utilities - heat, light, etc.	1.53	1.61	126,700	1.81
Equipment rental	0.66	0.32	4,900	0.07
Total Fixed Expenses	<u>9.61</u> %	<u>9.50</u> %	<u>\$ 534,800</u>	<u>7.64</u> %

Supporting Schedules - Sales = 100%

**Sales from
\$6,600,000 to \$8,500,000**

	All Firms	Profit Leaders	Printemps	
	%	%	\$	%
Factory Expenses (Continued)				
Other Expenses				
Factory supplies and expense	1.73 %	1.85 %	\$ 187,600	2.68 %
Packing, shipping, and delivery expense	1.68	0.34	52,400	0.75
Repairs and maintenance	2.27	2.13	154,400	2.21
Other factory Expense	0.74	0.75	10,200	0.14
Total Other Expenses	<u>6.42</u> %	<u>5.07</u> %	<u>404,600</u>	<u>5.78</u> %
Total Factory Expenses	<u>16.03</u> %	<u>14.57</u> %	<u>\$ 939,400</u>	<u>13.42</u> %
Administrative Expenses				
Salaries - executive	2.22 %	1.87 %	\$ 201,600	2.88 %
Salaries - office	2.72	4.71	108,500	1.55
Payroll taxes	0.36	0.45	16,800	0.24
Employee benefits	0.70	0.90	35,700	0.51
Bad debts	0.20	0.21	22,400	0.32
Data processing expense	0.48	0.48	12,600	0.18
Office supplies and expenses	0.36	0.33	18,200	0.26
Professional fees	0.72	0.86	29,400	0.42
Taxes - business	0.07	0.02	20,300	0.29
Telephone	0.32	0.24	53,900	0.77
Other administrative expenses	2.12	2.27	51,100	0.73
Total Administrative Expenses	<u>10.27</u> %	<u>12.34</u> %	<u>\$ 570,500</u>	<u>8.15</u> %
Selling Expenses				
Salaries - executive	1.29 %	1.52 %	\$ 84,000	1.20 %
Salaries and commissions - salesmen	5.68	4.81	221,200	3.16
Salaries - sales office clerical	0.72	0.40	28,000	0.40
Payroll taxes	0.52	0.32	21,000	0.30
Employee benefits	0.52	0.41	19,600	0.28
Advertising	0.50	0.48	14,000	0.20
Travel and entertainment	0.61	0.50	60,900	0.87
Other selling expenses	1.06	1.85	11,200	0.16
Total Selling Expenses	<u>10.90</u> %	<u>10.29</u> %	<u>\$ 459,900</u>	<u>6.57</u> %

The Balance Sheet

A balance sheet is a statement of a company's financial position at a specific time. It lists assets, liabilities, and owners' equity. The term, "balance sheet," comes from the fact that its two sides must balance or be equal. The balance sheet equation may take one of two forms:

$$\text{Assets} = \text{Liabilities} + \text{Owners' Equity}$$

OR

$$\text{Assets} - \text{Liabilities} = \text{Owners' Equity}$$

A company's assets are everything the company owns. Its liabilities are everything it owes. Owners' equity is what is left after liabilities are subtracted from assets, and it represents the financial interest of the proprietor, partners or shareholder(s)—whoever owns the company. Another term for owners' equity is "net worth."

A good printing manager should understand the relationship of a balance sheet's components to company operations. A company will reveal many aspects of its operational capabilities by an evaluation of its balance sheet. As with other financial data, an intelligent analysis can provide a unique management tool.

Keep in mind that particular ratios and relationships may differ according to the process a printing company uses or what products it produces. For example, it is likely that a web offset printer would have a greater investment in plant equipment and, correspondingly, more liabilities (debt) or equity (owner's financial interest) to support these assets than a sheetfed printer. On page 52 we have the balance sheet of our imaginary company, Printemps, which we will compare to a sample Dynamic Ratio Study balance sheet.

Assets—The Printer's Investment

How many dollars in assets should we invest to produce X dollars in profit? As any manager knows, this is a difficult question to answer. Return on Investment (ROI), a measure of profitability that is just as important as Profit on Sales, has been defined as income divided by assets.

$$\text{ROI} = \frac{\text{Income}}{\text{Assets}}$$

There are only two ways to increase ROI:

1. Either increase income, or
2. Decrease assets.

In our analysis of Printemps' balance sheet, our goal will be to ensure the efficient income-producing management of the company's assets. We will also look for ways to reduce assets without affecting income. As the above formula indicates, both goals will lead to a higher Return on Investment (ROI).

Because printing is a highly capital-intense industry, there are many types of assets involved. These are normally classified as Current Assets, Fixed Assets, and Other Assets. Added together, these comprise Total Assets. We will examine each type of asset as it relates to printing.

Balance Sheet - Total Assets = 100%

Assets	Industry High Profit Standards		Printemps		Difference More (Less)	
	\$6,600,000 to \$8,500,000		Printemps			
	% of Total Assets	Dollars	% of Total Assets			
Current Assets						
Cash	13.57 %	\$ 102,500	2.50 %	(11.07)		
Receivables	24.03	1,247,300	30.42	6.39		
Inventories	4.50	728,600	17.77	13.27		
Other current assets	4.65	223,000	5.44	0.79		
Total Current Assets	46.75	2,301,400	56.13	9.38		
Property, Plant, and Equipment						
Real estate	25.48	1,150,100	28.05	2.57		
Less: Accumulated depreciation	18.75	534,200	13.03	(5.72)		
	6.73	615,900	15.02	8.29		
Machinery and equipment	149.05	2,185,300	53.30	(95.75)		
Less: Accumulated depreciation	114.15	1,113,200	27.15	(87.00)		
	34.90	1,072,100	26.15	(8.75)		
Other fixed assets	10.64	209,100	5.10	(5.54)		
Less: Accumulated depreciation	7.89	170,200	4.15	(3.74)		
	2.75	38,900	0.95	(1.80)		
Net Property, Plant, and Equipment	44.38	1,726,900	42.12	(2.26)		
Other Assets	8.87	71,700	1.75	(7.12)		
Total Assets	100.00 %	\$ 4,100,000	100.00 %	(0.00) %		
Liabilities and Equity						
Current Liabilities						
Notes payable	4.75 %	\$ 523,200	12.76 %	8.01		
Accounts payable	6.91	607,700	14.82	7.91		
Other current liabilities	7.32	287,800	7.02	(0.30)		
Total Current Liabilities	18.98	1,418,700	34.60	15.62		
Long-Term Liabilities	21.50	1,566,100	38.20	16.70		
Total Liabilities	40.48	2,984,800	72.80	32.32		
Shareholders' Equity	59.52	1,115,200	27.20	(32.32)		
Total Liabilities and Equity	100.00 %	\$ 4,100,000	100.00 %	(0.00) %		

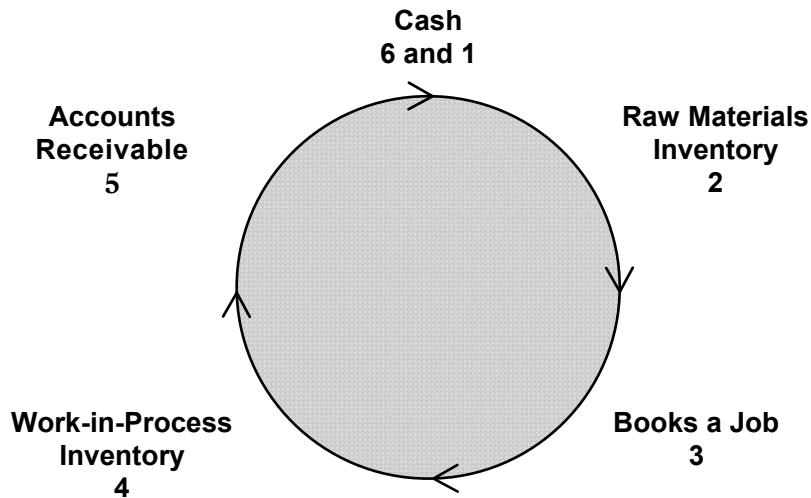
Current Assets—The Printer's Liquidity

Traditionally, Current Assets are listed in the balance sheet in their order of liquidity. They may be referred to as a company's liquid assets—assets that can be converted quickly into cash, usually within a one-year period. A printer uses these assets to pay his invoices or other debts as they come due.

Current Assets follow a circular pattern during the year, continuously being used up and replaced. For the average printer, this process takes place many times a year.

The typical trading cycle follows this pattern:

1. A company starts with cash.
2. Next, it purchases raw materials—paper, ink, plates, etc. and places it in inventory.
3. Then it books a job and,
4. Puts costs and materials into work-in-process.
5. When a job is completed and shipped, it is then billed to the customer. The cost of the job is then removed from the work-in-process inventory and the billed amount becomes an account receivable.
6. Finally, the customer pays the bill and the account receivable is converted back into cash and the cycle starts anew.



One of the keys to greater profit is to speed up the trading cycle, minimizing the time involved for each cycle. The more cycles per year, the more profit generated.

Let us now analyze each current asset generally, and then more specifically to see how Printemps' ratios compare to the industry as a whole.

Cash

There is no firm rule about the amount of cash a company should have on hand. The only certain thing is that having either too much cash or too little cash is likely to cause problems. A profitable company will have a surplus of cash after expenses. Conversely, a company facing financial loss is pushed into using whatever cash it has to cover expenses. A printing company that is growing or expanding will need more cash for plant investments and debt commitments, and for building sufficient inventories, than will a company that is well established.

Historically, profit leaders maintain approximately 7%–15% of their total assets in cash. Your company may need more or less, depending on its present situation.

It appears that Printemps has a cash deficiency. A comparison with the Dynamic Ratio Study shows 11.07% less cash as a percent of total assets than the Profit Leaders. Further analysis reveals that if both cash and receivables are combined, the difference between Printemps and the Profit Leaders is still 4.68%. Printemps' cash as a percentage of total assets may point to a low receivable turnover.

Current Assets			
Cash & Accounts Receivable			
	Industry Profit Leaders	Printemps	Variance
Cash	13.57 %	2.50 %	(11.07) %
Accounts Receivable	24.03	30.42	6.39
Total	<u>37.60</u> %	<u>32.92</u> %	<u>(4.68)</u> %

Accounts Receivable

There may be some reason for concern about Printemps' accounts receivable percentages. Remember, the balance sheet shows a company's financial picture only at a fixed point in time. It is possible that the accounts receivable are lower at other times in the sales year. However, year after year, the Dynamic Ratios have shown that firms like Printemps have a higher ratio of receivables to total assets on their balance sheets than do Profit Leaders. It appears logical to assume that the higher the sales, the larger the receivable balance. If a company's sales were increasing, there would be no cause for alarm. That is usually not the case. High receivables may not be bad, but their cause should be investigated.

Among the possible reasons for higher accounts receivable is the tendency of many printers to rush "work-in-process" to completion at the end of the fiscal year so that the completed work will boost the "sales" in their operating statement. When dealing with advertising agencies, printers may have to wait until the agency receives payment from its clients. In this instance, the wait can be long and costly, with high accounts receivable and slow cash collection periods.

Inventory

A printer's inventory is the sum of work-in-process, paper and other chargeable materials, and supplies. Finished goods inventory may be small or non-existent because the majority of a printer's sales are specialized, produced "to order" jobs.

While inventory may appear, at first glance, to be a simple and straightforward concept, inventory valuation methods vary among printers. The amount of a firm's inventory changes depending on the valuation method used (FIFO, LIFO, etc.). Management must decide which practice is best for them.

Printemps' inventory represents 17.77% of its total assets, or 13.27% more of the total assets than the Profit Leader's inventory. It may or may not be carrying excessive inventory in stock. Either way, it should keep a perpetual inventory system to insure the proper use and control of inventory. In addition, it should control and safeguard its inventory by taking a monthly physical count. Printemps' manager should make sure that too much cash is not tied up in inventory.

Other Current Assets

Other current assets seldom play a significant role in ratio analysis. Other current assets include various prepaid expense categories such as insurance, taxes, etc.

Property, Plant, and Equipment

As mentioned previously, printing companies must maintain a very high capital investment. Technology is changing rapidly. New machinery costs are increasing and, in many cases, used equipment is selling at prices close to those of the original equipment. As a result, equipment usually makes up a large portion of a company's assets. These assets are not for sale but are used in the operation of the plant. Property (with the exception of land), plant and equipment are depreciated over a period of time. Methods of depreciation vary; a printer usually uses one method of depreciation for tax purposes and another method for financial reporting or book purposes.

For book purposes, a printer will usually depreciate assets using the straight-line method over the estimated life of the asset. For tax purposes, printers may use accelerated cost recovery systems (MACRS and ACRS) percentages, Section 168 depreciation (bonus depreciation) and Section 179 depreciation, as well as other methods to depreciate buildings and improvements, furniture and fixtures, machinery and equipment, and delivery vehicles.

Property, Plant, and Equipment			
	Industry Profit Leaders	Printemps	Variance
Net Property, Plant, and Equipment	44.38%	42.12%	2.26 %

Printemps's property, plant, and equipment percentage is lower than that of the Profit Leaders. These percentages may vary considerably among different types of printers and different circumstances. For example, it may be advantageous for one printer to own his plant, while another printer, living in a region with different real estate costs, may be better off leasing space. Machinery and equipment percentages will also vary widely depending on the process each printer uses.

More important than the percentage of fixed assets owned, Printemps' manager should consider the following:

1. Is equipment being operated at capacity?
2. Is the company using outdated, inefficient equipment?
3. Can extra space held for future expansion be temporarily leased?

Other Assets

Other assets are those, which will not be converted into cash within a period of one year. They may include deposits on equipment, the cash surrender value of officers' life insurance, and goodwill. Generally, other assets are not a significant part of the balance sheet.

Liabilities and Equity

The liability and equity section of the balance sheet shows how each dollar of assets is funded.

Liabilities (\$). Obligations

Equity (\$). Ownership

Liabilities are divided into current and long-term liabilities. First we will examine Printemps' current liabilities, and then discuss its long-term liabilities.

Current Liabilities

Current liabilities are obligations that fall due within a period of a year and are paid out of current assets. They include obligations generated by the operating cycle, such as money owed to vendors for materials and supplies, sales billed in advance of delivery, employees' salaries, interest, the current portion of the principal payments due on notes, income taxes, and any other payable which is due in the next operating period.

Current Liabilities			
	Industry Profit Leaders	Printemps	Variance
Notes Payable	4.75 %	12.76 %	(8.01) %
Accounts Payable	6.91	14.82	(7.91)
Other Current Liabilities	7.32	7.02	0.30
Total	18.98 %	34.60 %	(15.62) %

It is obvious that Printemps has too much short-term debt. If the accounts receivable collection period is too long, or other cash consuming activities are occurring, a situation may arise where Printemps does not have sufficient cash to pay its short-term creditors promptly.

Long-Term Debt

Long-term debt provides a major source of funds to finance a printer's assets. It includes debt that will be paid some time beyond the current period (a firm's 12-month financial or operating year). Most of a printer's long-term debt is in the form of bank loans, mortgages, or capital lease obligations. Some large printers may issue bonds.

Long-Term Debt			
	Industry Profit Leaders	Printemps	Variance
Long-Term Liabilities	21.50%	38.20%	(16.70)%

Again, Printemps' ratios show that it has too much debt. Perhaps Printemps' management has not pursued better financing methods. Will Printemps be able to meet its financial obligations when they become due?

Equity

A company's equity is the amount of investment the owners have made in the company. The term "Proprietor's Equity" refers to the investment a single owner has in his unincorporated business. The term "Partners' Equity" is used for partnerships. "Shareholders' Equity" is used when speaking of a corporation because corporations issue shares of common stock. The owners of the common stock are the shareholders.

Interrelated Ratios

Ratio analysis is a general term used to describe the comparison of the relationships of different financial transactions in the operating cycle. Ratios supply a means of measuring the performance and risk in the business cycle of producing income. Ratio analysis establishes financial standards and guidelines which help companies make decisions on questions such as, what would be the most profitable use of the company's assets, as well as questions concerning the possible risk of financing the operating cycle, etc.

Many ratios can be developed from components of the income statement, balance sheet and employee data. Here are four key groupings that represent most financial ratios.

1. Profitability

Operating ratios reflect costs and profits in relationship to sales. Included in this section are Return on Investment, Sales Factors, Gross Profit analysis and Value Added analysis.

2. Liquidity and Activity

This shows the company's ability to meet obligations to creditors. It also shows the changes or turnovers in the levels of various business assets. This may indicate possible failure by company management to use all of its assets effectively.

3. Leverage and Funding

This measures the financial position of the liability and equity side of the balance sheet at a specified point in time. The effectiveness of investment turnover is also tested in this section.

4. Employee Profile

This shows the amount of output per employee and payroll per employee, as well as the relationship between direct payroll and support payroll. It also determines the amount of investment per employee, based on the above elements.

Profitability Ratios—Measure of Profits

Many of the financial decisions made by management are only based on the bottom line of the operating statement. When analyzing these financial ratios, more than one element should be considered at a time. The elements involved in considering the profitability ratios are:

- Sales dollars
- Number of employees
- Return on investment

1. Profitability Ratios

As previously explained, the Dynamic Ratio Study uses Median Values in reporting certain significant facts. Whenever Median Values are used, they are shown in italics.

Income before Income Taxes as a Percentage of Sales

This is a very basic measure of profitability. The reason for using Income Before Income Taxes is that there are different tax statuses companies can select, creating various tax liabilities. Income before income taxes works well within one industry, since costs of assets and operating expenses tend to be consistent, and lend themselves to comparison. A problem with this ratio is that it does not consider the investment involved to produce the earnings.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	4.31%	12.97%	
2016	2.66%	9.51%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.47%	2.29%	5.35%
2016	(0.10)%	2.49%	5.45%

$$\text{Income before Income Taxes as a Percentage of Sales} = \frac{\text{Income before Income Taxes}}{\text{Sales}}$$

Income before Income Taxes per Employee

This is an adequate measure of the median performance level of return that a firm receives from each employee. It can give a firm an idea of the profit in dollars they should expect from each employee.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$3,625	\$13,834	
2016	\$4,110	\$14,487	

Median Values			
Year	Lower Quartile	Median	Upper Quartile
2017	\$591	\$3,625	\$9,354
2016	\$(108)	\$4,110	\$9,262

$$\text{Income before Income Taxes Per Employee} = \frac{\text{Income before Income Taxes}}{\text{Total Number of Employees}}$$

Return on Investment as a Percent of Gross/Net Assets

Income as used here excludes interest expense since it really is a cost of raising capital. Therefore, it should not be included in the measurement of Return on Investment.

Both of these formulas or calculations are the same as saying Return on Investment (ROI). They both measure how effectively the company's investment is producing a profit. In questioning which of these two calculations is the most favorable, we lean toward the net asset approach.

Our reasoning for this is that it may (1) produce a more conclusive operational Return on Investment as well as a more accurate measurement of Return on Investment; and (2) result in a higher Return on Investment which may support continued use of present equipment. In theory, both calculations are useful and should be considered when measuring Return on Investment.

Return on Investment as a Percent of Gross Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	3.74%	7.92%	
2016	3.82%	11.14%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	1.12%	3.44%	6.18%
2016	0.47%	3.31%	6.43%

$$\text{Income before Interest Expense as a Percentage of Gross Assets} = \frac{\text{Income before Interest}}{\text{Expense and Other Income} + \text{Net Assets Plus Accumulated Depreciation}}$$

Return on Investment as a Percentage of Net Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	7.24%	15.77%	
2016	7.26%	22.69%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	3.05%	6.78%	13.17%
2016	0.91%	6.80%	12.37%

$$\text{Income before Interest Expense as a Percentage of Net Assets} = \frac{\text{Income before Interest}}{\text{Expense and Other Income} + \text{Net Assets}}$$

EBITFDA as a Percent of Sales/Value Added

These ratios try to arrive as closely as possible to EBITDA (Earnings before interest, taxes, depreciation and amortization). Since the Dynamic Ratio Study does not segregate administrative and selling depreciation and amortization, we can only factor in **factory** depreciation and amortization. EBITDA is often the base used in valuing a business. Once EBITDA is determined, a multiple is applied to it in order to arrive at the value of the Company.

Earnings before Interest Expense, Income Taxes, Factory Depreciation and Amortization (EBITFDA) as a Percent of Sales

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	7.91%	13.04%	
2016	7.55%	13.80%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	4.88%	7.06%	11.15%
2016	3.99%	7.70%	10.36%

$$\text{EBITFDA—As a Percent of Sales} = \frac{\text{Income before Income Taxes as a Percent of Sales Plus Interest Expense Plus Factory Depreciation and Amortization}}{\text{EBITDA}}$$

Earnings before Interest Expense, Income Taxes, Factory Depreciation and Amortization (EBITFDA) as a Percent of Value Added

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	12.05%	19.44%	
2016	11.69%	21.02%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	7.40%	12.01%	16.35%
2016	6.51%	11.98%	16.64%

EBITFDA—As a Percent of Value Added = **Income before Income Taxes as a Percent of Value Added Plus Interest Expense Plus Factory Depreciation and Amortization**

Profitability Ratios—Sales Factors

Profitability ratios based on sales may relate to historical evidence, which in turn may help management measure the productivity of assets and employees. Management can use this historical evidence to change or project future results.

Sales per \$1 of Gross/Net Assets

The below ratios portray the utilization of total assets (gross) and total assets after depreciation (net). In other words, an asset with a cost of \$100,000 should produce or support, on average, approximately \$108,000 in sales.

Sales per \$1 of Gross Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$1.07	\$0.95	
2016	\$1.08	\$1.15	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$0.74	\$0.98	\$1.28
2016	\$0.80	\$0.97	\$1.26

$$\text{Sales per } \$1 \text{ of Gross Assets} = \frac{\text{Sales}}{\text{Net Assets Plus Accumulated Depreciation}}$$

Sales per \$1 of Net Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$2.42	\$1.90	
2016	\$2.40	\$2.46	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$1.57	\$2.33	\$2.92
2016	\$1.57	\$2.21	\$2.90

$$\text{Sales per \$1 of Net Assets} = \frac{\text{Sales}}{\text{Net Assets}}$$

Sales per \$1 of Current Assets

This ratio represents sales to current assets and can help you decide how efficiently working capital is being utilized.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$4.91	\$3.80	
2016	\$4.62	\$4.43	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$3.55	\$4.90	\$5.99
2016	\$3.39	\$4.28	\$5.62

$$\text{Sales per \$1 of Current Assets} = \frac{\text{Sales}}{\text{Current Assets}}$$

Sales per \$1 of Net Fixed Assets

This ratio is a good indicator of how much in sales a printer is producing for each \$1 that is invested in fixed assets. If you were to assume that the Net Book Value of Equipment (Cost less Accumulated Depreciation) approximates the fair market value, this ratio could be used to measure all fixed assets, new and used.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$7.83	\$5.16	
2016	\$8.02	\$8.93	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$3.48	\$5.98	\$8.81
2016	\$3.32	\$5.62	\$9.76

$$\text{Sales per } \$1 \text{ of Net Fixed Assets} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$$

Sales per Employee

This computation shows the relationship of the sales produced as they relate to each employee in the firm. Many printers have often asked how many employees should it take to produce the current sales volume. This ratio gives you the ability to calculate the number of employees needed.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$160,457	\$179,496	
2016	\$159,862	\$172,204	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$136,863	\$160,457	\$195,613
2016	\$131,040	\$159,862	\$199,133

$$\text{Sales per Employee} = \frac{\text{Sales}}{\text{Number of Employees}}$$

Sales per Factory Employee

This calculation can be used to determine the optimum number of factory employees needed to generate the firm's product(s), to support the overhead and to provide a profit.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$213,292	\$244,364	
2016	\$210,632	\$231,801	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$181,683	\$213,292	\$269,429
2016	\$178,490	\$210,632	\$267,950

$$\text{Sales per Factory Employee} = \frac{\text{Sales}}{\text{Number of Factory Employees}}$$

Profitability Ratios—Gross Profit Analysis

Gross profit can be a very valuable number, one that may indicate your company's financial health. To compute the following ratios, first determine your gross profit (sales less the cost of goods manufactured), and then relate gross profit to sales and employees.

Gross Profit as a Percentage of Sales

To be successful, a company must achieve and sustain a healthy Gross Profit to Sales Ratio. Gross profits must support administrative and selling expenses as well as interest costs, and, at the same time, yield a sufficient amount of net income on sales.

Small size firms require a higher gross profit percentage than large firms. While firms gross profits range from 21–26%, the smaller firms' gross profits range around the 23-26% whereas the larger firms average around 21-22%. For firms at larger sales levels, the gross profit required becomes less because of lower relative administrative and selling expenses (economies of scale).

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	23.50%	30.01%	
2016	23.00%	28.20%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	17.85%	22.11%	27.31%
2016	17.93%	23.19%	27.60%

$$\text{Gross Profit as a Percentage of Sales} = \frac{\text{Gross Profit}}{\text{Sales}}$$

Gross Profit per Factory Employee

This calculation determines the dollar amount of gross profit that each factory employee produces. This also is a desirable common factor with which to weigh a firm's profit performance.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$48,805	\$61,840	
2016	\$49,137	\$64,192	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$37,697	\$48,805	\$58,818
2016	\$36,297	\$49,137	\$68,308

$$\text{Gross Profit per Factory Employee} = \frac{\text{Gross Profit}}{\text{Number of Factory Employees}}$$

Components of Cost of Product Produced as a Percent of Sales

If Gross Profit can foretell profitability, you will want to examine the three components that make up cost of product produced. These are Materials, Factory Payroll, and Factory Expenses. Control them and you can control Gross Profit.

Materials as a Percent of Sales

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	34.36%	32.17%	
2016	35.05%	34.03%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	39.25%	32.83%	28.90%
2016	40.33%	34.25%	29.72%

$$\text{A. Materials as a Percent of Sales} = \frac{\text{Materials}}{\text{Sales}}$$

Factory Payroll as a Percent of Sales

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	25.50%	23.17%	
2016	25.37%	22.83%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	29.19%	25.38%	22.38%
2016	28.60%	25.45%	21.69%

$$\text{B. Factory Payroll as a Percent of Sales} = \frac{\text{Factory Payroll}}{\text{Sales}}$$

Factory Expenses as a Percent of Sales

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	16.64%	14.65%	
2016	16.58%	14.94%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	19.17%	16.40%	13.44%
2016	19.49%	16.00%	13.67%

$$\text{C. Factory Expenses as a Percent of Sales} = \frac{\text{Factory Expenses}}{\text{Sales}}$$

Profitability Ratios—Value Added Analysis

Value Added is another way to say **sales of a company's own manufacture**. Value Added is sales less material costs and outside services. As discussed in a previous chapter, Value Added can be the most important component in measuring your firm. Please refer to the earlier chapter on Value Added for a more detailed explanation.

Value Added per Employee

This shows the value added or manufacturing by each of the employees of the company.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$109,695	\$118,951	
2016	\$104,563	\$114,388	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$88,325	\$109,695	\$127,100
2016	\$88,335	\$104,563	\$127,693

$$\text{Value Added per Employee} = \frac{\text{Value Added}}{\text{Number of Employees}}$$

Value Added per Factory Employee

This is one of the most significant ratios available to a printer. It shows the amount of Value Added produced per factory employee. If this number is too low, and management would like to increase profits, they should consider making changes to increase this amount, thereby raising the profitability of their firm. This ratio does change with sales volume. Therefore, each firm should be careful to review the Dynamic Ratio results for their sales category.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$144,504	\$158,138	
2016	\$138,040	\$153,050	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$118,975	\$144,504	\$169,074
2016	\$118,228	\$138,040	\$172,144

$$\text{Value Added per Factory Employee} = \frac{\text{Value Added}}{\text{Number of Factory Employees}}$$

Analysis of Operations to Value Added

Factory Payroll as a Percent of Value Added

This is simply the percentage a firm spends in payroll costs to produce its product. It is important because it is the largest component of Value Added and in theory is a variable cost that can be controlled.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	39.23%	34.55%	
2016	39.13%	34.49%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	44.54%	39.39%	35.31%
2016	44.12%	39.09%	33.88%

$$\text{A. Factory Payroll as a Percent of Value Added} = \frac{\text{Factory Payroll}}{\text{Value Added}}$$

Factory Expenses as a Percent of Value Added

This calculates a percentage of Factory Expenses, both fixed and variable, as compared to Value Added.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	25.46%	22.01%	
2016	25.54%	22.84%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	28.98%	24.67%	22.17%
2016	28.94%	25.25%	21.12%

$$\text{B. Factory Expenses as a Percent of Value Added} = \frac{\text{Factory Expenses}}{\text{Value Added}}$$

Administrative Expenses as a Percent of Value Added

This ratio gives you the percentage of Administrative Expenses it takes to manage the production of sales of your own manufacture.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	15.73%	16.65%	
2016	15.56%	14.85%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	17.67%	14.06%	10.80%
2016	18.37%	14.70%	11.47%

$$\text{C. Administrative Expenses as a Percent of Value Added} = \frac{\text{Administrative Expenses}}{\text{Value Added}}$$

Selling Expenses as a Percent of Value Added

This ratio tells you what your percentage of Selling Expenses is in relationship to your Value Added.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	14.02%	13.62%	
2016	14.47%	12.69%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	17.84%	13.97%	10.02%
2016	18.25%	14.33%	9.73%

$$\text{D. Selling Expenses as a Percent of Value Added} = \frac{\text{Selling Expenses}}{\text{Value Added}}$$

Interest Expense as a Percent of Value Added

This ratio indicates the relationship between Interest Expense and Value Added.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	1.42%	0.94%	
2016	1.40%	0.94%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	2.04%	1.15%	0.55%
2016	2.03%	1.04%	0.45%

$$\text{E. Interest Expense as a Percent} = \frac{\text{Interest Expense}}{\text{Value Added}}$$

Gross Profit as a Percent of Value Added

This calculation produces a ratio of your Gross Profit compared to the sales of your own manufacture, or Value Added. This is a basic measure of profitability and, since it is based on Value Added, is relatively consistent among printers.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	35.31%	43.44%	
2016	35.33%	42.67%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	29.85%	33.32%	39.18%
2016	29.60%	35.62%	41.29%

$$\text{Gross Profit as a Percent of Value Added} = \frac{\text{Gross Profit}}{\text{Value Added}}$$

Income before Income Taxes as a Percent of Value Added

Here it is again, Income before Income Taxes, but this time as a percent of Value Added. This ratio is the real bottom line of your manufacturing efforts. As you can see, "Profit Leaders" earned slightly less than four times as much from their manufacturing (Value Added) profits than "All Firms".

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	4.31%	12.97%	
2016	4.10%	14.45%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.74%	3.60%	8.28%
2016	(0.15)%	4.19%	8.58%

$$\text{Income before Income Taxes as a Percent of Value Added} = \frac{\text{Income before Income Taxes}}{\text{Value Added}}$$

Profitability Ratio—Financial Leverage

Times Interest Earned

This calculation determines the ability of a company to cover the payment of interest to lenders. The multiple is often used by banks as a measure of how many times interest is earned before it is paid. This ratio also indicates the extent to which earnings can decline before financial distress may occur.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	4.01	13.86	
2016	3.83	15.81	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.91	4.68	16.97
2016	0.41	5.21	22.89

$$\text{Times Interest Earned} = \frac{\text{Income before Interest Expense}}{\text{Interest Expense}}$$

2. Financial Ratios—Liquidity and Activity Ratios

The discussion in this section involves the liquidity and activity ratios. Liquidity ratio analysis relates to the amount of cash or current assets to current obligations. Liquidity usually refers to a company's ability to pay off its current liabilities at a point in time. Activity ratios measure how effectively a firm uses its resources by differentiating between the level of sales and the investment in various asset accounts.

Traditionally, Current Assets are listed on the Balance Sheet in their order of liquidity. They may be referred to as a company's liquid assets—assets that can be converted quickly into cash, usually within a one-year period. A printer uses these assets to pay his bills or other debts as they come due. The next four ratios illustrated are a measure of liquidity.

Current Ratio

This is a measure of a firm's ability to meet its financial obligations. It also shows short-term solvency, and provides an indicator as to how well short-term creditors are covered by assets that are expected to be converted into cash in a period roughly corresponding to the maturity of the claims. Essentially, it means that for every dollar of current liabilities you have a corresponding dollar amount of current assets.

It is common to strive to maintain this ratio at a figure of above 1.5 (1.5 to 1) and many financial professionals recommend to strive for a multiple of 2.00 (2 to 1). This means that for every dollar of current liabilities you will have \$2 of current assets to cover them. The higher the amount, the safer your financial position is. The reason for this is that if the ratio gets too low, your firm may have cash difficulties. The higher the ratio, the more flexibility there is between debt obligations which are due and the availability of the assets to pay them.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	1.33	2.23	
2016	1.35	2.13	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.80	1.75	3.18
2016	0.84	1.79	3.15

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Quick Ratio

This is a more efficient liquidity ratio because it eliminates inventories and other current assets from current assets. The quick ratio (or acid test) is a strict measurement of liquidity because it excludes inventory and other current assets that usually consist of prepaid insurance and taxes that may not be readily convertible into cash. This may distort a firm's financial analysis. The ratio is based on the assumption that the firm will pay its short-term debts with cash and receivable collections.

In most circumstances, a quick ratio of at least 1.00 (1 to 1) is considered desirable. It must be noted that this figure varies according to the industry.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	0.99	1.81	
2016	1.06	1.76	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.71	1.44	2.45
2016	0.74	1.48	2.46

$$\text{Quick Ratio} = \frac{\text{Current Assets Minus Inventory and Other Current Assets}}{\text{Current Liabilities}}$$

Cash Asset Ratio

This ratio helps management determine its cash liquidity.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	0.28	0.85	
2016	0.28	0.64	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.04	0.21	0.70
2016	0.03	0.20	0.78

$$\text{Cash Asset Ratio} = \frac{\text{Cash and Marketable Securities}}{\text{Current Liabilities}}$$

Days Cash for Operating Expenses

This formula calculates the number of days cash you have on hand to cover expenses. As you can see from the results, the printing industry does not have a great deal of cash on hand. With approximately one week's cash being the median for all firms, it becomes apparent why some printing managers feel they are living hand to mouth.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	11	44	
2016	11	21	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	3	11	32
2016	4	11	32

$$\text{Days Cash for Operating Expenses} = \left[\frac{\text{Cash and Marketable Securities}}{\text{Operating Expenses Minus Depreciation}} \right] \frac{365}{\text{Days}}$$

Turnover Analysis

Turnover is the time it takes to complete the trading cycle. Turnover that is as fast as possible, and consistent with quality standards is a sound management principle. Nevertheless, it seems to conflict with some printers' practices. Too often, production, estimating, and sales personnel seek extra time to do a job, even though the faster the job is done, the better the turnover. If management wants to increase the profits, it must insist that the trading cycle be completed as quickly and efficiently as possible—and manage its personnel to see that this policy is adhered to.

Inventory turnover and the collection period of receivables are ratios that are critical in analyzing the movement or rapidity of the cycle. It is imperative that printers understand how these ratios operate and try diligently to improve them. Time after time, printing companies that have been sliding down the profit line have climbed back up to a healthy position by improving their turnover ratios.

For example, one printing company forced into heavy short-term debt several years ago analyzed its operations only to discover that the collection period for receivables was approaching 63 days. After management installed tighter credit policies and began to monitor collection procedures more closely, it only took a short time to reduce the collection period to 50 days and eliminate a major portion of the short-term debt.

Accounts Receivable Turnover

This ratio reflects a company's credit policies and the effectiveness of its collection procedures. The median turnover decreases as the credit term becomes longer, requiring the company to possibly obtain financing on receivables to support the cycle.

In developing the denominator amount, the balances (notes and accounts receivable) from the beginning and end of each month or period are normally averaged. There are a few limitations. One is that the ending accounts receivable may not appropriately reflect any deviation in the accounts receivable balances. Secondly, difficulties may occur if a significant portion of sales are cash rather than credit sales. The denominator should be the best available average.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	8.52	8.54	
2016	7.83	8.47	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	6.83	8.52	10.05
2016	6.12	7.83	9.67

$$\text{Accounts Receivable Turnover} = \frac{\text{Sales}}{\text{Notes and Accounts Receivable}}$$

Number of Days Sales in Receivables (Collection Period)

This ratio shows the average period required to collect receivables and the effectiveness of a company's collection procedures. The sooner the receivables are collected, the sooner the money can be put to use by investing in additional assets, to pay off debt obligations, or to earn interest.

Two ways to possibly shorten the collection period of receivables are:

- To bill customers promptly after a job is completed,
- Seek good credit worthy customers.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	43	43	
2016	47	43	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	36	43	53
2016	38	47	60

$$\text{Number of Days Sales in Accounts Receivable (Collection Period)} = \frac{\text{Average Accounts Receivable} \times 365}{\text{Annual Sales}}$$

Total Inventory Turnover

The cost of product produced (materials, payroll and factory expenses) is taken from the income statement and is divided by average inventory, which includes paper, chargeable materials, work-in-process, finished goods and departmental supplies.

In those instances where customers supply paper, inventories will fluctuate and will possibly affect a printer's comparison of his inventory percentages to those in the Dynamic Ratio Study. Parenthetically, when customers supply paper a printer should make a realistic handling and overhead charge to cover his labor and warehousing costs plus a profit mark-up.

Some financial analysts use sales of materials rather than the cost of materials in computing turnover. Since printers value inventories at cost, cost of materials sold gives a more accurate figure in calculating the ratio. Using the monthly AVERAGE inventory is particularly important for printers because of the significant volume changes during the year. While a monthly inventory is, by far, the most highly recommended practice, some printers take inventory less often. If this is the practice in your plant, use the average annual inventory to calculate the ratio.

A low inventory turnover points to the possibility of a larger than necessary investment in inventory, while a higher turnover implies better management and control.

Total Inventory Turnover (Continued)

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	22.54	25.15	
2016	21.97	26.34	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	14.24	22.54	37.21
2016	14.63	21.97	34.86

$$\text{Total Inventory Turnover} = \frac{\text{Cost of Product Produced}}{\text{Average Total Inventory}}$$

Number of Days of Total Inventory

This computation merely converts the total inventory turnover into the number of days it takes to use the inventory.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	16	15	
2016	17	14	

Median and Quartile Values-All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	10	16	26
2016	10	17	25

$$\text{Number of Days Total Inventory} = \left[\frac{\text{Average Total Inventory}}{\frac{\text{Cost of Product Produced}}{365}} \right]$$

OR

$$\text{Number of Days Total Inventory} = \frac{365}{\text{Total Inventory Turnover}}$$

Paper Inventory Turnover

The computation of a paper inventory turnover refines the total inventory turnover to its most important component, which is paper. Paper inventory turnover improves when inventory levels are optimized and the storage time of paper before production is reduced.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	18.53	18.22	
2016	18.36	20.59	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	10.11	18.53	42.96
2016	11.28	18.48	43.54

$$\text{Paper Inventory Turnover} = \frac{\text{Paper Used}}{\text{Average Paper Inventory}}$$

Number of Days Paper Inventory

This computation changes the paper inventory turnover into the number of days it takes to use the paper.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	20	20	
2016	20	18	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	9	20	36
2016	8	20	32

$$\text{Number of Days Paper Inventory} = \left[\frac{\text{Average Paper Inventory}}{\frac{\text{Paper Cost}}{365}} \right]$$

OR

$$\text{Number of Days Paper Inventory} = \frac{365}{\text{Paper Inventory Turnover}}$$

Current Asset Turnover

Turnover analysis, which was previously discussed for receivables and inventories, can also be applied to total current assets. The result of your current asset turnover calculation can be viewed as the number of times (in one year) current assets are replenished. It can also be thought of as the amount of sales dollars arising for every dollar invested in current assets.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	4.91	3.80	
2016	4.62	4.43	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	3.55	4.90	5.99
2016	3.39	4.28	5.62

$$\text{Current Asset Turnover} = \frac{\text{Sales}}{\text{Current Assets}}$$

Operating Cycle (In Days)

Simply put, the operating cycle is the measure of the average number of days from the time a job is started until it is billed and paid for. As the formula indicates, the operating cycle is calculated by adding the number of collection days on receivables and the number of days of inventory.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	59	58	
2016	64	57	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	46	59	79
2016	48	64	85

$$\text{Operating Cycle (In Days)} = \frac{\text{Number of Days Sales in Accounts Receivable}}{\text{Plus Number of Days Total Inventory}}$$

Distribution of Current Assets

The ratios in this section are either liquidity or activity ratios. Each of these ratios involves an item or several items that comprise current assets. The distribution of current assets on the other hand gives you an idea of the composition of current assets. For example, let us say your expected or actual current liabilities are \$500,000 and you want your current ratio to be 2:1. That means that you will have current assets of \$1,000,000. Using the 2017 Dynamic Ratio Study results for Profit Leaders, you could project that the current asset structure would appear as follows:

Distribution of Current Assets Example

Cash	\$ 300,400	30.04 %
Accounts Receivable	523,000	52.30
Inventory	139,900	13.99
Other Current Assets	36,700	3.67
Total	<u>\$ 1,000,000</u>	<u>100.00 %</u>

Distribution of Current Assets

	Industry Results 2017		Industry Results 2016	
	All Firms	Profit Leaders	All Firms	Profit Leaders
Cash	20.81 %	37.73 %	20.90 %	30.04 %
Accounts Receivable	54.02	43.09	56.89	52.30
Inventory	19.07	13.63	17.69	13.99
Other Current Assets	6.10	5.55	4.52	3.67
Total	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>

	Your Results	
	2017	2016
Cash	%	%
Accounts Receivable		
Inventory		
Other		
Total	%	%

$$\begin{aligned}
 \text{A. Cash Ratio} &= \frac{\text{Cash}}{\text{Current Assets}} \\
 \text{B. Accounts Receivable Ratio} &= \frac{\text{Accounts Receivable}}{\text{Current Assets}} \\
 \text{C. Inventory Ratio} &= \frac{\text{Inventory}}{\text{Current Assets}} \\
 \text{D. Other Current Assets Ratio} &= \frac{\text{Other Current Assets}}{\text{Current Assets}}
 \end{aligned}$$

3. Leverage and Funding Ratios

Leverage ratios reflect a company's total debt—short-term and long-term. These ratios are important to a printing manager, particularly if his company is expanding and needs debt financing. He will want his company's leverage ratios to compare favorably with those of the printing industry. Lending institutions will look at these ratios closely because they measure the relationship between shareholders' funds and borrowed funds.

Trading on equity, or what is sometimes referred to as leverage, is the use of borrowed funds as capital to hopefully earn a higher rate of return on the assets employed than is paid for the capital. While the borrower will be concerned about his earnings, or extra earnings, from the leverage, the lender or creditor will be concerned with the company's ability to return the funds with interest. The prime objective of debt ratios is to focus management's awareness on the potential problems related to the use, size and repayment of the creditor's capital. Below are the ratios that measure leverage and the funding of a company.

Debt to Equity Ratios

The first ratio, debt to equity, shows how many dollars in liabilities a firm has for every dollar in shareholders' equity. The second ratio, long-term debt to equity, merely excludes current liabilities. The capital needed to fund the assets a company uses must come either from owners' funds (equity) or from borrowed funds (liabilities). It is hard to say what the best proportion or combination of liabilities and equity is in funding a company.

Debt to Equity

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	2.53	0.89	
2016	2.21	1.27	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	6.94	2.06	0.73
2016	4.48	1.62	0.69

$$\text{Debt to Equity} = \frac{\text{Total Liabilities}}{\text{Equity}}$$

Long-Term Debt to Equity

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	1.13	0.43	
2016	0.94	0.65	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	3.31	0.79	0.24
2016	2.34	0.65	0.17

$$\text{Long-Term Debt to Equity} = \frac{\text{Long-Term Liabilities}}{\text{Equity}}$$

Funding of Total Assets

While the distribution of current assets ratios provided us with the structure of our current assets, this set of ratios will show us the relationship of our liabilities and shareholders' equity to our total assets.

The funding of total assets ratios can give you an overall view of how the average companies structure their funding. The proper funding structure can give a company the ability to grow and expand when the opportunity is there. A company that is improperly structured will often miss these opportunities.

Funding of Total Assets

	Industry Results 2017		Industry Results 2016	
	All Firms	Profit Leaders	All Firms	Profit Leaders
Current Liabilities	39.64 %	24.29 %	39.48 %	27.25 %
Long-Term Debt	32.06	22.74	29.40	28.64
Total Liabilities	71.70	47.03	68.88	55.89
Shareholders' Equity	28.30	52.97	31.12	44.11
Total	100.00 %	100.00 %	100.00 %	100.00 %

	Your Results	
	2017	2016
Current Liabilities	%	%
Long-Term Liabilities		
Total Liabilities		
Shareholders' Equity		
Total	%	%

$$\text{A. Current Liabilities Ratio} = \frac{\text{Current Liabilities}}{\text{Total Assets}}$$

$$\text{B. Long-Term Debt Ratio} = \frac{\text{Long-Term Liabilities}}{\text{Total Assets}}$$

$$\text{C. Total Debt Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

$$\text{D. Shareholders' Equity Ratio} = \frac{\text{Shareholders' Equity}}{\text{Total Assets}}$$

Long-Term Debt to Long-Term Debt and Equity

This ratio is similar to the other two debt to equity ratios except that it includes the long-term debt with equity in the denominator. Some theorists believe that the funding of a company should include everything but current liabilities. This ratio measures the amount borrowed (long-term debt) to the total funding requirement (long-term debt and equity). Others feel this ratio gives them a better idea of what the creditors' risks are versus the owners' risks.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	0.53	0.30	
2016	0.49	0.39	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.77	0.44	0.19
2016	0.70	0.39	0.15

$$\text{Long-Term Debt to Long-Term Debt and Equity} = \frac{\text{Long-Term Debt}}{\text{Long-Term Debt and Shareholders' Equity}}$$

Fixed Assets to Long-Term Debt/Shareholders' Equity/Both

These ratios indicate your company's debt and equity positions in relationship to its asset position. Fixed assets generally should not be funded with current debt. That leaves long-term debt and shareholders' equity to fund the fixed assets (machinery and equipment, etc.). Again, there are no set ratios that are best for all companies.

Fixed Assets to Long-Term Debt

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	1.25	1.82	
2016	1.40	1.34	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.71	1.48	3.70
2016	0.68	1.62	5.01

$$\text{Fixed Assets to Long-Term Debt} = \frac{\text{Fixed Assets}}{\text{Long-Term Debt}}$$

Fixed Assets to Shareholders' Equity

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	1.41	0.78	
2016	1.32	0.87	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	2.35	1.17	0.89
2016	1.60	1.05	0.87

$$\text{Fixed Assets to Shareholders' Equity} = \frac{\text{Fixed Assets}}{\text{Shareholders' Equity}}$$

Fixed Assets to Long-Term Debt and Shareholders' Equity

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	0.66	0.55	
2016	0.68	0.53	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.55	0.65	0.72
2016	0.48	0.64	0.74

$$\text{Fixed Assets to Long-Term Debt and Shareholders' Equity} = \frac{\text{Fixed Assets}}{\text{Long-Term Debt and Shareholders' Equity}}$$

Investment Turnover

The ratio of sales to assets measures the efficiency with which the company is utilizing its investments. When relating sales to assets, there are three subdivisions that should be considered: gross assets, net assets, and net fixed assets.

Management may choose to evaluate one or a combination of these ratios in order to measure the amount of investment relative to sales activity. A ratio that is close to the industry average may reflect efficient use of the money invested in a company's capital assets. However, a ratio that is abnormally high compared to the industry average may be a problem. Such an example would be a company with an excessive amount invested in fixed assets which could lead to an eventual drainage of working capital; or a greater-than-average debt repayment schedule; or reduced profit stemming from high costs.

It can be advantageous to evaluate a period's performance. Try comparing your company's results with those of your competitors. After all, if you are comparing similar companies, each company should produce similar sales volumes for each dollar invested in assets.

Sales to Assets—Gross Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	1.07	0.95	
2016	1.08	1.15	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	0.74	0.98	1.28
2016	0.80	0.97	1.26

A. Gross Assets Ratio =
$$\frac{\text{Sales}}{\text{Total Assets Plus Accumulated Depreciation}}$$

Sales to Assets—Net Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	2.42	1.90	
2016	2.40	2.46	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	1.57	2.33	2.92
2016	1.57	2.21	2.90

B. Net Assets Ratio =
$$\frac{\text{Sales}}{\text{Total Assets}}$$

Sales to Assets—Net Fixed Assets

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	7.83	5.16	
2016	8.02	8.93	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	3.48	5.98	8.81
2016	3.32	5.62	9.76

$$\text{C. Net Fixed Assets Ratio} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$$

Sales to Total Debt

The ratio of sales to total debt is similar to the three ratios that compare sales to assets, except the comparison here is to liabilities. This ratio gives you the sales multiple for each dollar of total debt.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	3.59	4.33	
2016	3.85	4.85	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	2.58	3.59	5.00
2016	2.63	3.85	5.44

$$\text{Sales to Total Debt} = \frac{\text{Sales}}{\text{Total Liabilities}}$$

4. Employee Profile

One of the most analytical and manageable areas of all the ratios are those computed in the employee profile section. Often they offer the best common denominator that can be easily managed to produce higher profits.

Investment per Employee

These ratios give the reader an idea of how much money firms have invested in equity (or assets funded by equity), net assets, and machinery and equipment per employee. As the sales volume of a firm increases, the assets invested per employee also increases.

Shareholders' Equity per Employee

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$20,816	\$47,871	
2016	\$29,905	\$38,854	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$7,151	\$20,816	\$47,461
2016	\$9,512	\$29,905	\$50,707

$$\text{A. Shareholders' Equity per Employee} = \frac{\text{Shareholders' Equity}}{\text{All Employees}}$$

Net Assets Employed per Employee

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$74,133	\$103,465	
2016	\$80,287	\$78,612	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$50,845	\$74,133	\$105,108
2016	\$49,856	\$80,287	\$114,827

$$\text{B. Net Assets Employed per Employee} = \frac{\text{Net Assets Employed}}{\text{All Employees}}$$

Net Assets Employed per Factory Employee

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$99,116	\$131,629	
2016	\$104,095	\$104,939	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$69,312	\$99,116	\$137,148
2016	\$70,460	\$104,095	\$149,205

C. Net Assets Employed per Factory Employee = Net Assets Employed
Factory Employees

Machinery and Equipment Employed per Factory Employee

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$141,330	\$159,657	
2016	\$144,194	\$127,252	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$102,109	\$141,330	\$186,151
2016	\$100,044	\$144,194	\$200,786

D. Machinery and Equipment Employed per Factory Employee = Machinery and Equipment Employed
Factory Employees

Employees: Distribution by Department

These ratios present the distribution of employees by department on a percentage basis. The most important element here is the percentage of factory employees. A firm with a disproportionately high number of factory employees and relatively too few administrative and sales employees is rare. Factory employees produce the product and their productivity generates revenue.

Often, a very simple analysis will provide an indicator of productivity. The question to ask is: Are there enough factory employees to produce the product, support the overhead, and provide a profit? This question may seem elementary, but in many cases, the answer turns out to be a revelation.

Note that the percentage of factory employees is about 69% for the smaller firms, and rises to approximately 81% of all employees for the largest firms. Each sales class has a specific characteristic—a very simple, but valid relationship. These ratios will point to possible weaknesses in your personnel structure.

Factory Employees as a Percent of All Employees

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	74.42%	72.62%	
2016	74.45%	75.06%	

$$\text{A. Factory Employees as a Percent of Total Employees} = \frac{\text{Factory Employees}}{\text{Total Employees}} \quad \text{Administrative}$$

Employees as a Percent of All Employees

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	12.29%	13.24%	
2016	11.90%	12.39%	

$$\text{B. Administrative Employees as a Percent of Total Employees} = \frac{\text{Administrative Employees}}{\text{Total Employees}}$$

Sales Employees as a Percent of All Employees

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	13.29%	14.14%	
2016	13.65%	12.55%	

$$\text{C. Sales Employees as a Percent of Total Employees} = \frac{\text{Sales Employees}}{\text{Total Employees}}$$

Payroll Ratios— Including Taxes and Benefits— Including Executives

Total Payroll as a Percent of Sales

This ratio shows a printing company how much in total labor costs they are incurring to run their whole operation. It includes all employees in factory, administrative, and sales and includes their payroll, payroll taxes, and employee benefits. As you can see a significant portion of a company's sales dollars goes to cover payroll.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	39.52%	37.43%	
2016	39.64%	36.02%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	35.32%	39.62%	43.81%
2016	35.35%	39.91%	43.91%

$$\text{Total Payroll as a Percent of Sales} = \frac{\text{Total Payroll Including Taxes and Benefits}}{\text{Sales}}$$

Total Payroll as a Percent of Value Added

This ratio is similar to the preceding ratio except that it computes total labor costs based on value added (sales less material costs). Total payroll as a percent of value added ranges a 19% to 22% higher than total payroll as a percent of sales.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	60.39%	55.38%	
2016	61.01%	54.39%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	55.45%	60.59%	65.21%
2016	55.46%	60.95%	66.16%

$$\text{Total Payroll as a Percent of Value Added} = \frac{\text{Total Payroll Including Taxes and Benefits}}{\text{Value Added}}$$

Factory Payroll as a Percent of Gross Plant Investment

This ratio calculates the percentage of factory labor in relationship to plant investment. It can help firms calculate how much labor would be considered reasonable to run the equipment on hand.

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	39.87%	33.08%	
2016	38.47%	43.00%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	28.72%	39.87%	57.22%
2016	28.20%	38.47%	56.49%

$$\text{Factory Payroll as a Percent of Gross Plant Investment} = \frac{\text{Total Factory Payroll}}{\text{Machinery and Equipment (Gross)}}$$

Payroll per Employee

These calculations in the employee profile section are the ones concerning payroll per employee. There are three groups of calculations. The first group includes payroll, payroll taxes and employee benefits for all employees including executives. The second group is payroll only without payroll taxes, and benefits for those employees who are executives, while the third group is payroll only without payroll taxes and benefits for those employees who are non-executives.

A. Payroll Including Taxes and Benefits—Including Executives

	Industry Results 2017		Industry Results 2016	
	All Firms	Profit Leaders	All Firms	Profit Leaders
Payroll per Employee—All Employees	\$ 64,392	\$ 66,560	\$ 62,788	\$ 63,292
Payroll per Factory Employee	54,881	55,040	54,356	52,046
Payroll per Administrative Employee	89,633	100,171	85,455	91,692
Payroll per Sales Employee	92,560	90,238	94,939	97,103

2017 Median and Quartile Values - All Firms			
	Lower Quartile	Median	Upper Quartile
Payroll per Employee—All Employees	\$ 56,097	\$ 64,392	\$ 73,407
Payroll per Factory Employee	48,930	54,881	64,784
Payroll per Administrative Employee	65,137	89,633	114,067
Payroll per Sales Employee	74,159	92,560	122,973

	Your Results	
	2017	2016
Payroll per Employee—All Employees	\$ _____	\$ _____
Payroll per Factory Employee	_____	_____
Payroll per Administrative Employee	_____	_____
Payroll per Sales Employee	_____	_____

B. Payroll Excluding Taxes and Benefits—Executives Only

	Industry Results 2017		Industry Results 2016	
	All Firms	Profit Leaders	All Firms	Profit Leaders
Payroll per Executive—All Executives	\$ 93,704	\$ 108,302	\$ 101,974	\$ 118,823
Payroll per Factory Executive	80,121	76,629	81,577	88,242
Payroll per Administrative Executive	123,210	150,000	127,733	137,503
Payroll per Sales Executive	127,825	165,090	131,583	160,250

2017 Median and Quartile Values - All Firms			
	Lower Quartile	Median	Upper Quartile
Payroll per Executive—All Executives	\$ 75,479	\$ 93,704	\$ 145,617
Payroll per Factory Executive	63,459	80,121	103,122
Payroll per Administrative Executive	75,217	123,210	178,702
Payroll per Sales Executive	85,675	127,825	215,866

Your Results			
	2017	2016	
Payroll per Executive—All Executives	\$ _____	\$ _____	
Payroll per Factory Executive	_____	_____	
Payroll per Administrative Executive	_____	_____	
Payroll per Sales Executive	_____	_____	

C. Payroll Excluding Taxes and Benefits—Non-Executives Only

	Industry Results 2017		Industry Results 2016	
	All Firms	Profit Leaders	All Firms	Profit Leaders
Payroll per Non-Executive—All Employees	\$ 48,611	\$ 48,882	\$ 46,824	\$ 46,337
Payroll per Factory Non-Executive	44,777	44,671	43,241	42,607
Payroll per Administrative Non-Executive	50,754	51,345	47,777	50,000
Payroll per Sales Non-Executive	76,346	70,682	78,231	79,860

2017 Median and Quartile Values - All Firms			
	Lower Quartile	Median	Upper Quartile
Payroll per Non-Executive—All Employees	\$ 42,634	\$ 48,611	\$ 58,304
Payroll per Factory Non-Executive	38,130	44,073	52,122
Payroll per Administrative Non-Executive	40,015	50,754	64,574
Payroll per Sales Non-Executive	57,664	76,346	105,200

	Your Results	
	2017	2016
Payroll per Non-Executive—All Employees	\$ _____	\$ _____
Payroll per Factory Non-Executive	_____	_____
Payroll per Administrative Non-Executive	_____	_____
Payroll per Sales Non-Executive	_____	_____

Direct and Support Labor Ratios

The three ratios that follow give additional insight into payroll, which is the largest cost on the operating statement. The first two ratios further delineate labor costs, including taxes and benefits, as a percentage of value added. The purpose of these two ratios is to show how efficient graphic arts firms are from a standard of labor costs (1) in producing their printed product with just direct labor costs and (2) in supporting the production of their printed product with all other labor costs other than direct labor.

The last of the three ratios calculates a factor of labor support. This ratio shows us how much a company spends in additional labor support costs for each \$1.00 in direct labor costs.

Direct Labor as a Percent of Value Added

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	25.42%	21.77%	
2016	26.67%	23.20%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	30.17%	26.95%	21.18%
2016	30.24%	26.24%	22.82%

$$\text{Direct Labor as a Percent of Value Added} = \frac{\text{Direct Wages Including Taxes and Benefits (Prorated)}}{\text{Value Added}}$$

Support Labor as a Percent of Value Added

Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	34.97%	33.61%	
2016	34.34%	31.19%	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	38.32%	34.80%	29.83%
2016	39.32%	34.38%	29.08%

$$\text{Support Labor as a Percent of Value Added} = \frac{\text{Factory Supervision, General Factory Wages, Packing, Shipping and Delivery Wages, Total Administrative Wages, and Total Selling Wages, Including Taxes and Benefits on All of These Wages}}{\text{Value Added}}$$

Support Labor Efficiency Factor

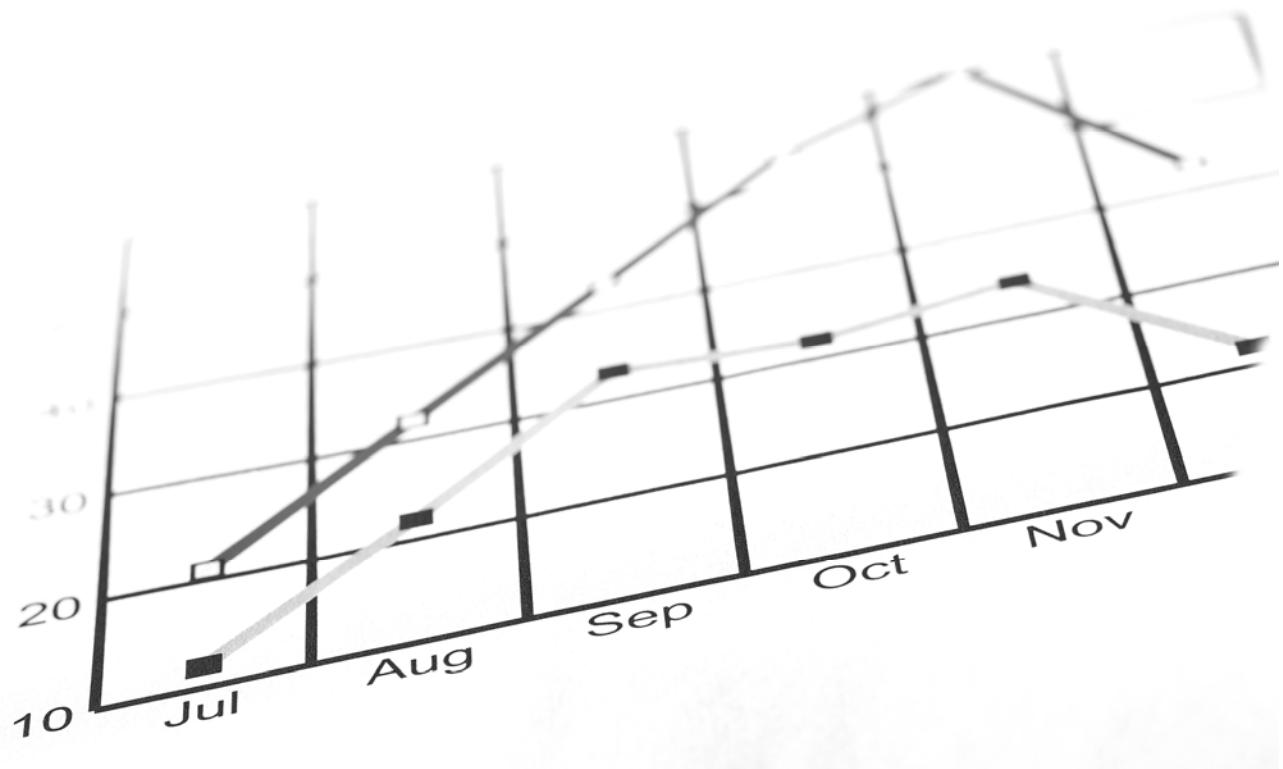
Industry Results			Your Results
Year	All Firms	Profit Leaders	
2017	\$1.38	\$1.54	
2016	\$1.29	\$1.34	

Median and Quartile Values - All Firms			
Year	Lower Quartile	Median	Upper Quartile
2017	\$1.69	\$1.20	\$0.94
2016	\$1.66	\$1.29	\$0.98

$$\text{Support Labor Efficiency Factor} = \frac{\text{Support Labor as a Percent of Value}}{\text{Direct Labor as a Percent of Value}}$$

Section 3

Meaningful Topics Relative to the Graphic Arts Industry

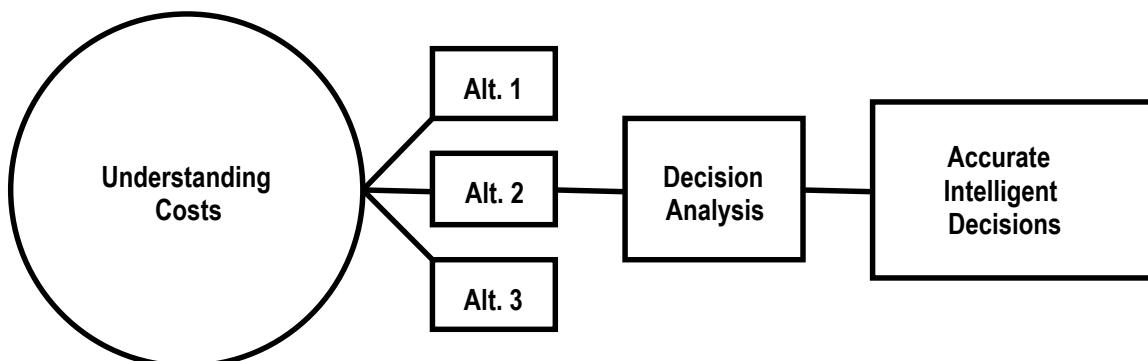


A Break-Even Angle to Cost/Volume/Profit

Costing and pricing decisions can "make or break" a printing manufacturer. The printer is constantly faced with decisions about selling prices, fixed costs, and variable costs. These decisions can be made intelligently if the printer fully understands and uses pricing techniques and cost-volume-profit relationships.

Of course, a printer cannot control some factors. Competition and market pressures will influence pricing decisions. Likewise, although costs do not determine the sales price, they do influence what that price will be. Understanding cost behavior enables the printer to make accurate predictions, thus ensuring good pricing and other financial management decisions. Using these concepts, a printer can more easily answer questions such as:

- What printing techniques are most profitable?
- Are we charging enough?
- Should we concentrate on web sales?
- Are we getting the most out of our press?
- Could we expand? Should we expand?



Cost Knowledge

Break-even analysis is the springboard to understanding cost behavior and the printer equipped with good cost knowledge will be able to manage and control expenses more efficiently. Throughout this discussion, keep in mind that printing is highly specialized and normally does not have "shelf items" to sell. In addition, we must recognize that while break-even analysis may be of more benefit to some printers than to others, all printers will be able to utilize its basic concepts in making good financial decisions. A printer may use the analysis on a job-by-job basis to determine whether to accept or reject certain jobs, or may use it to project one-year operating results for the company. Similarly, the analysis may provide good answers to other key questions.

Break-Even Point

The break-even point is the point at which sales and expenses are equal, that is, the point which the profit is zero.

Break-Even Point: **Sales Minus Expenses = \$0.00**

A printer obviously wants to do better than break-even. Break-even analysis encompasses much more than breaking even. It can determine what volume of printing must be generated and sold to reach a desired income level. It can also determine which jobs are profitable, and which are not.

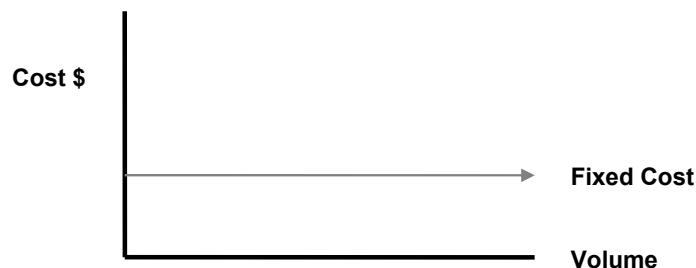
Before we discuss the break-even point further, let us consider the two terms "sales" and "costs." The term "sales" needs no explanation, the more sales the better (assuming they are profit-yielding sales). While printing sales volumes are generally on an upward trend, costs are also rising. This is the area we must understand and manage effectively in order to stay ahead.

Costs

A printing manufacturer will have many costs. Some will vary in direct proportion to the volume of printing produced. Other costs will remain relatively fixed over a period of time. Some expenses contain both variable and fixed elements. It is important for the printer to identify and segregate these costs to understand how they influence profits.

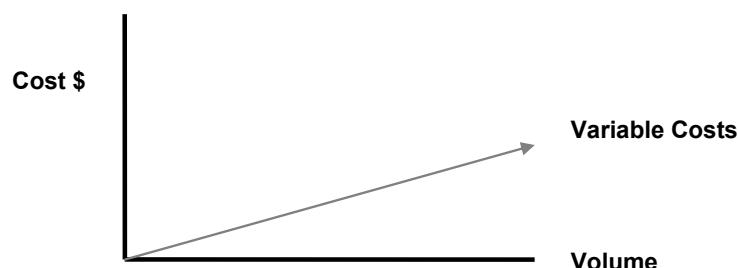
Fixed Costs

Fixed costs are expenses that remain the same regardless of the level of output over a period of time. Rent, depreciation, supervisors' salaries, and real estate taxes are just a few examples. Those fixed expenses listed in the Ratio Study section on Factory Expenses are identified and segregated. (See Ratio Supporting Schedules in the Income Statements, pages 48 and 49).



Variable Costs

Paper, ink and direct wages are examples of a printer's variable costs. As the volume of printing increases, these costs will rise proportionately.



Mixed Costs

Caution. Recognize the fact that some expenses cannot be neatly placed in the fixed or variable category. There are expenses that may vary with production at a certain point in time, but not in direct proportion. For example, one supervisor may be able to oversee the work of the press department up to a certain volume of production. If the sales volume increases appreciably, a second supervisor may have to be added to oversee the additional volume of printing.

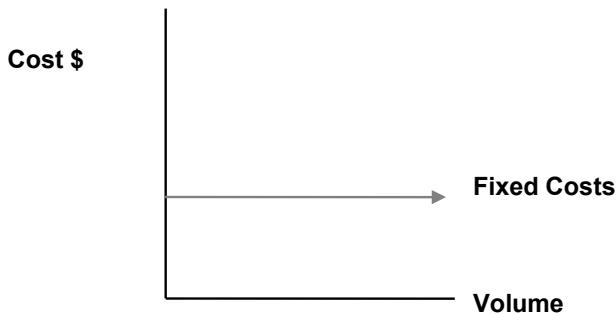
Conversely, if the volume of printing decreases, but only temporarily, there may be no need to reduce the production staff. However, if the drop in volume is considered permanent, a supervisor may have to be laid off. Therefore, in the short run, supervisory salaries are considered fixed; in the long run, they may be variable.

For this analysis, we will assume all costs can be classified clearly as fixed or variable. Normally, within a period of a year, one can accurately predict fixed and variable costs.

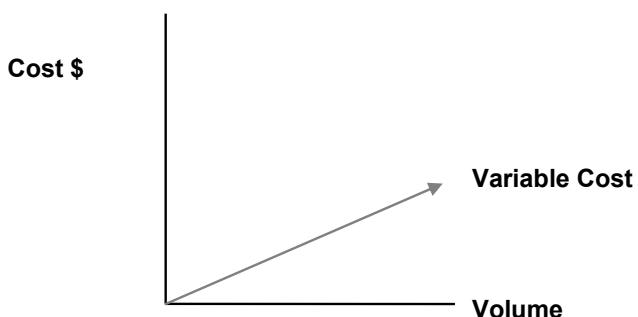
Graphing Costs and Sales

Combining fixed costs, variable costs, and the sales line on a graph emphasizes the break-even point. Graph number 4 shows that once the break-even point is reached in sales volume (fixed costs are covered), additional sales produce profits.

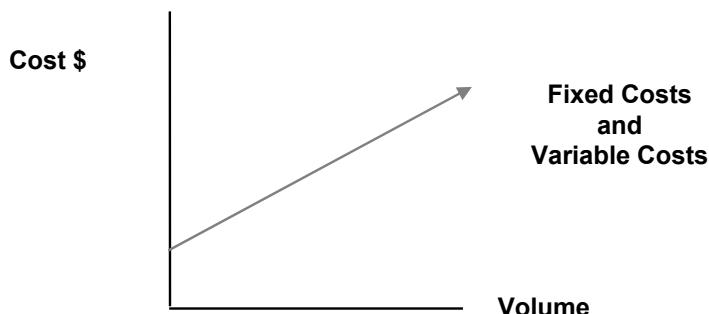
1. Fixed Costs



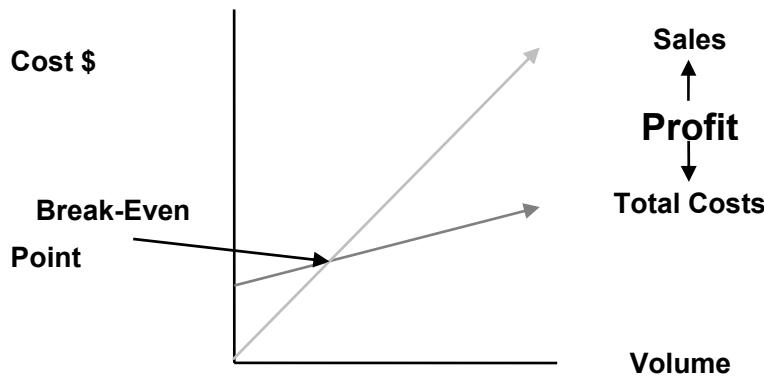
2. Variable Costs



3. Fixed and Variable Costs Combined



4. Break-Even Graph



Break-Even Analysis

How much printing must be sold to break even? What volume of printing must be sold to reach a target level of income? In printing, volume may be based on units (or thousands of units) of production, impressions per hour, dollar value of sales, or other measures. For our simple illustration, we will assume volume is based on thousands of units of production.

Printer Smith would like to know what volume of printing is needed to break even. He has segregated his fixed and variable costs for the preceding year and has estimated what they will probably be in the current year. He has found that his total fixed costs will be approximately \$500,000. His average sales price is \$250 per thousand units produced, and his variable costs are \$175 per thousand units produced.

To find Smith's break-even point, he would use the break-even point equation and let X equal the number of thousand units needed to break even.

Break-Even Equation

$$\text{Unit Sales (in thousands)} = \text{Variable Costs} + \text{Fixed Costs}$$

$$\$250X = \$175X + \$500,000$$

$$X = 6,667 \text{ Thousands of Units}$$

Therefore, Printer Smith would need to sell 6,667 thousands of units (or 6,667,000 units) of printing to break even.

Next, Printer Smith would like to know what volume of printing is needed to match the average Industry Profit Leader's income level. (Historically, Industry Profit Leaders achieve an average of 10% income before income taxes as a percentage of sales.)

The equation he will use is:

$$\text{Unit Sales (in thousands)} = \text{Variable Costs} + \text{Fixed Costs} + \text{Desired Income}$$

$$\$250X = \$175X + \$500,000 + 0.10(\$250X)$$

$$X = 10,000 \text{ Thousands of Units}$$

Therefore, if he sold 10,000,000 units, he should expect his income before income taxes to be 10% of sales.

Keep in mind that Printer Smith's break-even analysis was based on a particular set of assumptions. If his conditions change, a completely new set of cost-volume-profit relationships would appear.

Other Applications of Break-Even Analysis

Break-even analysis can also provide other helpful information, particularly in budgeting and forecasting. Printer Smith is considering a new plant layout and expansion. If he follows through with this plan, his fixed and variable costs may change considerably. To find out how much they could change, he could plot his various levels of expected production together with expected changes in his fixed and variable costs, and then analyze results at various levels of production.

He also can use the break-even approach on a job-by-job basis. Some jobs are accepted for reasons other than profit. These reasons might include filling in slack press time with a no-profit or low-profit job (bringing in cash for fixed expenses). Yet, to predict exactly how much income a particular job is adding to profits, the break-even analysis is very enlightening.

Strategies for Better Costing and Pricing

Economic conditions in recent years have forced business managers to seize tighter control of their costing and pricing strategies. Even though industry trends show that large printers have been relatively unaffected by recessionary pressures, the majority of small to medium printing firms are not as fortunate. These firms are ravaged by both inflationary and recessionary elements. The time is right for printing managers to employ updated costing and pricing strategies.

Replacement Costs

The average printer is spending approximately 35% of sales on materials. Printers cannot use yesterday's costs to determine today's pricing. While this simple statement may sound obvious, the fact remains that the majority of printers calculate prices based on outdated costs.

With costs continually changing, printers must be ready to update their costing and pricing systems. Furthermore, to price jobs profitably they must be able to anticipate what cost increases will be. That is the problem. Determining exact numbers for these costing components is difficult.

The NIFO (Next-In, First-Out) method for materials costing ensures that a printing firm's costs for a job will be reported to allow adequate funds to replace the goods used to produce the work.

Using the NIFO method, if you were to cost a job that required paper purchased at 46 cents per pound, and plates at \$7.25, you would look ahead to what the replacement cost of these materials will be before you cost and price the work. If today's prices indicate that paper has jumped to 52 cents, and plates to \$8.60, these are the figures you would use to calculate both your costs and your final price.

Pricing and Costing Using Replacement Values		
	Original Purchase Price	Current Price to Replace
Paper	\$ 0.46 /lb.	\$ 0.52 /lb.
Plates	\$ 7.25	\$ 8.60

According to NIFO, you cost and price at:

Paper	Plates
\$ 0.52 /lb.	\$ 8.60

Keep in mind that the purpose of your cost and accounting system is to give you a clear picture of the ongoing financial operations of your business. The more accurate this picture is, the more intelligently you can price your printed product. Any system that does not provide for the replacement of materials and supplies will dig directly into your profit on that job.

Updated Hourly Cost Rates

Hourly cost rates are another factor with tremendous impact on costing and pricing. Production cost calculations must be re-examined at increasingly close intervals as the cost of doing business climbs.

Since the basis for accurate budgeted hourly rates is an analysis of current operating expenses and anticipating increased expenses, these rates must be reviewed continually to make sure they are profitable, competitive and are producing an acceptable income and return on investment.

Increased Productivity

Printers must continuously find ways to maintain a competitive edge. They should take a close look at their levels of productivity. Improved productivity will lower the cost per unit and thus permit pricing to remain at competitive levels. Innovations are available in both management and technology that can give a big boost to productivity. Printers who do not keep pace with these innovations may well find that higher costs are driving them out of the competition; sending their customers to a printer who can offer better prices.

If your cost per hour of production is, for example, \$40.00 and you produce 5,000 units per hour, your costs are \$8.00 for each 1,000 units. With advances in technology, it may be possible to lower the cost per unit and gain a competitive edge in the market. A \$1 per thousand decrease in costs may make the difference between gaining and losing a big sale.

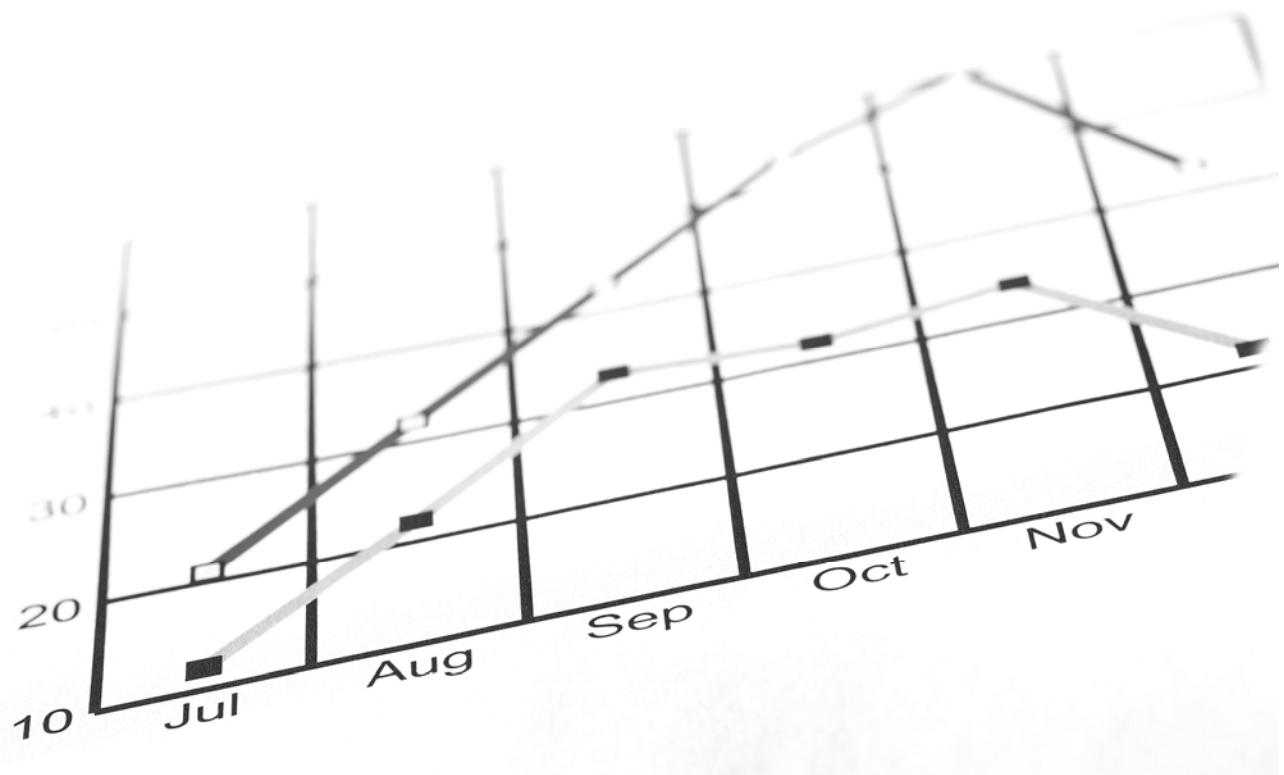
Units produced can be improved. It is a rare printer who can honestly say he cannot increase units produced per hour. For example, are your presses turning at full rated speed? A boost of 714 units produced per hour would lower the cost per unit to \$7 per thousand. Even though this 14% increase might not be fully achieved, it is remarkable just how much productivity can be improved if you set your goal and keep to it. **Increased Productivity Keeps Cost Per Unit Down.**

	Cost Per Hour \$	Units Produced (per Hour)	Cost per Unit (\$ per M)
Base	\$40.00	5,000	\$8.00
714 Units Per Hour Increase	\$40.00	5,714	\$7.00

It may be necessary to buy new equipment to implement this increase in units produced per hour. Alternatively, a production improvement program or merely an investment in higher quality materials may be sufficient. Often an increase in productivity can be affected without any added capital.

The profitable practices of today may be the loss operations of tomorrow. Printers must be ready to investigate all avenues that might lead to increased productivity. By doing so, they will be better prepared to maintain their customer base and possibly gain a larger share of the market. Tight controls must be maintained in all aspects of the business to help keep costs in line. Accounting systems must insure that all costs are reported, and that costs and prices are geared to insure a healthy continuing operation. If these practices are followed enthusiastically, printing firms should be able to compete effectively and achieve higher levels of profitability.

Resources



Ratios Resources

Customized Financial Analysis (CFA)

Your financials compared to the industry ratios in your own specialized booklet.

Ratios Volumes

Volume 1 Management Guide to the Dynamic Ratios

Volume 2 All Printers by Sales Volume and Geographic Area

Volume 3 All Printers by Product Specialty

Volume 4 Sheetfed Printers by Sales Volume and Geographic Area

Volume 5 Web Offset Printers and Combination Offset Web/Sheetfed Printers

Volume 6 Printers with Sales over \$22,000,000

Volume 7 Printers with Sales under \$4,000,000

Volume 8 Digital Printers

Volume 9 Commercial and Advertising Printers



Printing Industries of America, along with its affiliates, deliver products and services that enhance the growth, efficiency, and profitability of its members and the industry through advocacy, education, research, and technical information.

Printing Industries of America developed from the 1999 consolidation of the Graphic Arts Technical Foundation (GATF), founded in 1924, and Printing Industries of America (PIA), founded in 1887. This consolidation brought together two powerful partners: the world's largest graphic arts trade association representing an industry with more than 881,000 employees and \$165 billion in sales and a nonprofit, technical, scientific, and educational organization dedicated to the advancement of the graphic communications industries worldwide.

Printing Industries of America's staff of researchers, educators, and technical specialists helps members in more than 80 countries maintain their competitive edge by increasing productivity, print quality, process control, and environmental compliance and by implementing new techniques and technologies.

In addition to striving to advance a global graphic communications community through conferences, internet symposia, workshops, consulting, technical support, laboratory services, and publications, Printing Industries of America promotes programs, services, and an environment that helps its members operate profitably.

Many of Printing Industries' members are commercial printers, allied graphic arts firms such as electronic imaging companies, equipment manufacturers, and suppliers. Its special industry groups, sections, and councils were developed to serve the unique needs of specific segments of the print and graphic communications industries and provide members with current information on their specific segment, helping them to meet the business challenges of a constantly changing environment. These groups focus on web offset printing, label printing, binding, financial executives, sales and marketing executives, and digital printing.

Printing Industries Press publishes books on nearly every aspect of the field; training curricula; audiovisuals and CD-ROMs; and research and technology reports. It also publishes *Printing Industries of America: The Magazine*, providing articles on industry technologies, trends, business management practices, economics, benchmarks, forecasts, legislative and regulatory affairs, human and industrial relations issues, sales, marketing, customer service techniques, and management resources. The magazine represents the consolidation of *GATFWorld* and *Management Portfolio*, formerly bi-monthly publications of the Association.

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2017-2018



Vol. I

Management Guide to the Dynamic Ratios

The *Dynamic Ratios* are the industry's premier benchmarking tool for measuring individual company financial performance against industry averages and profit leaders. **Volume I** provides standards for the analysis and use of ratios. In addition, it explains how to analyze financial statements and relationships while discussing the importance of financial trends.



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