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An Examination of the Correlation Between Financial Ratio Analysis and Stock Price

Janet S. Hawn

AN EXAMINATION OF THE CORRELATION BETWEEN FINANCIAL RATIO ANALYSIS AND STOCK PRICE

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An Abstract Presented to the Faculty of the Graduate
School of Lindenwood College in Partial
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ABSTRACT

This thesis will focus on the study of financial ratio analysis and its correlation to stock prices.

Research has used various methods to determine the value of a stock. Examples of these stock valuation models include the Capital Asset Pricing Model (CAPM), the dividend discount model, and the free cash flows and the free cash flows to equity models.

The purpose of this study is to analyze the relationship between financial ratio analysis and stock prices and to explore the possibility that financial ratio analysis has a value in determining the price of a stock. Both financial data and general information from three different companies in four different industries are presented and analyzed. The industries include energy, consumer cyclical products, consumer non-cyclical products, and technology. Four companies from each of these industries are included. Under the category of energy, the three companies included were Chevron Corporation, Exxon Corporation and Texaco Incorporated. The four consumer cyclical products

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companies included Ford Motor Company, Wal-Mart Stores, Inc. and Nike, Incorporated. Under the category of consumer non-cyclical products, The Coca-Cola Company, McDonald's Corporation, and Pepsico, Incorporated were included. Finally, the technology industry companies studied included Compaq Computer Corporation, Intel Corporation and Microsoft Corporation.

Results of this study indicated that there is significant evidence to suggest that the hypotheses could not be supported and to conclude that, within the sample pool, financial ratio analysis has little relationship to stock prices.

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Chapter I

INTRODUCTION

Historical Perspective

Financial ratio analysis refers to analyzing individual corporate financial statements (that is, those statements which present the financial position and operating results of a corporation) and examining the relationship between various financial statement accounts (Brigham 866-874). Financial ratios are divided into five different types (liquidity, asset management, debt management, profitability, and market value).

Financial ratio analysis has its basis, therefore, in financial reporting. Historically, financial reporting changed significantly during the period 1900 through 1933. As Hawkins points out:

> As late as 1900, the amount of financial information presented to stockholders by the managers of most publicly owned American manufacturing corporations was meager. After 1900, the level and frequency of corporate financial disclosure by industrial management began to rise slowly and the credibility of its representations began to improve. (16)

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Hawkins further indicates that there was a demand for fuller financial disclosure by critics of big business, as well as the public, but that management generally ignored these comments during the pre-World War I era (21). The New York Stock Exchange (NYSE) demanded some form of an annual financial report as early as 1869 and the Investment Bankers Association of America sought voluntary standardized financial information between 1920 and 1927, but few companies complied (Hawkins 22-24).

The Securities Act of 1933 and the Securities Exchange Act of 1934 placed requirements on publicly-held companies to file official statements of a standardized format (DiVittorio 24). These public, standardized statements allowed greater ease of analysis not only for potential investors, but many other interested parties as well. The Securities Act of 1934 moved the authority to administer the 1933 version from the Federal Trade Commission to the Securities and Exchange Commission (SEC) who was given the authority to prescribe accounting practices. As Hawkins points out:

> In line with its power to prescribe
> accounting practices, the SEC quickly

standardized the format of required
financial statements it received. More
important, the Commission issued, from
time to time, a number of opinions on
accounting principles to encourage the
development of uniform standards and
practices in major accounting questions.
Today, the reports filed by corporations
with the Securities and Exchange Commission
and the national stock exchanges are
perhaps the most comprehensive, reliable,
and detailed financial statement available
publicly anywhere in the world. (31-32)

Thus, over time, these publicized statements

became a source of information for investors and other

analysts. Chartered financial analysts (CFA) became a

profession during the last several decades. According

to Graham, "an important step was taken in 1963 toward

giving professional standing and responsibility to

financial analysts" (138). Graham goes on to say:

The official title of chartered financial
analyst (CFA) is now awarded to those
senior practitioners who pass required
examinations and meet other tests of fitness.
The subjects covered include security analysis
and portfolio management. The analogy with
the long-established professional title of
certified public accountant (CPA) is evident
and intentional. (138)

According to Graham, by 1973, financial analysis had

become a well-established profession. The National

Federation of Financial Analysts had over 13,000

members by that time.   (145)

Financial ratio analysis, or the analysis of various relationships between financial statement accounts, has historically been used for a number of purposes.   Gardiner points out that, "ratio analysis is universally recognized as a powerful tool" (32). DiVittorio points out that:

> The ways in which financial statements
> are used vary as widely as the goals of
> those who use them, from simply trying
> to better understand a firm's operations
> to predicting future performance. Analysts
> often calculate ratios that help them make
> sense of a single financial statement or
> understand the relationship between the
> financial statements. They then compare
> these ratios to standards or benchmarks. (30)

One of purposes of financial ratio analysis is to provide information to the investing public.   Users include private investors, corporate financiers, investment advisors and banks, creditors, other companies, and managers and executives within the companies themselves.

Prior to making investment decisions, investors want to be as informed as possible so as to maximize their potential return.   In order to make decisions regarding a potential takeover of a company, a

financier needs the most complete information available in order to make that decision. Investment advisors and banks are interested in the financial position of companies so that they know who might be their potential clients, that is, which ones have money to invest. Prior to lending capital or to check on the safety of existing loans, creditors need to analyze the financial statements of customers. Companies who are contemplating doing business with other companies are also interested in financial ratio analysis. The financial status of a company might determine whether or not they actually do business with another company. Management and executives of companies themselves are also interested in financial ratio analysis. According to Brigham and Gapenski, some executives believe that managements' primary objective is shareholder wealth maximization while others believe that management must respond to all stakeholders (3-4). Therefore, it is particularly important for top executives to understand financial statements and financial ratio analysis.

Various studies have been done using financial ratios. Some studies, for example, have been used to predict bankruptcies. Shim used a "Z-score" model (or the "Z-test") to predict the likelihood of a company's

future bankruptcy. A "Z-test" is a statistical

technique used to test differences when observed

statistics are proportions (Zikmund 508). This

information, according to Shim, is useful when

companies are considering potential mergers. He stated

that:

> The "Z" score offers an excellent measure
> for predicting a firm's insolvency. But,
> like any other tool, one must use it with
> care and skill. The "Z" score of a firm
> should be looked upon not of just one or
> two years but of number of years. Also,
> it should not be used as a sole basis of
> evaluation. (23)

Further, Shim states that:

> The "Z" score can also be used to compare
> the economic health of different firms.
> Here again extreme care should be exercised.
> Firms to be compared must belong to the
> same market. Also, "Z" scores of the same
> period are to be compared. (23)

Shim used the following table on a company known as
Navistar International to illustrate his point on the
use of "Z" scores and predicting bankruptcy:

Table 1

Z Score of Navistar International

Year	Balance Sheet				Income Statement				Stock Data
	Current Assets	Total Assets	Current Liability	Total Liability	Retained Earnings	Working Capital	SALES	EBIT	Market Value or Net Worth
	CA	TA	CL	TL	RE	WC	SALES	EBIT	MRKT-NW
1979	3266	5247	1873	3048	1505	1393	8426	719	1122
1980	3427	5843	2433	3947	1024	994	6000	-402	1147
1981	2672	5346	1808	3864	600	864	7018	-16	376
1982	1656	3699	1135	3665	-1078	521	4322	-1274	151
1983	1388	3362	1367	3119	-1487	21	3600	-231	835
1984	1412	3249	1257	2947	-1537	155	4861	120	575
1985	1101	2406	988	2364	-1894	113	3508	247	570
1986	698	1925	797	1809	-1889	-99	3357	163	441
1987	785	1902	836	1259	-1743	-51	3530	219	1011
1988	1280	4037	1126	1580	150	154	4082	451	1016
1989	986	3609	761	1257	175	225	4241	303	1269
1990	2663	3795	1579	2980	81	1084	3854	111	563

Calculations					Misc Graph Values			
WC/ TA	RE/ TA	EBIT/ TA	MKT-NW/ TA	SALES/ TA	Z Score	TOP GRAY	BOTTOM GREY	Year
X1	X2	X3	X4	X5	A	B	C	X
0.266	0.2868	0.137	0.3681	1.6059	3.00	2.99	1.81	1979
0.17	0.1753	-0.069	0.2906	1.0269	1.42	2.99	1.81	1980
0.162	0.1122	-0.003	0.0973	1.3128	1.71	2.99	1.81	1981
0.141	-0.2914	-0.344	0.0412	1.1684	(0.18)	2.99	1.81	1982
0.006	-0.4423	-0.069	0.2677	1.0708	0.39	2.99	1.81	1983
0.048	-0.4731	0.0369	0.1951	1.4962	1.13	2.99	1.81	1984
0.047	-0.7872	0.1027	0.2411	1.458	0.89	2.99	1.81	1985
-0.05	-0.9813	0.0847	0.2438	1.7439	0.73	2.99	1.81	1986
-0.03	-0.9164	0.1151	0.803	1.8559	1.40	2.99	1.81	1987
0.038	0.0372	0.1117	0.643	1.0111	1.86	2.99	1.81	1988
0.062	0.0485	0.084	1.0095	1.1751	2.20	2.99	1.81	1989
0.029	0.0213	0.0292	0.1889	1.0155	1.60	2.99	1.81	1990

Note: (a) To calculate "Z" score for private firms, etnere Net Worth in the MKT-NW column. (For public-held companies, enter Market Value of Equity).

(b) EBIT = Earnings before Interest and Taxes

Z Score	Probability of Failure
1.8 or less	Very high
1.81 - 2.99	Not sure
3.0 or higher	Unlikely

Source: Shim, The Journal of Business Forecasting. Exhibit from "Forecasting Corporate Bankruptcy," by Jae K. Shim (Spring 1992).

Shivaswamy and Hoban used financial ratio analysis in the banking and commercial lending industry to identify meaningful ratios for retailers and manufacturers and to determine if different ratios are more useful for retail and manufacturing firms. The analysis of variance (ANOVA) test is a bivariate statistical analysis of variance used in comparing two or more groups or populations. It is also referred to as "one-way" because there is only one independent variable (Zikmund 510). Shivaswamy and Hoban used ANOVA to test for industry effect and concluded that some ratios were, in fact, more important to bankers in the retail industry and others were more important in the manufacturing industry (23).

Financial ratio analysis has become more simple to conduct with computerization. Zuckerman makes the point that:

> With desktop or even portable technology advancements, it is a relatively easy and quick process for an individual to automate the analysis of financial statements. It is possible to take what you are manually doing now and have a computer perform the task of calculating pertinent relationships. If you are uncomfortable customizing and working with this technology, there are plenty of excellent, inexpensive software products available for purchase. (33)

The advent of computers and their extensive use in financial ratio analysis appears to have changed the emphasis in management accounting education as well. As Siegel and Kulesza point out:

Due in part to the development of electronic spreadsheets, faster computers, and smarter software, the traditional orientation of accounting education that characterized most colleges and universities fell out of step with the realities of the workplace. Beginning in the early 1980s, at the dawn of practical desktop computers, CPA firms no longer needed to hire huge numbers of entry-level accountants to produce worksheets and to add and cross-foot numbers. Computers could perform those tasks in the blink of an eye...Consequently, public accounting practitioners began to press for educational change. They asked for more broadly educated entry-level accountants...Now, in many leading-edge companies accountants are sought out as facilitators in decision making. Their input is prized for a breath of perspective that is based on a broad, comprehensive understanding of business... The time-honored role of the accountant-- to serve as historical reporter, extra eyes on the assets, and custodian of information-- is no longer enough. The new milieu essentially has liberated the accountant from the narrow range of mechanical accounting skills that have been taken over by the computer. Corporations realized that for accountants to "add value" in the new corporate environment, they would have to put their skills to different use. Management accountants must be able to use that freed-up time for analysis and decision making. (43-44)

Current Perspective

Various financial ratios will be more important to
one user than another depending upon the purpose of the
user. Some argue that a relatively few ratios
determine a great deal. Kristy believes that the key
ratios are the current ratio, quick ratio, liquidity
ratio, equity/debt ratio, and return on equity ratio
(14). Each of these ratios will be discussed in
greater detail below.

Some argue that some of the traditional ratios do
not provide all of the necessary information. Dennis
points out that:

> Traditional measures of short-term solvency
> such as the current ratio and the quick ratio
> do not necessarily provide comprehensive
> measure of a company's ability to retire its
> debts as they come due. Why? Because
> certain current assets (including accounts
> receivable and inventory) may not readily be
> converted into cash. (41)

For purposes of this research, the full range of
financial statement analysis ratios, as identified by
Brigham and Gapenski, will be included (865-913). As
previously stated, financial ratios are divided into
four categories--liquidity, asset management, debt
management, profitability, and market value.

The first liquidity ratio is that of current ratio. The current ratio of a company is its current assets divided by its current liabilities. Kristy refers to the current ratio as "the granddaddy of financial ratios [because it] is a basic measure of liquidity" (14). Current assets include cash, short-term investments, accounts receivable, and inventories. Current liabilities include accounts payable, short-term debt, accrued expenses and any long-term debt maturing in the current period.

The current ratio is indicative of a company's ability to meet it short-term debt obligations through the use of its current assets. Therefore, it is also indicative of the firm's solvency. A high current ratio is better than a low ratio, which could indicate that a firm cannot meet its obligations. Another way to analyze the firm's current assets and liabilities is to look at its net working capital or current assets less current liabilities.

The second liquidity ratio is that of the quick (or acid test) ratio. The quick ratio is determined by subtracting inventories from current assets and dividing the balance by current liabilities.

The quick ratio further determines the liquidity

of a firm since inventories are the least liquid asset of a company. As such, removing them from the equation reveals a more accurate picture of a company's ability to pay off short-term liabilities. In addition, if a company were liquidated, the inventories are the most likely assets from which there would be losses.

Under the category of asset management, inventory turnover is the first ratio. The inventory turnover ratio is calculated by dividing sales by inventory.

The intent of the inventory turnover ratio is to provide an idea as to how often a company's inventory is sold out and restocked. A good inventory turnover ratio would indicate that a company is not carrying an excess stock. A low inventory turnover ratio would indicate that a company might be holding damaged or obsolete inventory.

The second asset management ratio is days sales outstanding (DSO). DSO (also called the average collection period) is calculated by dividing receivables by average sales per day. Average sales per day is calculated by dividing the total sales by 360. A lower DSO will indicate better collection of accounts receivable, while a high DSO might be a sign of poor collection procedures or credit policies.

The purpose of the DSO ratio is to gauge the accounts receivable of a company. DSO basically measures the length of time a company must wait in order to receive cash after it receives a sale.

The third asset management ratio is fixed asset turnover (also known as the fixed asset utilization ratio). Fixed asset turnover is calculated by dividing sales by fixed assets.

The purpose of the fixed asset turnover ratio is to measure the application of plant and equipment. Fixed asset turnover indicates whether or not a company uses its fixed assets at capacity. A high fixed asset turnover ratio, in comparison to other companies in the industry, indicates better usage of plant and equipment. A lower fixed asset turnover ratio indicates poorer usage of plant and equipment.

The fourth ratio under the category of asset management is the total asset turnover ratio. Total asset turnover is measured by dividing sales by total assets. Like fixed asset turnover, total asset turnover measures a company's use of its assets. In this case, the use of the company's total assets is measured. A high ratio indicates greater usage of assets. A low ratio indicates a lesser usage of total

assets. As Malburg points out:

> It makes no sense holding assets that
> don't help the company make money.
> The asset turnover ratio shows how many
> times a year sales replaces assets. We
> want this number to be as large as
> possible. The larger the turnover, the
> leaner and meaner is the company. (155-
> 156)

The first ratio under the category of debt
management is total debt to total assets (D/A). Total
debt to total assets, as its name implies, is
calculated by dividing total debt by total assets.
Total debt to total assets identifies the amount of
funding which has been borrowed to finance assets.

The lower the debt to total assets ratio, the
better opportunity to borrow additional funds and the
more confidence the creditors will have in the company.
The lower this ratio (if the owners supply more of the
capital to increase earnings, thus diluting some of
their control), the higher the equity in the company.

The second debt management ratio is times interest
earned (TIE). Times interest earned is calculated by
dividing earnings before interest and taxes by interest
charges. Times interest earned is indicative of the
number of times that income could be reduced and the

company would still be able to cover its expense annually. Earnings before interest is used in this case because interest is deductible and is, therefore, not subject to taxes.

A low times interest earned ratio could indicate that a company cannot meet its interest expense. Therefore, there is little "cushion" and creditors would be unlikely to loan the company any additional funds. Gardiner points out that profitability ratios are amongst the best known financial statistics. (32)

The first profitability ratio is that of the profit margin on sales ratio (also known as the profit margin). Profit margin on sales is calculated by dividing net income after preferred dividends (that is, net income available to common stockholders) by sales. This gives an indication of the profit for each dollar of sales.

The higher the profit margin on sales, the better position the company is in. A lower profit margin will indicate that either the company's costs are high, the sales prices are low, or that both costs are high and prices low.

The second profitability ratio is that of basic earning power. Basic earning power is calculated by

dividing earnings before interest and taxes by total assets. Basic earnings power is indicative of a company's ability to maximize its earnings with available assets.

A low basic earnings power would indicate that a company is, therefore, getting little return for its assets. A higher basic earnings power ratio would indicate that a company is maximizing its earnings potential given its assets.

The third profitability ratio is that of return on assets (also known as ROA). Return on assets is calculated by dividing net income available to common stockholders by the total assets.

The fourth profitability ratio is that of return on equity (also known as ROE or the rate of return on stockholders' investment). The return on equity ratio is calculated by dividing net income available to stockholders by common equity. This ratio is a measure of the return of investment to the owners. Therefore, the higher the rate of return to the owners, the better the investment for stockholders.

The first market value ratio is that of price/earnings. The price/earnings ratio is, as its name implies, the price per share divided by the

earnings per share. The price/earnings ratio is typically higher for a high growth company, but lower for a risky company. The price/earnings ratio is an indication of the amount investors are willing to pay for the stock of a particular company. Drake and Peavy conclude, in their analysis of a company known as MiniScribe Corporation, that "fundamental securities analysis is a useful tool for evaluating stock value." (69)

The market/book ratio is yet another measure of what investors are willing to pay for stock in a particular company. The higher the rate of return on equity, the higher the book value. A summary chart displaying the ratios by type is illustrated in Table 2 below.

Table 2

Summary of Financial Ratios

Liquidity	Current
	Quick, or acid test
Asset Management	Inventory turnover
	Days sales outstanding (DSO)
	Fixed asset turnover
	Total asset turnover
Debt Management	Debt to total assets (D/A)
	Times interest earned (TIE)
Profitability	Profit margin on sales
	Basic earning power (BEP)
	Return on assets (ROA)
	Return on equity (ROE)
Market Value	Price/earnings (P/E)
	Market/book (M/B)

Source: Brigham, Eugene E., and Gapenski, Louis C. Financial Management Theory and Practive. Orlando: The Dryden Press, Table 22-5.

Statement of Purpose

As noted earlier, investors want to be informed prior to making investment decisions, that is, purchasing stock. Also, as noted above, management and executives of companies are interested in shareholder wealth maximization and, as a result, need to follow the stock prices of their own companies. Hence, these parties might be well served by knowing whether or not there is a correlation between financial ratio analysis and stock prices.

The purpose of this project is to analyze the

relationship between financial ratio analysis and stock prices. Data will be analyzed from two different perspectives. First, since one of the goals of management is to increase stockholder wealth, data will be analyzed to determine if, in fact, a relationship between financial ratios (or particular financial ratios) and stock prices exists. As McMahon and Davies state:

> Based on the prescriptive literature, the expectation is that comprehensive financial reporting and insightful financial analysis should generally lead to improved financial control. On the other hand, given the complex dynamics of enterprise growth, it may be unrealistic to expect that superior historical financial reporting and analysis practices will stand out as correlates with success. (15)

Secondly, the relationship between financial ratios and stock prices will be studied to see if this analysis does indeed hold any benefits to investors. As Kane points out:

> Fundamental financial ratios appear to contain unique information about how stocks perform in recession-associated bear markets. (42)

Kane highlights a study by Johnson in which he

noted the following:

> Market responses to earnings
> announcements have been shown to vary
> across the business cycle. Financial
> ratios also appear to be acutely
> sensitive to business downturns...a
> number of accounting-based ratios were
> found to be much better predictors of
> stock returns during business downturns.
> (42).

Both financial data and general information from three different companies in four different industries will be presented and analyzed. Actual financial ratio analysis, which will include the areas of liquidity, asset management, debt management, profitability, and market value, will be conducted on the data from these companies. Finally, the data will be analyzed to determine if the company's stock price over the same period of time has any correlation to the financial ratio analysis or any specific financial analysis ratios. As Winicur points out:

> It is clear that one year's data on a
> firm is less useful than two and the
> availability of several years of
> data...add enormously to our ability
> to evaluate a firm. We must be careful,
> however, not to view this data in
> isolation. It is important to evaluate
> any company within its operating
> environment, whether that environment
> is the world economy or the local one,

a particular industry or a level of
government regulation. The data should
be compared to other firms, other years,
and any available "norms." With this
larger view (and an appreciation of the
fact that no method of analysis is
foolproof), the accountant can be more
fully prepared to make careful, informed
business decisions or to assist a client
in such decisions. (8)

Chapter II

LITERATURE REVIEW

The valuation of a company's stock and management's ability to have an impact on the stock price is of great importance.

> Indeed, since all important corporate decisions should be analyzed in terms of how they will affect the price of the firm's stock, it is essential that managers know how stock prices are determined. (Brigham and Gapenski, 214)

As noted by Brigham and Gapenski, managers have a vested interested in knowing how their decisions will affect the price of the firm's stock. There have been numerous stock valuation models over the years. Several of the major models will be described in detail in this chapter.

Valuation of Stocks

Stock prices for any two companies in the same industry can react dramatically different under the same set of circumstances. For example, as interest rates rise, the price of the stock of one company may

also rise. For another company, the price may fall.
This may hold true even if both companies are of
similar sizes or even if they have similar ratios.
Each company has a different sensitivity toward
interest rates and earnings estimates.

This chapter will describe various stock valuation
methods. The primary stock valuation models attempt to
explain these sensitivities.

The major stock valuation models are used to
obtain a value per share for each stock. This
information, as noted above, is useful not only to
investors, but to managers of corporations as well.

Preceding a description of the stock valuation
models, it is necessary to define a few terms.

> Money has a "time value." A dollar
> now is worth more than a dollar a
> year from now, since we could put the
> dollar now in a bank at 5 percent
> interest and have $1.05 in a year. For
> different securities, future benefits
> may be received at different times.
> Even when the amount of future payment
> is the same, differences in the speed of
> their receipt may create differences in
> value. The time value of money suggests
> that earlier receipts are more desirable
> than later receipts, even when both are
> equal in amount and certainty, because
> earlier receipts can be reinvested to
> generate additional returns before later
> receipts come in. The force operating

is the principle of compound interest.
(Fischer, 73)

The value of a stock, therefore, is based on the
cash flows one expects to receive each year in the
future, discounted at some discount rate for those
years, using the theory of the time value of money.

The basic model of the time value of money is
shown in Illustration 1.

Illustration 1

Time Value of Money

$$V_0 = \sum_{t=1}^{t=n} \frac{C_t}{(1+R_t)^t}$$

Source: Online, www.stocksense.com/valuation.html

In this equation, V_0 is the present value of the asset,
t is time, n is the number of years or periods of cash
flow, C is the expected cash flows, and R is the
discount rate or required rate of return for each
period. According to Brigham and Gapenski:

All such assets are valued in

essentially the same way: (1) The
cash flow stream must be estimated;
this involves finding both the expected
cash flow for each period and the
riskiness of that cash flow. (2) The
required rate of return for each cash
flow is established on the basis of its
riskiness and the returns available
on other investments; these rates could
be constant over time, or different
rates might be required for each cash
flow. (3) Each cash flow is discounted
by its required rate of return.
(4) Finally, these present values are
summed to find the value of the asset…
note that the basic valuation model can
be applied to physical assets as well as
to securities…[including] common stock,
which represents ownership and which has
a residual claim to all income and assets
after the claims of debtholders and
preferred stockholders have been
satisfied. (214-215)

Future expected cash flows must be discounted to obtain

a present value for the price of the stock. Brigham and

Gapenski state that, "…of all the techniques used in

finance, none is more important than the concept of

discounted cash flow, often called the time value of

money"(172). In simple terms, $100,000 received ten

years into the future is worth less today because of

inflation, supply and demand, and risk. Risk decreases

as the period of time decreases. Bauman, author of

Estimating the Present Value of Common Stocks By the

Variable Rate Method, notes that:

The present value concept is not new to the field of finance. It has long been an important tool in capital budgeting decisions ...nor is the concept new to the field of investment, having been used for some time for payments...which provide prices and yield rates to maturity. The present value theory simply states that the present worth, sometimes referred to as the intrinsic value, of a given investment, or stock, is equal to its future cash income, or dividends discounted at an appropriate yield rate or rates. (1-2)

Table 3 shows the present value of $1 received at a future point in time.

Table 3

Present Value of $1 Due at the End of N Periods

Years (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	15%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.870
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.756
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.658
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.572
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.497
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.432
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.376
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.327
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.284
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.247
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.215
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.187
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.163
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.141
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.123
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.107
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.093
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.081
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.070
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.061
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.030
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.015

Source: Fischer, D. E. and R. J. Jordan. Security Analysis and Portfolio Management. 6th ed. Englewood Cliffs, N. J.: Prentice Hall, 1995, Table 4-3.

In order to estimate the present value of a stock,
it is necessary to estimate future dividends which will
be generated by a particular stock and to select a
discount rate (or rates) most appropriate to the
particular stock. According to Bauman, the discount
rate is the rate of return the investor expects to
obtain on an investment if he invests an amount equal
to the investment's present value (2). Bauman notes
that:

> For very high quality stocks, the
> discount rate should be low; that is,
> if the estimated future income is fairly
> certain to be received, the investor
> should be satisfied with a modest rate
> of return. Likewise, for very speculative
> stocks, the discount rate should be high;
> that is, if the estimated income is
> subject to a high degree of uncertainty,
> the investor should seek a large potential
> rate of return. (10)

As noted above, the discount rate an investor
expects to earn depends on the inflation rate, the
impact of supply and demand on a stock, and the risk
involved. Inflation is measured by the government.
Supply and demand are determined by the market. If
there is a large enough number of shares of stock

available, no one can influence the price. Investors

buy and sell freely in this type of market. The

discount rate, according to Lorie and Hamilton, authors

of The Stock Market: Theories and Evidence, is the

risk-free rate plus some risk premium (127). The risk-

free rate is described in more detail below.

Brigham and Gapenski identify real and nomimal

risk-free rates. They describe the *real* risk-free rate

as:

> …the interest rate that would exist on a
> riskless security if no inflation were
> expected…it may be thought of as the rate
> of interest that would exist on short-
> term U.S. treasury securities in an
> inflation-free world. The real risk-
> free rate is not static--it changes over
> time depending on economic conditions,
> especially (1) on the rate of return
> corporations and other borrowers can
> expect to earn on productive assets and
> (2) on people's time preferences for
> current versus future consumption. (79)

Brigham and Gapenski define the nominal risk-free rate

of interest as:

> …the real risk-free rate plus a premium
> for expected inflation. To be strictly
> correct, the risk-free rate should mean
> the interest rate on a totally risk-free
> security—one that has no risk of default,
> no maturity risk, no liquidity risk, and
> no risk of loss if inflation increases.

There is no security, and hence there is
no observable truly risk-free rate.
However, there is one security that is
free of most risks—a U.S. Treasury bill
(T-bill), which is a short-term security
issued by the U.S. government. Treasury
bonds (T-bonds), which are longer-term
government securities, are free of default
and liquidity risks but T-bonds are
exposed to some risk due to changes in the
general level of interest rates. (79)

Defining the risk-free rate as the current yield on a

government bond is based on the premise that it is

unlikely that the government would default on its

bonds. Therefore, in relative terms, it is free of

risk.

Finding the risk-free rate for stocks, unlike

bonds, is more complex. There are three primary

methods for valuing stocks. The three methods are the

Capital Asset Pricing Model (CAPM), the dividend

discount model, and the free cash flows and the free

cash flows to equity models. All three of these

methods are described in detail below.

One of the more prevalent models is the Capital

Asset Pricing Model (CAPM). According to T.E. Copeland

and J.F. Weston, CAPM is based on the assumptions shown

in Table 4.

Table 4

Assumptions of CAPM

1	Investors are risk-averse individuals who maximize the expected utility of the end-of period wealth.
2	Investors are price takers and have homogeneous expectations about asset returns which have a joint normal distribution.
3	There exists a risk-free asset such that investors may borrow or lend unlimited amounts at the risk-free rate.
4	The quantities of assets are fixed. Also, all assets are marketable and perfectly divisible.
5	Asset markets are frictionless and information is costless and simultaneously available to all investors.
6	There are no market imperfections such as taxes, regulations, or restrictions of short selling.

Source: Copeland, T. E. and J.F. Weston. Financial Theory and Corporate Policy. 3rd Edition, Addison-Wesley Pub Co., 1988, pages 160-161.

CAPM was originally promoted by William F. Sharpe in 1963, but later developed further by other theorists, Teynor, Mossin and Lintner (Copeland, 160). CAPM defines the relationship between the required rate of return on assets and risk.

Utilizing the Capital Asset Pricing Model, the discount rate is defined as shown below.

$$R = R_f + R_p * Beta$$

In this equation, R_f is riskfree rate and R_p is the risk premium. A. Damodaran, author of Investment

Valuation: Tools and Techniques for Determining the
Value of Any Asset, defines R_p as 5.5% (48). The last
part of the equation, Beta, is important to explain in
more detail. Beta is a measure of the relationship (or
volatility) between a stock relative and an index. As
pointed out by Brigham and Gapenski:

> An average stock, by definition, must
> move up and down in step with the general
> market as measured by some index such as
> the Dow Jones industrial Average or the
> New York Stock Exchange index. Such a
> stock will, by definition, have a beta of
> 1.0, which indicates that if the market
> moves up or down by 10 percentage points,
> the stock will also tend to move up or
> down by 10 percentage points. (149)

A stock with a relatively high beta will rise more than
the index when the market is rising and will fall more
quickly than the market average on a day when the index
or market is down. The average beta for all stocks is,
based on this logic, 1.0.

Different companies compute and publish betas.
Value Line and Standard and Poor's are two examples of
such companies who publish this type of information.
One method for calculating the beta would be to use a
regression line between the weekly returns of the stock
and those of the stock market for a period of time, for

example, the last year or even two years. Because there are various methods to determine beta, various companies may arrive at different betas for the same company's stock. It is also important to note that a particular company's beta may change over time. The Capital Asset Pricing Model has two important properties. First, CAPM assumes that "every asset must be priced so that its risk-adjusted required rate of return falls exactly on a straight line...called the security market line" (Copeland, 165). The security market line starts at the risk-free rate, as shown in Illustration 2. As noted by Copeland:

> Investors can always diversify away all
> risk except the covariance of an asset
> with the market portfolio. In other words,
> they can diversify away all risk except
> the risk of the economy as a whole, which
> is inescapable (undiversifiable).
> Consequently, the only risk which investors
> will pay a premium to avoid is covariance
> risk. Therefore, the total risk of any
> individual asset can be partitioned into
> two parts, systematic risk which is a
> measure of how the asset varies with the
> economy, and unsystematic risk, which is
> independent of the economy. (165)

Illustration 2

Capital Assets Pricing Model
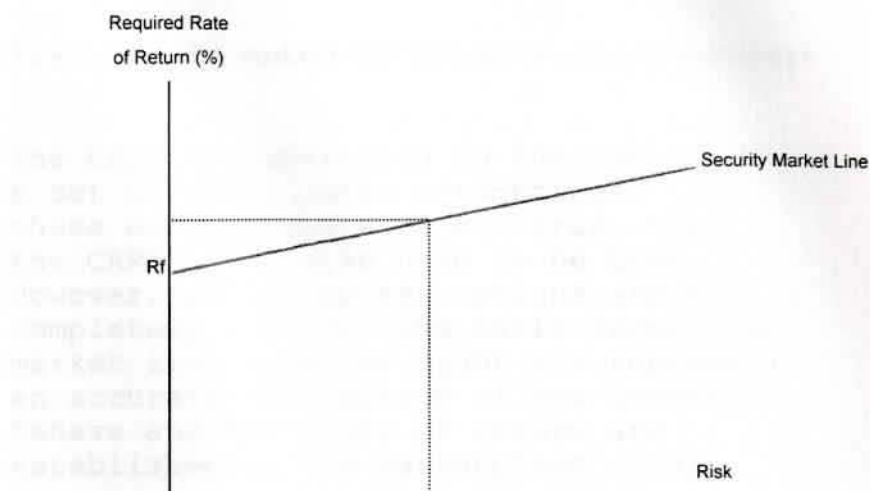
Required Rate
of Return (%)

Security Market Line

Rf

Risk

Source: Copeland, T. E. and J.F. Weston. Financial Theory and Corporate Policy. 3rd Edition, Addison-Wesley Pub Co., 1988, Figure 7.3.

The second property of the Capital Asset Pricing Model, according to Copeland, is that the measure of risk for individual stocks is linearly additive when combined into portfolios (166). In other words, the beta of a portfolio is the weighted average of the individual assets' betas which are part of that portfolio. Because a linear-weighted relationship is assumed using CAPM, betas of individual stocks become very important.

It has been indicated that CAPM cannot be confirmed empirically. The assumptions identified previously in Table 4 are said, by some, to be unrealistic. As noted by Brigham and Gapenski:

> The CAPM was developed on the basis of a set of unrealistic assumptions. If those assumptions were all true, then the CAPM would also have to be true. However, since the assumptions are not completely correct, the basic securities market line might or might not represent an accurate description of how investors behave and how rates of return are established in the marketplace (155).

Despite such commentaries, a great deal of agreement exists regarding the value of the CAPM. Copeland notes that "because the CAPM allows decision makers to estimate the required rate of return for projects of different risk, it is an extremely useful concept" (172). Brigham and Gapenski point out that:

> The CAPM framework, with its focus on market as opposed to total risk, is clearly useful as a way of thinking about the riskiness of assets in general. Thus, as a conceptual model the CAPM is of truly fundamental importance…however, it is equally important to recognize its limitations (158).

Realizing the limitations or weaknesses of the

CAPM, Lorie and Hamilton advocate the Dividend Discount

Model and note the following.

> One of the earliest and ablest proponents
> of the view that dividends determine the
> investment value of stock was John Burr
> Williams. He says, "Let us define the
> investment value of a stock as the present
> worth of all dividends to be paid upon it.
> Most people will object at once to the
> foregoing by saying that it should use the
> present worth of future *earnings* not future
> *dividends*. But should not earnings and
> dividends both give the same answer under
> the implicit assumptions of our critics?
> If earnings not paid out in dividends are
> successfully reinvested at compound interest
> for the benefit of the stockholder, as the
> critics imply, then these earnings should
> produce dividends later; if not, then they
> are money lost. Furthermore, if these
> reinvested earnings will produce dividends,
> then our formula will take account of them
> when it takes account of all future
> dividends. (115-116)

The dividend discount model is also referred to as

the dividend valuation model or the dividend growth

valuation model. This model is based on the Discounted

Cash flow (DCF) approach and basically assumes that the

value of a stock is the present value of the future

stream of revenues or dividends, in this case. Since

these dividends are paid at a future point in time, the

the value of the stock must be computed in present

value.

The dividend discount model formula is shown in Illustration 3.

Illustration 3

Dividend Discount Model

$$V_0 = \sum_{t=1}^{t=n} \frac{D_t}{(1+R)^t} + \frac{V_n}{(1+R)^n}$$

Source: Online, www.stocksense.com/valuation.html

In this equation, V is the value of the stock, t and n represent the year, D is dividend per share expected to be paid, and R is the discount rate or required rate of return. (Using A. Damodaran's formula, this would be Rf + 0.055 times beta).

The dividend discount model basically uses the CAPM model to estimate the discount rate and dividends as future cash flows. As Van Horne, author of Fundamentals of Financial Management, points out:

> Investors formulate subjective judgments
> about the dividends per share that are
> expected to be paid in various future
> periods. For the individual investor,
> the dividend in the equation [shown above]

are his estimates of the expected future
dividend stream. (198)

The dividend discount model does not, however,
take into account the effect of the changes in the
market value of stocks. In addition, according to
Lorie and Hamilton, there continues to be controversy
related to the significance of earnings and dividends.
They do, however, describe John Burr Williams as a
"great pioneer" whose ideas have been utilized formally
in the comprehensive theory of corporation finance and
investments (116-117).

Williams' dividend discount model has been used by
others to develop other models. A few outgrowths of the
dividend discount model will be discussed later in this
chapter.

The third major stock valuation model is the free
cash flow and free cash flow to equity model. Free
cash flow is shown in a company's statement of cash
flows. This statement shows the flow of cash, both
incoming and outgoing, and the net increase or decrease
in cash. As noted by the authors of the text <u>Financial
and Managerial Accounting</u>, Carl S. Warren and Philip E.
Fess:

The statement of cash flows reports a firm's major sources of cash receipts and major uses of cash payments for a period. Such a statement provides useful information about a firm's activities in generating cash from operations, maintaining and expanding operating capacity, meeting its financial obligations, and paying dividends. (591)

A sample statement of cash flows is shown in Table 5.

Table 5

Message Corporation

Statement of Cash Flows

For Year Ended December 31, 1992

Cash flows from operating activities:				
Net income, per income statement			$	90,500
Add: Depreciation	$	18,000		
Decrease in inventories		8,000		
Increase in accounts payable		18,000		44,000
			$	134,500
Deduct: Increase in trade receivables	$	9,000		
Increase in prepaid expenses		1,000		
Decrease in income tax payable		1,500		
Gain on sale of investments		30,000		41,500
Net cash flow from operating activities			$	93,000
Cash flows from investing activities:				
Cash received from sale of investments			$	75,000
Less: Cash paid for purchase of equipment				157,000	(82,000)
Net cash flow used for investing activities				
Cash flows from financing activities:				
Cash received from sale of preferred stock			$	160,000
Less: Cash paid for dividends	$	23,000		
Cash paid to retire bonds		125,000		148,000
Net cash flow provided for financing activities				12,000
Increase in cash			$	23,000
Cash at the beginning of the year				26,000
Cash at the end of the year			$	49,000

Source: Warren, Carl S., and Fess, Philip E., Financial and Managerial Accounting, Third Edition. Cincinnati, Ohio: South-Western Publishing Co., 1992, page 606.

Dividends are only one form of income an investor expects to receive from a stock. In determining stock valuation, capital gains are yet another source of income. In order for a stock price to appreciate over time, a company must also increase its free cash flow

(FCF). This is based on the premise that the cash flow belongs to the shareholders insofar as the company only borrows cash from its shareholders. As Brigham and Gapenski point out, the higher the cash flow of a company, the more an investor will pay for the company (873).

There are various versions of the free cash flow models. Therefore, the definition of each varies. Brigham and Gapenski define free cash flow as follows:

> Free cash flow has many different definitions, depending on the purpose of the analysis, but, in general, it is the cash flow that remains after considering all anticipated cash inflows and outflows, including capital expenditures and asset sales. The bottom line of the statement of cash flows, the net increase (decrease) in cash and cash equivalents, can be viewed as the firm's basic free cash flow. (873)

Corporations include a statement of cash flow in their annual financial statements which they file with the Securities and Exchange Commission (SEC). According to Warren and Fess, in 1987, the Financial Accounting Standards Board issued Statement of Financial Standards Number 95, which included the statement of cash flow as part of the basic set of

financial statements (591). The inclusion of this statement has made information about cash flow readily available and, therefore, free cash flow-based stock valuations methods became more prevalent.

Free cash flow analysis is particularly important to raiders and leverage buyout companies. For example, raiders can use the cash from one company to make interest payments on debt incurred in the acquisition of the company.

The free cash flow to equity (FCFE) model is described by the following equation:

FCFE = Operating Cash Flow - Cash Expenses for growth.

In this equation, operating cash flow is the net income of the company plus depreciation and amortization. Cash expenses for growth are capital expenditures plus change in working capital. Working capital is defined as the total current assets less the total current liabilities less the previous year's working capital. In greater detail, the formula is:

FCFE = Net Income + Depreciation and Amortization - Capital Expenditures + Change in Working Capital.

Using the free cash flow to equity model to

determine the value of a stock is accomplished by using the following equation:

Free Cash Flow to Equity Model

$$V_0 = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1+R)^t} + \frac{FCFE_{n+1}}{(1+R)^n (R2-G2)}$$

Source: Online, www.stocksense.com/valuation.html

In this equation, V represents the value of the stock, t and n represent the year, R represents the discount rate at the first stage (Rf + 0.055*Beta), R2 represents the discount rate at the second stage (Rf2 + 0.055), and G2 represents the dividend growth rate at the second stage (Damodaran, 140). As noted earlier, all of this information can be obtained from the income statement and cash flow statement which are a normal part of companies' financial reports.

There are numerous models which have been supported over the years. Some models have become

outgrowths of these three basic models. For example, the Gordon growth model (GGM) is an outgrowth of the dividend discount model and the free cash flow to equity models. The GGM combines dividends, expected growth in dividends, a measure of earnings' stability, a measure of the firm's capital leverage, an index of operating asset liquidity, and a measure of the firm's size (Lorie and Hamilton, 116-117). Another model found in the literature is the Goldman Sachs model which is based on a growth trend and is computed and extrapolated into the future until the expected deviation of earnings from the trend reaches seven percent (Firth, 22). Another model is the Miller-Modigliani model. According to Weston, Chung and Hoag, who authored the book Mergers, Restructuring, and Corporate Control, the Miller-Modigliani model gives the same results as the free cash flow model, but the Miller-Modigliani model highlights a critical relationship between profitability and the cost of capital and emphasizes that each firm is "indeed a no-growth firm unless it has favorable investment opportunities" (158).

In spite of the numerous models espoused over the

years, the above three major models (the Capital Asset Pricing Model, the dividend discount model and the free cash flow and free cash flow to equity model) appear to be the theories which have thus far withstood the test of time.

The purpose of this project, as indicated in previously, is to analyze the relationship between financial ratio analysis and stock prices. If a relationship does, in fact, exist, then this information could possibly yield another valuation model. This type of valuation model, if it proves to be useful, could possibly have some predictive capability.

In order to determine if this relationship is a valuable tool from either management's or an investor's perspective, it would have to be assumed that these variables could be controlled to a certain extent, or at least affected. The next section of this chapter presents a discussion of management's ability to influence the variables involved in financial statement analysis.

Variables in Financial Ratios

As noted above, in order for financial ratio analysis to be useful to either management or stockholder, managers of companies must have a certain ability to affect some of the company's financial ratios.

All of the ratios are derived from seventeen basic variables. These include current assets, inventory, current liabilities, sales, receivables, fixed assets, total assets, total debt, earnings before interest and taxes, interest expense, net income before preferred dividends, net income available to common stockholders, common equity, price per share, earnings per share, depreciation and amortization, and book value per share. These variables, which are found in balance sheet, statement of income, and statement of cash flows, are shown in Table 6. Each of these variables are described below and discussed in terms of management's ability to control or influence their outcome.

Table 6

Financial Ratio Variables

Current Assets
Inventory
Current Liabilities
Sales
Receivables
Fixed Assets
Total Assets
Total Debt
Earnings Before Interest & Taxes
Interest Expense
Net Income before preferred dividends
Net Income available to common stockholders
Common equity
Price per share
Earnings per share (per Value Line)
Depreciation & Amortization
Book value per share (per Value Line)

Source: Brigham, Eugene E., and Gapenski, Louis, C.Financial Management Theory and Practice. Orlando: The Dryden Press, 1991, Table 22-5.

Current assets are defined by the Accounting Principles Board defines current assets, as shown below:

> …cash or other assets that are reasonably expected to be realized in cash or sold or consumed during the normal operating cycle of a business or within one year if the operating cycle is shorter than one year. (198)

Current assets include items such as cash, short-term investments, notes receivable, accounts receivable,

merchandise inventory, prepaid insurance, and supplies.
As such, current assets are under management's control
to the extent that they can liquidate various other
assets. For example, if property, plant and equipment
are sold, current assets are increased. On the other
hand, if property, plant and equipment can be purchased
or long-term investments can be made, then the current
assets of a company are reduced.

The Committee on Accounting Procedures of the
American Institute of Certified Public Accountants
defines inventory as:

> ...the sum of those items of tangible
> property which (1) are held for sale in
> the ordinary course of business, (2) are
> used in the process of production for
> such sale, or (3) are to be currently
> consumed in the production of goods or
> services which will be available for
> sale. (27)

Inventory, as indicated above, is a current asset.
James Don Edwards, Roger H. Hermanson, and R.F.
Salmonson, writers of a text called <u>Financial</u>
<u>Accounting</u>, note that:

> Inventory is one of the largest and most
> important assets owned by a merchandising
> or manufacturing business. In certain
> companies, it may be several times the

>size of other assets. What is included
>in inventory varies with the nature of
>the business. Retail and wholesale
>merchandising businesses buy merchandise
>from others and sell it in the condition
>in which it is acquired Thus, they have
>only one important item of inventory -
>merchandise held for resale.
>Manufacturing companies generally have
>three inventory items - raw materials,
>work in process, and finished goods. (198)

Inventory can be controlled in a merchandising

industry, therefore, through a variety of methods. For

example, management can control the amount of inventory

acquired. Inventory can be moved along through price

reductions. Inventory can be controlled in a

manufacturing industry to the extent that management

can control the amount of raw materials purchased, the

timing of the work in process and the inventory

turnover.

Current liabilities are defined by Belverd E.

Needles, author of the text <u>Financial Accounting</u>, as

"obligations due within the normal operating cycle of

the business or within a year, whichever is longer"

(264). Current liabilities include items such as

accounts payable, notes payable, and wages payable. To

the extent that management can lengthen or shorten

their payments on accounts payable, for example, they

have some ability to influence current liabilities.

Sales revenue is comprised of a company's total sales less sales returns, allowances and discounts. To the extent that management can control pricing (and perhaps inventory levels as well), they can have an impact on sales.

Receivables, as noted above, are included in current assets. Accounts and notes receivable are those current assets which are produced by the sales to customers. Needles defines accounts receivable as "short-term liquid assets that arise from the sales on credit to customers at either the wholesale or the retail level" (312). Therefore, management's ability to control credit sales is critical to its ability to control receivables turnover. This is particularly true in relation to the timing of the turnover of receivables.

Fixed assets are a company's long-term assets, or property, plant and equipment. This includes land, buildings, equipment, and improvements to land. Needles offers the following definition:

> Long-term assets are assets that (1) have a useful life of more than one year, (2) are acquired for use in the operation

of the business, and (3) are not intended for resale to customers. (400)

Management has the ability to make decisions regarding the acquisition and sale of long-term assets and, therefore, has some ability to affect fixed assets.

Total assets are made up of current assets, property, plant and equipment and any other long-term assets the company may have. Assuming that management has the ability to control each of these variables, then they have the ability to control total assets.

Total debt is current liabilities plus long-term debt. To the extent that management controls current liabilities and makes decisions about long-term debt, they have the ability to affect total debt as well.

Earnings before interest and taxes is, as its name implies income (sales and other revenues less expenses) before income taxes. Assuming some of these variables can be affected (for example, income), then the bottom line can also be affected.

Interest expense is the expense incurred as a result of borrowing money. The amount of interest expense a company has is dependent upon the principal amount borrowed, the rate of interest at which the

principal is borrowed, and the time over which repayment is scheduled to occur. Since management is capable of making decisions regarding both the amounts borrowed and the terms of the financing, they have some ability to influence this expense.

Net income before preferred dividends is, as its name implies, net income before any distributions are made to preferred stockholders. As indicated earlier, since management has the ability to affect the various parts of the income statement (for example, sales or expenses related to sales), they have some ability to have an impact on net income.

Net income available to common stockholders is net income after the distribution of dividends to the preferred stockholders, but before the distribution of dividends to common stockholders. To the extent that management has a role in determining whether or not dividends are paid to preferred stockholders, they also have some ability to affect net income available to common stockholders.

Common equity, or owners' equity, is the basic right of ownership in a company. Common equity is made up of contributed capital (investments made by

stockholders in a company) and retained earnings (the earnings which are not distributed to stockholders). For the sake of financial ratio analysis, common equity is limited to common stock since preferred stockholders are treated as if they are creditors of the company. Edwards, Hermanson and Salmonson state the following:

> When a corporation issues only one
> class of stock, it must be common
> stock. Holders of common stock have
> full voting rights and privileges in
> the corporation. Though common stock
> ranks behind preferred stock in
> distribution of assets and dividends
> upon dissolution of the corporation,
> there is no limit to the amount of
> dividends which a share of common stock
> may receive. Common stock also
> possesses a greater chance of increasing
> in market value. Thus, while holders of
> common stock in a corporation assume
> greater risks than holders of preferred,
> they also have the potential
> to realize a greater return on their
> investment. (446-447)

The amount of common stock outstanding for any corporation is determined by their board of directors and the shareholders themselves. Therefore, management has limited influence on common stock, although their recommendations are obviously taken into account in the decision making made by a board of directors.

Price per share refers to the current market price

of the stock.   This too is driven by external forces

outside of management's control.   Management does,

however, have an impact on market prices when it

releases quarterly financial reports.

Earnings per share are, as its name implies, the

earnings of a company divided by the number of shares.

The earnings per share is influenced to the extent that

management has an impact on the earnings of the company

itself.

Depreciation and amortization is defined by

Edwards, Hermanson and Salmonson as:

> That portion of the cost of a long-
> lived tangible asset used in a business
> that is allocated to each period of the
> asset's life. (75)

They further state that:

> Depreciation is another example of the
> continuous incurrence of an expense
> which results from the gradual using up
> of a previously recorded asset. The
> overall period of time involved in using
> up a depreciable asset, a building for
> example, is less definite than in the case
> of an insurance premium or prepaid rent.
> In the case of a depreciable asset, its
> life must be estimated in advance and
> individuals are not able to peer 10 to 50
> years into the future with any real degree
> of accuracy. (96)

However, because management has the ability to choose between a variety of depreciation methods (for example, the accelerated depreciation method or the double-declining-balance method), they do have some ability to affect depreciation and amortization expense.

Book value per share is defined by Needles in the following statement:

> The book value of a company's stock represents the total assets of the company less liabilities. Thus, it is simply the owners' equity in the company or, to look at it another way, the company's net assets. The book value per share, therefore, represents the equity of the owner of one share of the stock in the net assets of the corporation. (570)

Consequently, management only has the ability to control book value per share to the extent that they have an ability to make an impact on the assets and liabilities of the company.

In conclusion, many of the variables used in financial ratio analysis can be influenced by management. Therefore, if there does indeed exist a correlation between a company's stock price and its financial ratios and the trend patterns of the

company's financial ratios, then a potential model
might have some predictive value in terms of a
company's stock price. As Brigham and Gapenski note:

> Trend analysis gives clues whether a
> firm's financial situation is improving,
> holding constant or deteriorating. (885)

Based on the above, it is obvious that new models have
been introduced over time. It is also obvious that
some of the models build on notions espoused in
previous literature. None of these models have
successfully provided the "final answer" to the
question of how to determine the value of a company's
stock. In addition, these models have provided little
in the way of predictive capabilities. Consequently,
taking a look at another model, based on financial
ratio analysis, seems to make a great deal of sense.
As discussed earlier, financial ratios certainly had a
great deal of success in statistically predicting
corporate failures (Shivaswamy and Hoban, 8). As such,
the purpose of this research is to see if financial
ratios also have predictive capabilities for corporate
success.

Hypothesis

Multiple models for stock valuation have been promulgated. None of these models look directly at all ratios, although some of the models incorporate various parts of financial ratios. For example, the free cash flow to equity model factors net income into the equation.

Based on the preceding information and conclusions, the following hypothesis has been developed and will be tested, that is, that there will be a significant correlation between a given ratio and the stock price. To be more specific, for eleven of the financial ratios (that is, the current ratio, the quick ratio, the inventory turnover ratio, the fixed asset turnover ratio, the total asset turnover ratio, the times interest earned ratio, the profit margin on sales ratio, the basic earnings power ratio, the return on assets ratio, the return on equity ratio, and the market to book ratio), the stock prices also rises because there is significant positive correlation. As the three other ratios decrease (days sales outstanding, debt to total assets and price to

earnings), the price of the stock rises because of a significant negative correlation. Table 7 summarizes the fourteen ratios with regard to the hypothesis being tested.

Table 7

Summary of 14-Point Hypothesis

	Ratio		Stock Price	Ratio		Stock Price	Correlation
Liquidity							
Current Ratio	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Quick, or acid test	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Asset Management							
Inventory Turnover	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Days sales outstanding	Decreases/Improves	->	Rises	Increases/Worsens	->	Decreases	Negative
Fixed asset turnover	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Total asset turnover	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Debt Management							
Debt to total assets	Decreases/Improves	->	Rises	Increases/Worsens	->	Decreases	Negative
Times interest earned	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Profitability							
Profit margin on sales	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Basic earning power	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Return on assets	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Return on equity	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive
Market Value							
Price/earnings	Decreases/Improves	->	Rises	Increases/Worsens	->	Decreases	Negative
Market/book	Increases/Improves	->	Rises	Decreases/Worsens	->	Decreases	Positive

Source: Ratio information from Brigham, Eugene E., and Gapenski, Louis, C. Financial Management Theory and Practice. Orlando: The Dryden Press, 1991, Table 22-5.

To summarize, the theory proposed here is that each of the above ratios and stock price has either a significant positive or a significant negative correlation, depending upon which ratio is being

studied.   Table 8, which shows the formula for each of the ratios, is presented to assist the reader in understanding the hypothesized relationship.

Table 8

Financial Ratio Formulas

Liquidity	
Current Ratio	$\dfrac{\text{Current assets}}{\text{Current liabilities}}$
Quick, or acid test	$\dfrac{\text{Current assets-Inventories}}{\text{Current liabilities}}$
Asset Managment	
Inventory Turnover	$\dfrac{\text{Sales}}{\text{Inventory}}$
Days sales outstanding (DSO)	$\dfrac{\text{Receivables}}{\text{Sales/360}}$
Fixed asset turnover	$\dfrac{\text{Sales}}{\text{Fixed assets}}$
Total asset turnover	$\dfrac{\text{Sales}}{\text{Total assets}}$
Debt Management	
Debt to total assets (D/A)	$\dfrac{\text{Total debt}}{\text{Total assets}}$
Times interest earned (TIE)	$\dfrac{\text{EBIT}}{\text{Interest charges}}$
Profitability	
Profit margin on sales	$\dfrac{\text{Net income*}}{\text{Sales}}$
Basic earning power (BEP)	$\dfrac{\text{EBIT}}{\text{Total assets}}$
Return on assets (ROA)	$\dfrac{\text{Net income*}}{\text{Total assets}}$
Return on equity (ROE)	$\dfrac{\text{Net income*}}{\text{Common equity}}$
Market Value	
Price/earnings (P/E)	$\dfrac{\text{Price per share}}{\text{Earnings per share}}$
Market/book (M/B)	$\dfrac{\text{Market price per share}}{\text{Book value per share}}$

Source Brigham, Eugene E., and Gapenski, Louis, C. Financial Management Theory and Practice. Orlando: The Dryden Press, 1991, Table 22-5.

In the case of the liquidity ratios, under the hypothesis proposed herein, there is a significant positive correlation between the current ratio and stock price. That is to say that, as the current ratio improves or rises, the stock price rises. For example, if a company is paying bills less frequently or accumulating more bank loans, there is less of an opportunity for assets to be liquidated to cover expenses.

> If a company is getting into financial difficulty, it will begin paying its bills (accounts payable) more slowly, building up bank loans, and so on. If these current liabilities raise faster than current assets, then the current ratio will fall, and this could spell trouble. Since the current ratio provides the best single indicator of the extent to which the claims of short-term creditors are covered by assets which are expected to be converted to cash in a period roughly corresponding to the maturity of the claims, it is one commonly used measure of short-term solvency. (Brigham and Gapenski, 875)

Needles notes that a company's ability to make a profit usually affects its liquidity (682). Thus, reducing current assets by inventories and thus placing a company in a position where they are unable or

limited in their ability to pay off current obligations with current assets less inventories, could also be indicative of financial problems. According to Kristy, author of "Conquering Financial Ratios: the Good, the Bad, and the Who Cares," the quick ratio is an indicator of payment ability. Kristy describes a quick ratio of .25 to 1 as "worrisome" (16). Therefore, as the quick or acid test (which is another measure of solvency) ratio decreases or worsens, the stock price might also fall, if indeed a significant positive correlation exists as hypothesized.

Under the category of asset management, as the inventory turnover rises or improves, under the significant positive correlation hypothesis formulated, the stock price rises. Lower ratios might be indicative of holding obsolete inventory or excessively high levels of stocks. DiVittorio, who wrote "Unlocking the Secrets of Financial Statements," points out that inventory turnover is better as it gets higher because it reveals the frequency with which merchandise is sold (30). As days sales outstanding falls (or improves), the stock price should rise as a result of a hypothesized significant negative correlation. A

falling days sales outstanding ratio should indicate a reduction in the amount of time between selling items and actually receiving the cash and, as such, put the company in a better financial position. Kristy refers to days sales outstanding as the single best indicator of the quality of accounts receivable. He notes that when this ratio starts "creeping up," it could be a sign that bad debts are accumulating (17). As fixed asset turnover increases, the stock price should also increase under the hypothesis that a significant positive correlation exists between the two variables. That is to say that, if a firm's fixed asset turnover ratio is increasing, it is using its fixed assets productively to generate sales. A possible concern here, however, is the fact that fixed assets are valued at historical cost on the balance sheet, so the earlier years in the study might show similar assets to more current years at a lower cost level. Total asset turnover measures the use of all assets of a company and, therefore, an increase in the total asset turnover ratio would mean an increase in the stock price under the hypothesis that a significant positive correlation exists.

Brigham and Gapenski state the following about the debt management ratios:

> The extent to which a firm uses debt
> financing, or financial leverage, has
> three important implications. (1) By
> raising funds through debt, the owners
> can maintain control of the firm with
> a limited investment. (2) Creditors
> look to the equity, or owner-supplied
> funds, to provide a margin of safety:
> If the owners have provided only a
> small proportion of total financing,
> then the risks of the enterprise are
> born mainly by its creditors. (3) If
> the firm earns more on investments
> financed with borrowed funds than it
> pays in interest, then the return on
> the owners' capital is magnified, or
> "leveraged." (879)

Therefore, in the area of debt management ratios, as debt to total assets improves or falls, the stock price should rise under the proposed hypothesis of a significant negative correlation between the debt to total assets and the stock price of a company. In other words, a higher ratio would mean more claims against the company's assets and, therefore, the company would have difficulty borrowing any more money. As times interest earned increases, the stock price should also increase because of a hypothesized significant positive correlation. This is because the

times interest earned ratios reflects a company's
ability to cover its annual interest costs.

Under the category of profitability ratios, as
profit margin on sales improves or increases, the stock
prices also should increase based on the hypothesis
proposed of a significant positive correlation. That
is to say that the company would be more profitable.

> Long-term solvency has to do with a
> company's ability to survive over many
> years. The aim of long-term solvency
> analysis is to point out early if a
> company is on the road to bankruptcy.
> Studies have shown that accounting ratios
> can show as much as five years in advance
> that a company may fail. Declining
> profitability and liquidity ratios are
> key signs of possible business failure.
> (Needles, 684)

If the hypothesis of a significant positive correlation
is proven, as basic earning power increases, so should
the stock price since it reflects a company's ability
to get the most earnings from its assets. As return on
assets increases, the stock price should also increase
under the hypothesis of a significant positive
correlation, reflecting more net income available to
stockholders vis-à-vis its total assets. Also assuming
a significant positive correlation, as return on equity

drops, the stock price should fall, indicating less income available to stockholders as compared to common equity.

In the area of market value ratios, since a higher price to earnings ratio is more typical of riskier companies, as the price to earnings ratio increases, the stock price should fall, assuming a significant negative correlation. As the ratio increases, there would be less earnings per share in relation to the price per share.

> The market price of a company's shares of stock is of interest to the analyst because it represents what investors as a whole think of a company at a point in time. Market price is the price at which people are willing to buy and sell the stock. It provides information about how investors view the potential return and risk connected with owning the company's stock. This information cannot be obtained simply by considering the market price of the stock by itself. Companies have different numbers of outstanding shares and different amounts of underlying earnings and dividends. Thus, the market price must be related to the earnings per share. (Needles, 685-686)

Assuming that no additional stock is issued, in the case of market to book, as the ratio increases, the stock price should increase because the market price

would be higher in relationship to the book value under the hypothesis of a significant positive correlation.

In conclusion, the proposed 14-point hypothesis states that there is a significant positive correlation between eleven of the fourteen financial ratios and the price of the stock and a significant negative correlation between the other three of the fourteen financial ratios and the price of the stock. The purpose of this research is to determine if such a correlation exists between stock prices and financial ratio analysis.

Chapter III

RESEARCH METHODOLOGY

An empirical study was performed to determine the
validity of the proposed hypothesis. The 14-point
hypothesis proposed basically states that, as financial
ratios improve, so does the price of the stock. As
financial ratios worsen, so does the price of the
stock. The purpose of this chapter is to describe the
subjects, methods of observation, data collection and
analysis.

Subjects

As noted in Chapter I, four industry groups were
included in this study. The industries included were
energy, consumer cyclical products, consumer non-
cyclical products, and technology. The industry groups
which were excluded were utilities, financials, basic
materials and industrials. It was believed that the
four industries selected for the study represented a
cross-section of more conventional industries to which
financial ratios apply. For example, the basic
materials industry group was excluded because swings in

commodities prices could potentially make the ratios less relevant. As another example, financial industries do not have assets to which the ratios would apply.

Three companies from each of these industries were randomly picked as a sample from a large list of leaders in each industry. Large companies with a significant history were studied in order to collect sufficient data for this study. Under the category of energy, the three companies included were Chevron Corporation, Exxon Corporation and Texaco Incorporated. The four consumer cyclical products companies included Ford Motor Company, Wal-Mart Stores, Inc. and Nike, Incorporated. Under the category of consumer non-cyclical products, The Coca-Cola Company, McDonald's Corporation, and Pepsico, Incorporated were included. Finally, the technology industry companies studied included Compaq Computer Corporation, Intel Corporation and Microsoft Corporation. Each of the industries and companies studied is described below.

As indicated above, four different industries (or industry groups) were included in this study. These industries included energy, consumer cyclical products,

consumer non-cyclical products, and technology.

Energy industries are companies involved in energy-related fields. Examples of such fields include coal, oil (drilling), oil (integrated majors), oil (secondary), oilfield equipment and services, and pipelines (Barron's Market Week, 103).

Consumer cyclical and non-cyclical products industry groups are defined in terms of the business cycles. Business cycles reflect the recession and recovery of the economy. Consumer cyclical industries include those companies most sensitive to the economy. Bodie, Kane and Marcus state the following:

> As the economy passes through different stages of the business cycle, the relative performance of different industry groups might be expected to vary. For example, at a trough, just before the economy begins to recover from a recession, one would expect that cyclical industries, those with above-average sensitivity to the state of the economy would tend to outperform other industries. Examples of cyclical industries are producers of durable goods such as automobiles or washing machines. Because the purchase of these goods can be deferred during a recession, sales are particularly sensitive to macro-economic conditions. (306)

Companies included in the consumer cyclical industry

group include advertising, airlines, apparel, clothing and fabrics, footwear, automobile manufacturers, automobile parts and equipment, casinos, home construction, home furnishings, lodging, media, broadcasting, publishing recreation products, entertainment, recreation products, toys, restaurants, and certain retailers, such as apparel and specialty products (Barron's Market Week, 103).

Consumer non-cyclical products, on the other hand, have little sensitivity to business cycles. The state of the economy has little impact upon these companies, particularly when the economy heads into a recession. Examples of these types of companies include beverages, consumer services, cosmetics and personal care, food, food retailers, health care providers, household products, household durable products, household non-durable products, medical supplies, pharmaceuticals, and tobacco companies.

The technology industry includes companies involved in various technical fields. Examples include aerospace and defense, communications, computers, diversified technology, industrial technology, medial and biotechnology, advanced medical devices,

biotechnology, office equipment, semiconductors, and software and processing companies (Barron's Market Week, 103).

The following is a brief description of each of the companies included in this project. As noted earlier, the petroleum industries studied include Chevron Corporation, Exxon Corporation, and Texaco Incorporated. The consumer non-cyclical products' companies studied include The Coca-Cola Company, McDonald's Corporation and Pepsico, Incorporated. The consumer cyclical products' companies studied include Ford Motor Company, Wal-Mart Stores, Inc. and Nike Incorporated. The technology industry companies studied include Compaq Computer Corporation, Intel Corporation and Microsoft Corporation.

Chevron Corporation is one of the largest international oil companies, refining crude oil into a variety of products, including motor gasoline, diesel and aviation fuels, lubricants, asphalt, chemicals and other products. According to Value Line, Chevron employs roughly 43,000 people and has 135,500 stockholders (408). Chevron has locations throughout the United Stated and the world. The company holds

principal locations in California, Mississippi, Utah, Texas, and Hawaii. As indicated on their home page on the Internet, Chevron is the tenth largest industrial corporation and the third largest petroleum corporation in the United States (Online, www.chevron.com/about/ hr/chevnav/fcompany.htm).

Exxon incorporated in New Jersey in 1882. The company operates and markets products not only in the United States, but in over 100 other countries according to their 10-K (1). As noted in their 10-K:

> Their principal business is energy,
> involving exploration for, and
> production of, crude oil and natural
> petroleum products. Exxon Chemical
> Company, a division of Exxon, is a
> major manufacturer and marketer of
> petrochemicals. Exxon is engaged in
> exploration for, and mining and sale of,
> coal and other minerals. Exxon also
> has an interest in Electric Power
> General in Hong Kong. Affiliates of
> Exxon conduct extensive research programs
> in support of these businesses. (1)

According to Value Line, Exxon employs approximately 95,000 and has 603,207 stockholders (410). Exxon Corporation claims to be the largest supplier of energy. They note the following on their Internet home page:

Exxon's success has made it one of
the world's leading suppliers of
affordable energy, a critical element
of economic growth. (Online, www.
exxon.com.exxoncorp)

Texaco Incorporated, is a major integrated
international oil company. According to Value Line,
Texaco employs 28,960 people and has 195,680
stockholders (424). Texaco operates in more than 150
countries. As noted in their Annual Report:

Texaco and its affiliates help supply
the world's energy needs. We find and
produce crude oil and natural gas,
manufacture and market high-qualify
fuel and lubricant products; operate
transportation, trading and
distribution facilities; and produce
alternate forms of energy for power
and manufacturing. We find and produce
oil and natural gas from a global
portfolio and new and mature fields.
Newer prospects in the U.K. North
Sea, China, West Africa and Latin
America complement established
operations in the U.S., Indonesia and
the Middle East and exploration
activities in the Asia-Pacific region
and the deepwater Gulf of Mexico.
Texaco and its affiliates own or have
interests in 25 refineries in the U.S.
and around the world. Equity crude
processing capacity is 1.5 million
barrels a day. With our affiliates,
we market automotive fuels through
some 22,000 service stations
worldwide, and through our global
businesses, we sell lubricants,

coolants and marine and aviation
fuel. (4)

Ford Motor Company ranks second in U.S. automobile and truck manufacturers, selling more than 70 different types of cars worldwide. Ford is also the world's largest producer of trucks, as indicated in their annual report (1). Ford also has an equity interest in Mazda Motor Corporation (33.4 percent) and Kia Motors Corporation (9.4 percent), as well as serving as one of the largest providers of financial services worldwide though Ford Credit, according to their 1996 annual Report (1). Ford, according to their 1996 Annual Report, employs 371,702 people (1). According to Value Line, they have 255,380 stockholders (104).

Wal-Mart Stores, Inc. operates Wal-Mart stores in every state in the United States. According to the company's 1996 10-K:

> The average size of a Wal-Mart store
> is approximately 91,100 square feet,
> and store sizes generally range
> between 30,000 and 150,000 square feet
> of building area. The company operates
> Wal-Mart Supercenter stores in 22 states,
> and the average size of a Supercenter is
> 182,000 square feet. The company operates
> Sam's Clubs in 48 states. The average
> size of a Sam's Club is approximately
> 121,000 square feet, and club sizes

generally range between 90,000 and 150,000
square feet of building space. The company
operates Wal-Mart stores, Sam's Clubs and
Wal-Mart Supercenters in Argentina, Canada
and Puerto Rico, and through joint ventures
in Brazil and Mexico. (4)

Wal-Mart merchandise includes softgoods and domestics,

hardgoods, stationary and candy, records and

electronics, pharmaceuticals, sporting goods and toys,

health and beauty aids, shoes, and jewelry. According

to their 1996 10-K, softgoods and domestics, together

with hardgoods, makes up 50% of the company's sales

(5). According to Value Line, Wal-Mart employs

approximately 730,000 people and has approximately

257,000 stockholders (1667).

Nike, Incorporated, incorporated in 1968 in the

state of Oregon, designs and sells footwear, apparel,

and accessories for both athletic and leisure wear.

Nike has approximately 17,200 employees and 77,000

shareholders (Value Line, 1672). According to Value

Line, Directors and Officers of Nike own 95.5% of its

Class A shares (1670). According to Nike's 10-K, the

company sells products (which are virtually all

manufactured by independent contractors) in

approximately 110 countries worldwide. Nike's footwear

products are all manufactured abroad, whereas apparel
products are manufactured both abroad and in the United
States (1).

The Coca-Cola Company is the world's largest soft
drink company. According to Value Line, Coca-Cola
employs approximately 26,000 people and has
approximately 225,000 stockholders (1540). According
to the company's 10-K:

> Finished soft drink products bearing
> the Company's trademarks, sold in the
> United States since 1886 are now sold
> in nearly 200 countries and include the
> leading soft drink products in most of
> these countries. The Company is also
> the world's largest marketer and
> distributor of juice and juice-drink
> products (1).

According to McDonald's 10-K:

> The Company develops, operates,
> franchises and services a worldwide
> system of restaurants which prepare,
> assemble, package and sell a limited
> menu of value-priced foods. These
> restaurants are operated by the company
> or, under the terms of franchise
> arrangements, by franchisees who are
> independent third parties, or by
> affiliates operating under joint-
> venture agreements between the company
> local businesspeople (2).

McDonald's Corporation operates nearly 16,000 fast-food

products are all manufactured abroad, whereas apparel products are manufactured both abroad and in the United States (1).

The Coca-Cola Company is the world's largest soft drink company. According to Value Line, Coca-Cola employs approximately 26,000 people and has approximately 225,000 stockholders (1540). According to the company's 10-K:

> Finished soft drink products bearing the Company's trademarks, sold in the United States since 1886 are now sold in nearly 200 countries and include the leading soft drink products in most of these countries. The Company is also the world's largest marketer and distributor of juice and juice-drink products (1).

According to McDonald's 10-K:

> The Company develops, operates, franchises and services a worldwide system of restaurants which prepare, assemble, package and sell a limited menu of value-priced foods. These restaurants are operated by the company or, under the terms of franchise arrangements, by franchisees who are independent third parties, or by affiliates operating under joint-venture agreements between the company local businesspeople (2).

McDonald's Corporation operates nearly 16,000 fast-food

chain restaurants in the United States and Canada, as well as overseas. According to Value Line, McDonald's employs approximately 237,000 people and has 925,000 shareholders (321).

Pepsico, Incorporated operates three major businesses, including restaurants, beverages, and snack foods. According to Value Line, Pepsico has approximately 486,000 employees and around 207,000 stockholders (1543). Value Line also reports that, in 1996, restaurants accounted for 36% of sales; beverages, 33%; snack foods, 31%. In terms of profits, restaurants accounted for 19%; beverages, 21%; snack foods, 60%. Twenty-nine percent of the company's sales were international, but that was only 3% of the company's profits (Value Line, 1543).

Compaq Computer Corporation manufactures desktop and laptop IBM-compatible personal computers, including servers, professional workstations, networking products, management software, Internet solutions, and other options, such as keyboards, monitors, memory, and storage. According to Value Line, Compaq employs 18,863 employees and has just under 9,000 stockholders (1085). According to the company's 1996 Annual Report,

Compaq is the world's fifth-largest company in computer sales (20). The company set a goal in 1996 to become one of the three largest global computer companies by the year 2000.

Intel Corporation is a major manufacturer of integrated circuits. According to Value Line, Intel employs approximately 48,500 and has around 124,000 shareholders (1060). Intel introduced the first microprocessor 25 years ago, making technological history. Its products include processors, networking and communications products and computer enhancement products. According to the company's 1996 Annual Report, in 1996, Intel's market value more than doubled to $111 billion (2).

Microsoft was founded in 1975 as a partnership. Microsoft Corporation incorporated in 1981 and currently has nearly 21,000 full-time employees (Online, www.microsoft.com/jobs/guide/emstats.html). According to Microsoft's 1996 10-K, they employ 13,991 employees in the United States and 6,570 internationally, 6,861 of which are in product research and development, 10,097 in sales, marketing, and support, 1,485 in manufacturing and distribution, and

2118 in finance and administration (11). As stated in

Microsoft's 10-K:

> Microsoft develops, manufactures,
> licenses, sells, and supports a wide
> range of software products, including
> operating systems for personal
> computers (PCs) and servers; server
> applications for client/server
> environments, business and consumer
> productivity applications; interactive
> media programs; and internet platform
> and development tools. Microsoft also
> offers online services, sells personal
> computer books and input devices and
> researches and develops advanced
> technology software products. Microsoft
> products are available for most PCs,
> including Intel microprocessor-based
> computers and Apple computers. (1)

Microsoft is the world's leading software supplier

(Online, www.microsoft.com/jobs/guide/emstats.html).

As reported by Value Line, Microsoft has almost 40,000

stockholders, but William H. Gates, Chairman and Chief

Executive Officer, owns 23.7% of the stock (2216).

Instrument

The recording instrument used in this study was a

data compilation form. All of the information

necessary to compute the financial ratios for each

company was recorded on this form. This form included

all of the financial ratio variables described in Table 6. The recording instrument is shown in Appendix A.

As shown in Table 6, the variables included were current liabilities, sales, receivables, fixed assets, total assets, total debt, earnings before interest and taxes, interest expense, net income before preferred dividends, net income available to common stockholders, common equity, price per share, earnings per share, depreciation and amortization, and book value per share. A form was completed for each company, showing six years of each of these financial ratio variables.

Procedures

Data was collected for this study from various companies' annual reports and 10-Ks which were collected during the period 1996 to 1997. Year-end stock price information was provided by Morgan Stanley, Dean Witter, Discover & Company. Earnings per share and book value per share were compiled from Value Line.

The research was conducted on the above-listed companies in a longitudinal style, using the companies' previous six-year financial history. The periods

covered included each company's fiscal year ending 1991 through 1996.

Other secondary research was utilized as necessary to obtain general and financial information with regard to these industries and companies. This secondary research included academic and business journals, as well as information on the Internet from the various companies' home pages.

This study focused on several industries in order to eliminate possible bias resulting from trends occurring in a specific industry. Likewise, three companies were chosen from each of the four industries so that any trends particular to one company would not be determined to be representative of the entire industry.

Data Analysis

The data analysis was conducted using the Pearson correlation coefficient. The standard deviations, covariances, and statistical significance were all calculated for each of the pairs (the respective stock price and each financial ratio in each given year) for

each company. A total of 168 correlations were calculated (14 correlations for each of 12 companies).

The level of significance was determined for each of these pairs, using a one-tailed test with a 5% significance level. A one-tailed test was used because it was hypothesized that there was a significant positive or negative correlation between the price of the stock and each of the particular financial ratios.

This level of significance was used to determine if, in fact, a statistical correlation existed, thus providing justification to reject the null hypothesis and supporting the hypothesis proposed in this study. If a statistical correlation did not exist, then the null hypothesis was not rejected; rather, the data simply failed to support the hypothesis proposed herein.

Chapter IV

RESULTS

The actual financial ratio variables and ratios from each of the five major categories, are presented below. In addition, the inferential statistics (mean, standard deviations and correlations) between the various ratios and stock prices for the period studied are also presented in this chapter.

The statistical significance of the correlations, as indicated in Chapter III, were determined using the Pearson Correlation Coefficient, a one-tailed test with a significance level of 5% for the critical values. The critical values of the Pearson Correlation Coefficient are shown in Table 9. Given six years of data for the correlation, there were four degrees of freedom. Hence, the critical value at 5% is .729. In cases where the absolute value of the calculated correlation coefficient was greater than the critical value, the null hypothesis was rejected and the actual hypothesis was supported. Conversely, if the absolute value of the calculated correlation coefficient was less than the critical value, there was a failure to

Table 9

Critical Values of the Pearson Correlation Coefficient

	Level of Significance for One-Tailed Test			
	.05	.025	.01	.005
	Level of Significance for Two-Tailed Test			
d.f.	.10	.05	.02	.01
1	.988	.997	.9995	.9999
2	.900	.950	.980	.990
3	.805	.878	.934	.959
4	.729	.811	.882	.917
5	.669	.754	.833	.874
6	.622	.707	.789	.834
7	.582	.666	.750	.798
8	.549	.632	.716	.765
9	.521	.602	.685	.735
10	.497	.576	.658	.708
11	.576	.553	.634	.684
12	.458	.532	.612	.661
13	.441	.514	.592	.641
14	.426	.497	.574	.623
15	.412	.482	.558	.606
16	.400	.468	.542	.590
17	.389	.456	.528	.575
18	.378	.444	.516	.561
19	.369	.433	.503	.549
20	.360	.423	.492	.537
21	.352	.413	.482	.526
22	.344	.404	.472	.515
23	.337	.396	.462	.505
24	.330	.388	.453	.496
25	.323	.381	.445	.487
26	.317	.374	.437	.479
27	.311	.367	.430	.471
28	.306	.361	.423	.463
29	.301	.355	.416	.486
30	.296	.349	.409	.449
35	.275	.325	.381	.418
40	.257	.304	.358	.393
45	.243	.288	.338	.372
50	.231	.273	.322	.354
60	.211	.250	.295	.325
70	.195	.232	.274	.303
80	.183	.217	.256	.283
90	.173	.205	.242	.267
100	.164	.195	.230	.254

Source: Fisher, R. A. and F. Yates. Statistical Tables for Biological, Agricultural, and Medical Research. London: Longman Group. Ltd.

Presentation of Financial Ratios and Correlations

    The financial variables which were used to calculate all of the financial ratios for all twelve companies are shown in Appendices B-1 through B-12.

    The historical prices per share of stock for each of the twelve companies is shown in Table 10.

Table 10

Stock Price Per Share, 1991-1996

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	34 1/2	34 3/4	43 9/16	44 5/8	52 3/8	65
Exxon Corporation	30 7/16	30 9/16	31 9/16	30 3/8	40 1/4	49
Texaco Incorporated	30 5/8	29 7/8	32 3/8	29 15/16	39 1/4	49 1/16
Consumer Cyclical Products Companies:						
Ford Motor Company	14 1/16	21 7/16	32 1/4	27 7/8	28 7/8	32 1/4
Wal-Mart Stores, Inc.	16 1/2	26 15/16	32 9/16	26 1/2	22 7/8	20 3/8
Nike, Incorporated	9 15/16	14 1/2	18 1/8	14 3/4	19 23/32	50 9/50
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	20 1/16	20 15/16	22 5/16	25 3/4	37 1/8	52 5/8
McDonald's Corporation	19	24 3/8	28 1/2	29 1/4	45 1/8	45 3/8
Pepsico	33 3/4	42 1/4	41 7/8	36 1/4	55 7/8	29 5/8
Technology Companies:						
Compaq Computer	3 17/32	6 1/2	9 27/32	15 13/16	19 3/16	29 3/4
Intel Corporation	6 1/8	10 7/8	15 1/2	15 94/97	28 3/8	65 15/32
Microsoft Corporation	11 11/31	17 1/2	22	25 3/4	45 3/16	60 1/16

    The financial statement analysis for each of the three companies in the four different industries are presented below. The data is presented by the four categories as noted earlier--liquidity, asset

management, debt management, profitability, and market

value. Tables 11 and 12 show the current ratio (the

companies' current assets divided by its current

liabilities for each of the twelve companies) and the

quick ratios (current assets less inventories, divided

by current liabilities), respectively.

Table 11

Current Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	1.0	0.9	0.8	0.8	0.8	0.9
Exxon Corporation	0.8	0.8	0.8	0.8	0.9	1.0
Texaco Incorporated	1.0	1.3	1.4	1.2	1.2	1.2
Consumer Cyclical Products Companies:						
Ford Motor Company	1.0	1.0	1.0	1.1	0.9	1.0
Wal-Mart Stores, Inc.	1.6	1.7	1.5	1.6	1.5	1.5
Nike, Incorporated	2.0	3.3	3.6	3.2	1.8	1.9
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	1.0	0.8	0.9	0.8	0.7	0.8
McDonald's Corporation	0.5	0.6	0.6	0.3	0.5	0.5
Pepsico	1.2	1.1	0.8	1.0	1.1	1.0
Technology Companies:						
Compaq Computer Corporation	2.8	2.4	2.6	2.6	2.4	2.4
Intel Corporation	2.9	2.5	2.4	2.0	2.2	2.8
Microsoft Corporation	3.5	4.0	5.1	4.7	4.2	3.2

Table 12

Quick Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	0.7	0.7	0.6	0.6	0.7	0.7
Exxon Corporation	0.5	0.5	0.5	0.6	0.6	0.7
Texaco Incorporated	0.8	1.0	1.2	0.9	1.0	1.0
Consumer Cyclical Products Companies:						
Ford Motor Company	0.7	0.8	0.7	0.8	0.7	0.8
Wal-Mart Stores, Inc.	0.2	0.2	0.1	0.1	0.1	0.1
Nike, Incorporated	1.1	2.2	2.3	2.3	1.3	1.2
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	0.8	0.6	0.7	0.7	0.6	0.7
McDonald's Corporation	0.5	0.5	0.6	0.3	0.5	0.5
Pepsico	1.0	0.9	0.6	0.8	0.9	0.8
Technology Companies:						
Compaq Computer Corporation	2.1	1.5	1.7	1.6	1.6	2.1
Intel Corporation	2.6	2.3	2.0	1.6	1.7	2.5
Microsoft Corporation	3.3	3.8	4.8	4.6	4.1	3.2

The inventory turnover ratios (sales divided by inventory), the days sales outstanding ratios (DSO, receivables divided by average sales per day), the fixed asset turnover ratios (sales divided by fixed assets), and the total assets turnover ratios (sales divided by total assets) for all of the twelve companies are shown in Tables 13 through 16, respectively.

Table 13

Inventory Turnover Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	15.5	17.9	20.1	20.5	22.7	29.9
Exxon Corporation	18.9	19.9	20.0	20.2	21.4	24.9
Texaco Incorporated	24.0	24.4	25.6	24.0	26.2	30.5
Consumer Cyclical Products Companies:						
Ford Motor Company	11.6	15.5	16.5	16.5	15.4	17.7
Wal-Mart Stores, Inc.	5.6	5.9	6.0	6.1	5.9	5.9
Nike, Incorporated	5.1	7.2	6.6	8.1	7.6	6.9
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	11.7	12.8	13.3	15.5	16.1	19.5
McDonald's Corporation	157.2	167.4	170.3	164.8	168.9	153.5
Pepsico	29.2	28.6	27.1	29.4	28.9	30.5
Technology Companies:						
Compaq Computer Corporation	7.5	4.9	6.4	5.4	6.8	15.7
Intel Corporation	11.3	10.9	10.5	9.9	8.1	16.1
Microsoft Corporation	39.1	32.1	29.6	45.6	67.5	109.5

Table 14

DSO Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	41.3	38.8	37.9	40.2	39.8	34.0
Exxon Corporation	26.7	25.1	22.5	25.9	26.4	28.7
Texaco Incorporated	40.3	34.2	38.2	36.5	42.3	42.0
Consumer Cyclical Products Companies:						
Ford Motor Company	15.7	9.4	9.1	8.6	10.8	11.1
Wal-Mart Stores, Inc.	3.4	3.4	3.4	3.7	3.9	3.3
Nike, Incorporated	62.5	63.0	61.1	66.8	79.6	74.9
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	29.0	29.1	31.2	32.7	33.9	31.9
McDonald's Corporation	12.8	12.4	13.9	15.1	13.9	15.7
Pepsico	27.6	26.0	27.1	25.9	28.5	28.6
Technology Companies:						
Compaq Computer Corporation	68.7	86.7	68.9	75.8	76.6	63.0
Intel Corporation	52.6	65.9	59.4	61.8	69.2	64.3
Microsoft Corporation	47.5	35.2	32.4	36.8	35.2	26.5

Table 15

Fixed Asset Turnover Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	1.7	1.7	1.7	1.6	1.7	2.0
Exxon Corporation	1.8	1.9	1.8	1.8	1.9	2.0
Texaco Incorporated	2.4	2.3	2.3	2.4	2.8	3.3
Consumer Cyclical Products Companies:						
Ford Motor Company	3.2	3.8	4.0	4.0	3.5	3.5
Wal-Mart Stores, Inc.	8.8	8.6	6.7	5.8	5.8	5.5
Nike, Incorporated	10.3	9.8	10.4	9.3	8.6	10.1
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	4.0	3.7	3.7	4.0	4.2	5.2
McDonald's Corporation	0.7	0.7	0.7	0.7	0.8	0.7
Pepsico	2.9	3.0	2.8	2.9	3.1	3.1
Technology Companies:						
Compaq Computer Corporation	3.7	5.1	9.2	11.5	13.3	15.5
Intel Corporation	2.2	2.1	2.2	2.1	2.2	2.5
Microsoft Corporation	3.5	3.6	4.3	5.0	5.0	6.5

Table 16

Total Asset Turnover Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	1.10	1.12	1.04	1.02	1.06	1.23
Exxon Corporation	1.31	1.36	1.30	1.28	1.33	1.38
Texaco Incorporated	1.38	1.37	1.25	1.28	1.43	1.65
Consumer Cyclical Products Companies:						
Ford Motor Company	0.41	0.47	0.46	0.49	0.45	0.45
Wal-Mart Stores, Inc.	2.86	2.84	2.70	2.55	2.51	2.49
Nike, Incorporated	1.76	1.82	1.80	1.60	1.51	1.64
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	1.13	1.18	1.16	1.17	1.20	1.15
McDonald's Corporation	0.59	0.61	0.62	0.61	0.64	0.61
Pepsico	1.03	1.05	1.06	1.15	1.20	1.29
Technology Companies:						
Compaq Computer Corporation	1.16	1.30	1.76	1.76	1.89	1.72
Intel Corporation	0.76	0.72	0.77	0.83	0.93	0.88
Microsoft Corporation	1.12	1.05	0.99	0.87	0.82	0.86

The total debt to total assets (that is, the total

debt divided by total assets) and the times interest
earned (TIE or the earnings before interest and taxes
divided by interest charges) for each of the companies
are shown in Tables 17 and 18, respectively.

Table 17

Total Debt to Total Assets Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	44.1%	43.5%	42.3%	38.8%	39.6%	36.0%
Exxon Corporation	33.6%	33.3%	32.2%	32.2%	29.0%	28.0%
Texaco Incorporated	42.6%	41.0%	41.0%	41.5%	42.9%	41.9%
Consumer Cyclical Products Companies:						
Ford Motor Company	16.3%	15.6%	14.9%	14.8%	14.1%	15.1%
Wal-Mart Stores, Inc.	41.5%	43.6%	47.8%	51.3%	54.4%	53.2%
Nike, Incorporated	38.5%	26.2%	21.4%	24.2%	35.6%	37.4%
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	49.9%	58.1%	54.9%	54.8%	56.4%	52.7%
McDonald's Corporation	48.9%	42.3%	38.2%	42.7%	43.6%	40.1%
Pepsico	61.4%	59.8%	59.1%	56.9%	54.0%	55.4%
Technology Companies:						
Compaq Computer Corporation	25.2%	30.6%	30.5%	37.5%	38.1%	39.4%
Intel Corporation	25.3%	25.8%	25.2%	24.7%	23.0%	23.6%
Microsoft Corporation	17.8%	16.9%	14.8%	17.0%	18.7%	24.0%

Table 18

TIE Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	4.3	7.9	7.7	8.1	4.5	13.0
Exxon Corporation	10.5	9.3	11.8	10.1	18.3	25.7
Texaco Incorporated	2.5	2.8	2.6	2.4	2.0	6.9
Consumer Cyclical Products Companies:						
Ford Motor Company	(2.9)	(0.1)	5.0	12.2	10.8	9.8
Wal-Mart Stores, Inc.	12.1	9.6	9.8	7.1	6.0	4.9
Nike, Incorporated	16.9	17.0	23.1	32.1	26.8	22.8
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	12.4	16.1	19.0	18.7	15.9	16.1
McDonald's Corporation	3.3	3.9	5.3	6.2	6.4	6.6
Pepsico	2.7	3.2	4.2	4.1	3.6	3.4
Technology Companies:						
Compaq Computer Corporation	4.2	7.2	9.6	18.0	11.9	20.6
Intel Corporation	14.6	29.1	70.6	63.2	194.4	317.4
Microsoft Corporation	n/a	n/a	n/a	n/a	n/a	n/a

The profit margin on sales ratios (net income after preferred dividends divided by sales), the basic earnings power (BEP or earnings before interest and taxes divided by total assets), the return on assets ratios (ROA or net income available to common stockholders divided by total assets), and the return on equity ratios (ROE or net income available to stockholders divided by common equity) for each of the companies, are shown in Tables 19 through 22, respectively.

Table 19

Profit Margin on Sales Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	3.39%	4.11%	3.50%	4.82%	2.56%	6.09%
Exxon Corporation	4.87%	4.12%	4.82%	4.55%	5.31%	5.71%
Texaco Incorporated	3.58%	2.00%	3.21%	2.80%	1.71%	4.53%
Consumer Cyclical Products Companies:						
Ford Motor Company	-3.13%	-8.75%	2.76%	4.95%	3.75%	3.77%
Wal-Mart Stores, Inc.	3.96%	3.67%	3.60%	3.46%	3.25%	2.93%
Nike, Incorporated	9.56%	9.67%	9.29%	7.88%	8.39%	8.55%
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	13.98%	12.73%	15.58%	15.78%	16.57%	18.83%
McDonald's Corporation	12.84%	13.44%	14.61%	14.71%	14.57%	14.72%
Pepsico	5.60%	1.70%	6.35%	6.15%	5.28%	3.63%
Technology Companies:						
Compaq Computer Corporation	4.00%	5.20%	6.42%	7.98%	5.35%	7.25%
Intel Corporation	17.13%	18.26%	26.13%	19.86%	22.01%	24.74%
Microsoft Corporation	25.12%	25.66%	25.39%	24.65%	24.47%	25.31%

Table 20

BEP Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	6.5%	10.2%	7.0%	8.1%	5.2%	13.6%
Exxon Corporation	9.7%	8.6%	9.6%	8.9%	11.4%	12.5%
Texaco Incorporated	5.4%	5.2%	4.4%	4.7%	4.0%	11.1%
Consumer Cyclical Products Companies:						
Ford Motor Company	-1.5%	-0.1%	2.0%	4.0%	2.8%	2.6%
Wal-Mart Stores, Inc.	17.9%	16.5%	15.4%	14.0%	13.0%	11.6%
Nike, Incorporated	27.0%	27.9%	27.2%	20.7%	20.7%	22.8%
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	23.3%	24.8%	26.5%	26.9%	28.8%	28.4%
McDonald's Corporation	11.4%	12.4%	13.9%	13.9%	14.1%	12.9%
Pepsico	8.8%	9.1%	10.2%	10.7%	9.6%	8.4%
Technology Companies:						
Compaq Computer Corporation	5.4%	9.4%	15.1%	19.0%	15.2%	17.8%
Intel Corporation	19.0%	19.4%	31.1%	26.1%	32.2%	33.4%
Microsoft Corporation	40.8%	39.4%	36.8%	32.1%	30.1%	33.5%

Table 21

ROA Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	3.7%	4.6%	3.6%	4.9%	2.7%	7.5%
Exxon Corporation	6.4%	5.6%	6.3%	5.8%	7.1%	7.9%
Texaco Incorporated	4.9%	2.7%	4.0%	3.6%	2.4%	7.5%
Consumer Cyclical Products Companies:						
Ford Motor Company	-1.3%	-4.1%	1.3%	2.4%	1.7%	1.7%
Wal-Mart Stores, Inc.	11.3%	10.4%	9.7%	8.8%	8.2%	7.3%
Nike, Incorporated	16.8%	17.6%	16.7%	12.6%	12.7%	14.0%
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	15.8%	15.1%	18.1%	18.4%	19.9%	21.6%
McDonald's Corporation	7.6%	8.2%	9.0%	9.0%	9.3%	9.0%
Pepsico	5.8%	1.8%	6.7%	7.1%	6.3%	4.7%
Technology Companies:						
Compaq Computer Corporation	4.6%	6.8%	11.3%	14.1%	10.1%	12.5%
Intel Corporation	13.0%	13.2%	20.2%	16.6%	20.4%	21.7%
Microsoft Corporation	28.2%	26.8%	25.0%	21.4%	20.2%	21.7%

Table 22

ROE Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	8.8%	11.4%	9.0%	11.6%	6.5%	16.7%
Exxon Corporation	16.4%	14.5%	15.5%	13.8%	16.2%	17.4%
Texaco Incorporated	15.0%	8.4%	12.1%	10.2%	7.0%	21.0%
Consumer Cyclical Products Companies:						
Ford Motor Company	-10.0%	-50.1%	16.2%	24.5%	16.9%	16.6%
Wal-Mart Stores, Inc.	24.1%	23.0%	22.8%	21.7%	21.1%	18.6%
Nike, Incorporated	27.8%	24.7%	22.2%	17.2%	20.3%	22.8%
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	36.6%	42.8%	47.5%	48.8%	55.4%	56.7%
McDonald's Corporation	18.9%	18.4%	19.3%	19.7%	19.0%	18.8%
Pepsico	19.5%	7.0%	25.1%	25.6%	22.0%	17.3%
Technology Companies:						
Compaq Computer Corporation	6.8%	10.6%	17.4%	23.6%	17.1%	21.4%
Intel Corporation	18.5%	19.6%	30.6%	24.7%	29.4%	30.6%
Microsoft Corporation	34.3%	32.3%	29.4%	25.8%	27.2%	31.8%

The price/earnings (P/E) ratios (that is, the price per share divided by the earnings per share) and the market to book ratios for each of the companies are displayed in Tables 23 and 24, respectively.

Table 23

P/E Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	18.7	14.8	15.6	17.2	17.4	16.0
Exxon Corporation	13.6	16.0	15.0	16.5	15.8	17.5
Texaco Incorporated	14.0	15.1	16.3	18.7	18.7	16.2
Consumer Cyclical Products Companies:						
Ford Motor Company	(5.9)	(29.4)	14.1	5.6	8.1	9.0
Wal-Mart Stores, Inc.	23.6	31.0	31.9	22.6	19.2	15.3
Nike, Incorporated	10.6	13.4	15.2	14.6	14.2	26.6
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	32.9	29.1	26.6	26.0	31.2	37.6
McDonald's Corporation	16.1	18.8	19.5	17.4	22.9	20.5
Pepsico	45.0	52.2	42.7	32.7	45.1	25.3
Technology Companies:						
Compaq Computer Corporation	10.1	16.7	13.5	12.4	12.8	16.0
Intel Corporation	12.8	17.3	12.0	10.9	14.3	22.5
Microsoft Corporation	27.7	29.2	27.8	26.0	39.0	35.3

Table 24

Market/Book Ratios

	1991	1992	1993	1994	1995	1996
Energy Companies:						
Chevron Corporation	1.6	1.6	2.0	2.0	2.4	2.7
Exxon Corporation	2.2	2.3	2.3	2.0	2.5	2.8
Texaco Incorporated	1.8	1.8	1.9	1.7	2.4	2.7
Consumer Cyclical Products Companies:						
Ford Motor Company	0.7	1.8	2.6	1.6	1.3	1.5
Wal-Mart Stores, Inc.	5.4	7.1	7.0	4.8	3.6	2.7
Nike, Incorporated	2.9	3.3	3.3	2.6	2.9	5.9
Consumer Non-Cyclical Products Companies:						
The Coca-Cola Company	12.0	14.1	12.6	12.6	17.3	21.2
McDonald's Corporation	3.0	3.3	3.6	3.3	4.2	3.8
Pepsico	9.6	12.6	10.5	8.4	12.0	6.9
Technology Companies:						
Compaq Computer Corporation	1.2	1.9	2.3	2.8	2.8	3.3
Intel Corporation	2.3	3.3	3.5	2.8	3.8	6.4
Microsoft Corporation	8.8	8.7	7.7	6.7	10.0	10.2

Descriptive statistics for each of the financial ratios are provided below. These statistics include the mean, standard deviation and correlation using the Pearson correlation coefficient. Means were calculated for each company's stock price and the various financial ratios for each company. The mean is basically a measure of central tendency. Standard deviations for both stock price and the various financial ratios were also calculated. Standard deviation is defined by Zikmund as a quantitative index of a distribution's spread or variability (733). In addition, correlations were calculated, as noted above, using the Pearson correlation coefficient with a 5%

level of significance.

Tables 25 through 38 show these descriptive statistics. Table 25 shows descriptive statistics for the current ratios of the companies.

Table 25

Current Ratio – Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.87	45.80	0.06	11.56	-0.25355
Exxon Corporation	0.87	35.36	0.08	7.70	0.97260
Texaco Incorporated	1.25	35.19	0.13	7.66	0.00943
Consumer Cyclical Products Companies:					
Ford Motor Company	1.00	26.13	0.04	7.12	-0.32185
Wal-Mart Stores, Inc.	1.59	24.29	0.08	5.63	0.00101
Nike, Incorporated	2.63	21.20	0.80	14.59	-0.43427
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.84	29.80	0.09	12.81	-0.53409
McDonald's Corporation	0.50	31.94	0.10	10.94	0.06281
Pepsico	1.02	39.94	0.14	9.18	-0.08619
Technology Companies:					
Compaq Computer Corporation	2.54	14.10	0.16	9.61	-0.67243
Intel Corporation	2.49	23.72	0.34	21.76	0.21897
Microsoft Corporation	4.11	30.31	0.70	18.55	-0.34730

As shown in Table 25, a significant positive correlation between stock price and current ratio existed in only five of the twelve cases. Therefore, the hypothesis was rejected.

Table 26 shows descriptive statistics for the quick ratios of the companies.

Table 26

Quick Ratio - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.67	45.80	0.04	11.56	0.43755
Exxon Corporation	0.58	35.36	0.09	7.70	0.96362
Texaco Incorporated	0.98	35.19	0.12	7.66	0.18404
Consumer Cyclical Products Companies:					
Ford Motor Company	0.75	26.13	0.04	7.12	0.25035
Wal-Mart Stores, Inc.	0.15	24.29	0.04	5.63	0.22247
Nike, Incorporated	1.73	21.20	0.58	14.59	-0.36286
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.66	29.80	0.06	12.81	-0.22601
McDonald's Corporation	0.47	31.94	0.10	10.94	0.06027
Pepsico	0.84	39.94	0.13	9.18	-0.09336
Technology Companies:					
Compaq Computer Corporation	1.78	14.10	0.25	9.61	0.16750
Intel Corporation	2.13	23.72	0.41	21.76	0.22615
Microsoft Corporation	3.98	30.31	0.66	18.55	-0.26902

As shown in Table 26, only one of the twelve correlations (Exxon) was significant enough (that is, greater than .729) to support the hypothesis. Therefore, the hypothesis was rejected.

Table 27 shows descriptive statistics for the inventory turnover ratios of the companies.

Table 27

Inventory Turnover Ratio - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	21.10	45.80	4.97	11.56	0.98074
Exxon Corporation	20.90	35.36	2.11	7.70	0.96124
Texaco Incorporated	25.79	35.19	2.49	7.66	0.97336
Consumer Cyclical Products Companies:					
Ford Motor Company	15.55	26.13	2.11	7.12	0.91474
Wal-Mart Stores, Inc.	5.90	24.29	0.17	5.63	0.79704
Nike, Incorporated	6.92	21.20	1.01	14.59	0.15731
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	14.82	29.80	2.82	12.81	0.95601
McDonald's Corporation	163.68	31.94	6.80	10.94	-0.10094
Pepsico	28.93	39.94	1.12	9.18	-0.45214
Technology Companies:					
Compaq Computer Corporation	7.80	14.10	3.99	9.61	0.76236
Intel Corporation	11.13	23.72	2.70	21.76	0.71237
Microsoft Corporation	53.89	30.31	30.45	18.55	0.94100

As shown in Table 27, eight of the twelve correlations were significant enough to support the hypothesis. Therefore, the hypothesis was not rejected.

Table 28 shows descriptive statistics for the days sales outstanding (DSO) ratios of the companies.

Table 28

DSO Ratio – Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	38.65	45.80	2.59	11.56	-0.76289
Exxon Corporation	25.91	35.36	2.04	7.70	0.67873
Texaco Incorporated	38.91	35.19	3.20	7.66	0.73077
Consumer Cyclical Products Companies:					
Ford Motor Company	10.78	26.13	2.63	7.12	-0.70451
Wal-Mart Stores, Inc.	3.52	24.29	0.24	5.63	0.10647
Nike, Incorporated	68.01	21.20	7.57	14.59	0.55449
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	31.29	29.80	1.95	12.81	0.54773
McDonald's Corporation	13.97	31.94	1.27	10.94	0.66495
Pepsico	27.30	39.94	1.17	9.18	0.08946
Technology Companies:					
Compaq Computer Corporation	73.28	14.10	8.28	9.61	-0.43980
Intel Corporation	62.19	23.72	5.79	21.76	0.42625
Microsoft Corporation	35.62	30.31	6.87	18.55	-0.74622

As shown in Table 28, only four of the twelve correlations had the hypothesized negative relationship. Therefore, the hypothesis was rejected.

Table 29 shows descriptive statistics for the fixed assets turnover ratios of the companies.

Table 29

Fixed Assets Turnover Ratio - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	*Correlation*
Energy Companies:					
Chevron Corporation	1.72	45.80	0.14	11.56	0.70214
Exxon Corporation	1.84	35.36	0.08	7.70	0.85466
Texaco Incorporated	2.61	35.19	0.39	7.66	0.98617
Consumer Cyclical Products Companies:					
Ford Motor Company	3.67	26.13	0.30	7.12	0.56587
Wal-Mart Stores, Inc.	6.86	24.29	1.49	5.63	-0.15726
Nike, Incorporated	9.75	21.20	0.68	14.59	0.09628
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	4.13	29.80	0.56	12.81	0.93912
McDonald's Corporation	0.74	31.94	0.02	10.94	0.78843
Pepsico	2.96	39.94	0.11	9.18	0.13279
Technology Companies:					
Compaq Computer Corporation	9.71	14.10	4.62	9.61	0.95454
Intel Corporation	2.21	23.72	0.13	21.76	0.87738
Microsoft Corporation	4.65	30.31	1.13	18.55	0.93433

As shown in Table 29, eleven of the twelve correlations had the hypothesized positive relationship. Seven of eight positive calculated correlation coefficients were greater than .729. Therefore, the hypothesis was not rejected.

Table 30 shows descriptive statistics for the total assets turnover ratios of the companies.

Table 30

Total Asset Turnover Ratio - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	1.10	45.80	0.08	11.56	0.48675
Exxon Corporation	1.33	35.36	0.04	7.70	0.67065
Texaco Incorporated	1.39	35.19	0.14	7.66	0.89295
Consumer Cyclical Products Companies:					
Ford Motor Company	0.46	26.13	0.02	7.12	0.56605
Wal-Mart Stores, Inc.	2.66	24.29	0.17	5.63	-0.03756
Nike, Incorporated	1.69	21.20	0.12	14.59	-0.29327
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	1.16	29.80	0.02	12.81	0.01703
McDonald's Corporation	0.61	31.94	0.01	10.94	0.79200
Pepsico	1.13	39.94	0.10	9.18	-0.07858
Technology Companies:					
Compaq Computer Corporation	1.60	14.10	0.29	9.61	0.69832
Intel Corporation	0.82	23.72	0.08	21.76	0.65525
Microsoft Corporation	0.95	30.31	0.12	18.55	-0.81291

As shown in Table 30, eight of the twelve correlations had the hypothesized positive relationship, but in two cases were the calculated correlation coefficient greater than .729. Therefore, the hypothesis was rejected.

Table 31 shows descriptive statistics for the total debt to total assets ratios of the companies.

Table 31

Total Debt to Total Assets Ratio - Descriptive
Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.41	45.80	0.03	11.56	-0.93118
Exxon Corporation	0.31	35.36	0.02	7.70	-0.95235
Texaco Incorporated	0.42	35.19	0.01	7.66	0.35545
Consumer Cyclical Products Companies:					
Ford Motor Company	0.15	26.13	0.01	7.12	-0.78475
Wal-Mart Stores, Inc.	0.49	24.29	0.05	5.63	0.10053
Nike, Incorporated	0.31	21.20	0.07	14.59	0.36430
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.54	29.80	0.03	12.81	-0.09666
McDonald's Corporation	0.43	31.94	0.04	10.94	-0.43013
Pepsico	0.58	39.94	0.03	9.18	-0.36671
Technology Companies:					
Compaq Computer Corporation	0.34	14.10	0.06	9.61	0.90814
Intel Corporation	0.25	23.72	0.01	21.76	-0.70369
Microsoft Corporation	0.18	30.31	0.03	18.55	0.81811

As shown in Table 31, seven of the twelve correlations
had the hypothesized negative relationship, but in only
three of the seven cases was the calculated correlation
coefficient greater than .729. Therefore, the
hypothesis was rejected.

Table 32 shows descriptive statistics for the
times interest earned ratios of the companies.

Table 32

Times Interest Earned Ratios – Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	7.59	45.80	3.17	11.56	0.63212
Exxon Corporation	14.28	35.36	6.46	7.70	0.99617
Texaco Incorporated	3.21	35.19	1.81	7.66	0.82277
Consumer Cyclical Products Companies:					
Ford Motor Company	5.78	26.13	6.21	7.12	0.79928
Wal-Mart Stores, Inc.	8.26	24.29	2.70	5.63	0.00431
Nike, Incorporated	23.12	21.20	5.84	14.59	0.08720
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	16.36	29.80	2.38	12.81	0.01409
McDonald's Corporation	5.27	31.94	1.38	10.94	0.86762
Pepsico	3.55	39.94	0.57	9.18	0.20507
Technology Companies:					
Compaq Computer Corporation	11.92	14.10	6.33	9.61	0.90046
Intel Corporation	114.87	23.72	117.79	21.76	0.97196
Microsoft Corporation	n/a	30.31	n/a	18.55	n/a

As shown in Table 32, all of the correlations had the hypothesized positive relationship, but only six of the correlations were greater than .729. Therefore, the hypothesis was neither rejected nor supported.

Table 33 shows descriptive statistics for the profit margin on sales ratios of the companies.

Table 33

Profit Margin on Sales Ratios - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.04	45.80	0.01	11.56	0.50956
Exxon Corporation	0.05	35.36	0.01	7.70	0.88378
Texaco Incorporated	0.03	35.19	0.01	7.66	0.47817
Consumer Cyclical Products Companies:					
Ford Motor Company	0.01	26.13	0.05	7.12	0.71936
Wal-Mart Stores, Inc.	0.03	24.29	0.00	5.63	0.01684
Nike, Incorporated	0.09	21.20	0.01	14.59	-0.31666
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.16	29.80	0.02	12.81	0.89813
McDonald's Corporation	0.14	31.94	0.01	10.94	0.73433
Pepsico	0.05	39.94	0.02	9.18	0.06805
Technology Companies:					
Compaq Computer Corporation	0.06	14.10	0.01	9.61	0.64086
Intel Corporation	0.21	23.72	0.04	21.76	0.59099
Microsoft Corporation	0.25	30.31	0.00	18.55	-0.25845

As shown in Table 33, ten of the correlations had the hypothesized positive relationship, but only three of the correlations were greater than .729. Therefore, the hypothesis was rejected.

Table 34 shows descriptive statistics for the basic earning power ratios of the companies.

Table 34

Basic Earning Power Ratios - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.08	45.80	0.03	11.56	0.47846
Exxon Corporation	0.10	35.36	0.02	7.70	0.95515
Texaco Incorporated	0.06	35.19	0.03	7.66	0.79274
Consumer Cyclical Products Companies:					
Ford Motor Company	0.02	26.13	0.02	7.12	0.84549
Wal-Mart Stores, Inc.	0.15	24.29	0.02	5.63	-0.02412
Nike, Incorporated	0.24	21.20	0.03	14.59	-0.32235
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.26	29.80	0.02	12.81	0.78332
McDonald's Corporation	0.13	31.94	0.01	10.94	0.56816
Pepsico	0.09	39.94	0.01	9.18	0.30951
Technology Companies:					
Compaq Computer Corporation	0.14	14.10	0.05	9.61	0.77979
Intel Corporation	0.27	23.72	0.06	21.76	0.71877
Microsoft Corporation	0.35	30.31	0.04	18.55	-0.72872

As shown in Table 34, nine of the correlations had the hypothesized positive relationship, but only five of the correlations were greater than .729. Therefore, the hypothesis was rejected.

Table 35 shows descriptive statistics for the return on assets ratios of the companies.

Table 35

Return on Assets Ratios - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.05	45.80	0.02	11.56	0.56877
Exxon Corporation	0.07	35.36	0.01	7.70	0.94351
Texaco Incorporated	0.04	35.19	0.02	7.66	0.65946
Consumer Cyclical Products Companies:					
Ford Motor Company	0.00	26.13	0.02	7.12	0.69653
Wal-Mart Stores, Inc.	0.09	24.29	0.01	5.63	-0.02854
Nike, Incorporated	0.15	21.20	0.02	14.59	-0.32533
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.18	29.80	0.02	12.81	0.89870
McDonald's Corporation	0.09	31.94	0.01	10.94	0.79906
Pepsico	0.05	39.94	0.02	9.18	0.08671
Technology Companies:					
Compaq Computer Corporation	0.10	14.10	0.04	9.61	0.71167
Intel Corporation	0.18	23.72	0.04	21.76	0.74252
Microsoft Corporation	0.24	30.31	0.03	18.55	-0.78093

As shown in Table 35, nine of the correlations had the hypothesized positive relationship, but only four of the correlations were greater than .729. Therefore, the hypothesis was rejected.

Table 36 shows descriptive statistics for the return on equity ratios of the companies.

Table 36

Return on Equity Ratios - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	0.11	45.80	0.04	11.56	0.51111
Exxon Corporation	0.16	35.36	0.01	7.70	0.74411
Texaco Incorporated	0.12	35.19	0.05	7.66	0.60729
Consumer Cyclical Products Companies:					
Ford Motor Company	0.02	26.13	0.28	7.12	0.64146
Wal-Mart Stores, Inc.	0.22	24.29	0.02	5.63	0.13206
Nike, Incorporated	0.22	21.20	0.04	14.59	-0.10816
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	0.48	29.80	0.08	12.81	0.84444
McDonald's Corporation	0.19	31.94	0.00	10.94	-0.00207
Pepsico	0.19	39.94	0.07	9.18	0.06691
Technology Companies:					
Compaq Computer Corporation	0.16	14.10	0.06	9.61	0.76681
Intel Corporation	0.26	23.72	0.05	21.76	0.65683
Microsoft Corporation	0.30	30.31	0.03	18.55	-0.24647

As shown in Table 36, nine of the correlations had the hypothesized positive relationship, but only three of the correlations were greater than .729. Therefore, the hypothesis was rejected.

Table 37 shows descriptive statistics for the price to earnings ratios of the companies.

Table 37

Price to Earnings Ratios - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	16.6	45.8	1.42	11.56	-0.09855
Exxon Corporation	15.7	35.4	1.32	7.70	0.63652
Texaco Incorporated	16.5	35.2	1.89	7.66	0.18117
Consumer Cyclical Products Companies:					
Ford Motor Company	0.3	26.1	15.96	7.12	0.67288
Wal-Mart Stores, Inc.	23.9	24.3	6.50	5.63	0.68363
Nike, Incorporated	15.8	21.2	5.53	14.59	0.98687
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	30.6	29.8	4.34	12.81	0.73381
McDonald's Corporation	19.2	31.9	2.39	10.94	0.87114
Pepsico	40.5	39.9	9.74	9.18	0.58539
Technology Companies:					
Compaq Computer Corporation	13.6	14.1	2.44	9.61	0.38906
Intel Corporation	15.0	23.7	4.31	21.76	0.80410
Microsoft Corporation	30.8	30.3	5.12	18.55	0.80541

As shown in Table 37, only one of the correlations had the hypothesized negative relationship. Therefore, the hypothesis was rejected.

Table 38 shows descriptive statistics for the market to book ratios of the companies.

Table 38

Market to Book Ratios - Descriptive Statistics

	Mean Ratios	Mean Price	Standard Deviation Ratio	Standard Deviation Price	Correlation
Energy Companies:					
Chevron Corporation	2.1	45.8	0.42	11.56	0.99343
Exxon Corporation	2.4	35.4	0.27	7.70	0.94889
Texaco Incorporated	2.1	35.2	0.38	7.66	0.98594
Consumer Cyclical Products Companies:					
Ford Motor Company	1.6	26.1	0.65	7.12	0.64744
Wal-Mart Stores, Inc.	5.1	24.3	1.77	5.63	0.58033
Nike, Incorporated	3.5	21.2	1.23	14.59	0.95730
Consumer Non-Cyclical Products Companies:					
The Coca-Cola Company	15.0	29.8	3.61	12.81	0.96706
McDonald's Corporation	3.5	31.9	0.43	10.94	0.89664
Pepsico	10.0	39.9	2.18	9.18	0.80021
Technology Companies:					
Compaq Computer Corporation	2.4	14.1	0.76	9.61	0.92288
Intel Corporation	3.7	23.7	1.42	21.76	0.97265
Microsoft Corporation	8.7	30.3	1.34	18.55	0.64561

As shown in Table 38, all of the correlation coefficients had the hypothesized positive relationship. Nine of the calculated correlation coefficients were significant enough to support the hypothesis. Therefore, the hypothesis was supported.

CHAPTER V

DISCUSSION

Below is a discussion of the results presented in Chapter IV. This discussion includes a summary of the results presented for each of the 14 hypotheses, a discussion of the limitations of the study, and suggestions for future research.

Summary

The purpose of this project was to ascertain whether or not the 14-point hypothesis outlined in Chapter II, which stated that each of the financial analysis ratios has either a significant positive or a significant negative correlation to stock price, could be supported. (Table 7 presented the hypothesized relationships.) Depending upon which ratio is being studied, it was hypothesized that, as a given financial ratio increases, so does the price of the stock (a positive correlation) or, as a given financial ratio decreases, the price of the stock increases (a negative correlation).

In the case of the first financial analysis ratio,

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the current ratios of the companies, a positive correlation between the ratio and the stock price was hypothesized. The data did not demonstrate that a positive correlation existed, so the hypothesis was rejected. Only in five of the twelve correlations did a positive correlation between stock price and current ratio exist. Only one of the five calculated correlation coefficients were significant (that is, greater than .729). One cannot, therefore necessarily determine that, as a company's current ratio improves, so does the stock price. If a company is paying its bills less frequently or accumulating more bank loans, it does not necessarily mean that this will translate into a decrease in stock price. In other words, while these factors may mean a company is experiencing financial difficulties, it does not necessarily mean the stock price will fall. Conversely, an increasing current ratio does not necessarily mean the stock price will rise.

In the case of the quick ratio, a positive correlation was also hypothesized. The data collected could not support the hypothesis here either. Eight of the calculated correlation coefficients were postiive, but only one of the eight was significant enough to

support the hypothesis. Therefore, the hypothesis was rejected. Consequently, although reducing current assets by inventories and placing a company in a position where they are limited in their ability to pay off current obligations may be indicative of financial problems according to Kristy, it does not necessarily affect stock price (16). On the other hand, as solvency improves, it does not necessarily mean that the stock price of a company will rise.

Hence, neither one of the liquidity ratios (the current ratio or the quick ratio) had a significant positive correlation to stock price as was hypothesized. Perhaps other factors influence stock price as opposed to the liquidity ratios which are calculated based on current assets, current liabilities, and inventories. Among these factors might be industry trends (for example, a competitor who gains additional market share or who goes out of business), the economy (for example, inflation), or news and rumors spread about the company or industry (for example, takeovers or mergers or announcements about earnings). Any of these factors could have an impact on the price of the stock, making liquidity less important.

In the case of the inventory turnover ratio, a positive relationship with stock price was hypothesized. The data collected as part of this project supported the hypothesis, but not overwhelmingly so. The majority of the correlations were positive (ten of the twelve correlations). Eight of the ten positive correlations were significant. So, the hypothesis was partially supported. As DiVittorio pointed out, lower ratios can be indicative of holding obsolete inventory or excessively high levels of stocks (30). Hence, it is conceivable, based on the data collected, that a decreasing inventory turnover ratio could affect a company's stock price in a negative way. Conversely, a good inventory turnover ratio may, in fact, be indicative of good financial condition and may be correlated with an increase in stock price.

The days sales outstanding (DSO) ratios and stock prices of the companies were hypothesized to have a negative relationship. The data collected, however, did not support the hypothesis. Only four of the twelve correlations had the hypothesized negative relationship. In only two cases was this negative relationship significant. The hypothesis, therefore, was not supported. Consequently, while Kristy may claim

that the days sales outstanding ratio may be the single best indicator of the quality of a company's accounts receivable, that does not mean that an increase in the ratio signals a decrease in the stock price as was hypothesized (17).

A positive correlation was hypothesized between the fixed assets turnover ratios of the companies and the companies' stock prices. The data collected supported this hypothesis. Eleven of the twelve calculated correlation coefficients had the hypothesized positive relationship. Seven of the eight positive calculated correlation coefficients were significant. An increasing fixed assets turnover ratio could indicate that a company is using its fixed assets productively to generate sales. Therefore, this data supports the possibility that, as a company's fixed assets turnover ratio increases, the company's stock price might also increase.

The total assets turnover ratios of the companies was hypothesized to have a positive correlation to stock price. Only eight of the twelve correlations had the hypothesized positive relationship. Of those eight, in only two cases were the calculated correlation coefficients significant. The data,

therefore, did not support the hypothesis. Consequently, the use of all of the assets of a company is not positively correlated with its stock price.

As noted above, in the category of asset management ratios, the inventory turnover ratio, fixed asset turnover ratio and the total asset turnover ratio were hypothesized to have a significant positive correlation to stock price and days sales outstanding was hypothesized to have a significant negative correlation to stock price. Two of the asset management ratios were supported by the data collected, the inventory turnover ratio and the fixed asset turnover. So, these two of the asset management ratios, calculated based on sales, inventory and fixed assets, might have an impact on stock price. However, in the case of the days sales outstanding and total asset turnover, other factors might influence stock price as opposed to those variables which make up these ratios (receivables and total assets). Again, other factors might impact stock more than their days sales outstanding ratio or their total asset turnover ratio. Things such as trends in the industry, the economy, or news and rumors spread about the company or industry might better explain variations in the price of a

stock.

The total debt to total assets ratios of the companies was hypothesized to have a negative correlation to stock price. Once again, the data did not support the hypothesis. Only seven of the twelve correlations had the hypothesized negative relationship. Of those seven, in only three cases was the calculated correlation coefficient greater than .729. Therefore, the hypothesis was rejected. The total debt to total assets ratio is not negatively correlated with stock price as originally hypothesized. Even though a higher ratio might mean more claims against a company's assets, it does not necessarily mean the stock price will fall (Brigham and Gapenski, 879).

As the times interest earned ratio increases, it was hypothesized that the stock price would also increase because of a positive correlation. All of the correlations had the hypothesized positive relationship, but only six of the correlations were greater than .729. So, only one-half of the data collected supported the hypothesis. Consequently, the hypothesis was neither supported nor rejected. While a company may not be able to cover its annual interest

costs, it does not necessarily mean a decrease in the stock price.

Therefore, none of the data collected supported the hypothesized relationship for either one of the debt management ratios (that is, a significant negative correlation for the debt to total assets ratio or a significant positive correlation for the times interest earned ratio). Once again, the factors which influence stock price do not appear to be derived from the debt management ratios calculated by using total debt, total assets, earnings before interest and taxes, and interest charges. As indicated earlier, other factors which affect stock price might be industry trends, the economy, or news and rumors spread about the company or industry. These outside factors may play a more important role in determining stock price than debt management ratios.

The profit margin on sales ratios of the companies was hypothesized to have a positive correlation. Ten of the correlations had the hypothesized positive relationship, but only three of the correlations were significant. The data collected, therefore, did not support the hypothesis. So, even though a company may be more profitable, it does not necessarily mean that

the company's stock price will increase. Needles pointed out that declining profitability ratios can be key signs of possible business failures (684). However, based on the data collected, even though a company may have declining profitability, it does not necessarily mean that the stock price will fall.

Basic earning power was hypothesized to have a positive correlation with stock price. The hypothesis was not supported based on the data collected because the data did not support a positive correlation. Nine of the correlations had the hypothesized positive relationship, but only five of the correlations were significant. Consequently, while the basic earnings power may reflect a company's ability to get the most earnings from its assets, it does not necessarily mean that the stock price will increase as earnings power increases.

The return on assets ratio was hypothesized to have a positive correlation to stock price. The data did not support the hypothesis and the hypothesis was rejected. Nine of the correlations had the hypothesized positive relationship, but only four of the correlations were significant. So, even though an increase in return on assets may reflect more net

income available to stockholders vis-à-vis its total assets, one cannot expect an increase in the stock price.

The return on equity ratio was also hypothesized to have a positive correlation to stock price. Once again, the data did not support the hypothesis and the hypothesis was rejected. Nine of the correlations had the hypothesized positive relationship, but only three of the correlations were significant. Hence, even though a drop in the return on equity may indicate less income available to stockholders as compared to common equity, it does not necessarily mean that the stock price will also fall.

All of the ratios included in the category of profitability ratios (profit margin on sales, basic earnings power, return on assets and return on equity) were hypothesized to have a significant positive correlation to stock price. The data collected did not support a significant positive correlation for any of the profitability ratios. So, the ratios derived from the variables involved in the profitability ratios (net income, sales, earnings before interest and taxes, total assets and common equity) might be related in stock price. Other factors (economy, industry trends

and current news), that are external to a company, may better explain variations in the price of a stock than the profitability of a company.

A negative correlation between the price to earnings ratios of the companies and the stock prices of the companies was hypothesized. The data did not support the negative correlation. Only one of the calculated correlation coefficients was negative. So, while a higher price to earnings ratio is more typical of riskier companies, it does not mean that as the price to earnings ratio increases, the stock price will fall, even though there would be less earnings per share in relation to the price per share. Needles states that the price must be related to the earnings per share, but the data here did not support a negative correlation (685-686).

A positive correlation was hypothesized for the market to book ratio and the stock price. The data collected supported the hypothesis. All of the calculated correlation coefficients were positive. Nine of the twelve coefficients were significant. Thus, as the ratio increases, the stock price might be reasonably expected to increase because the market price would be higher in relationship to the book

value.

To summarize the category of market value ratios, the price to earnings ratio was hypothesized to have a significant negative correlation to stock price and market to book ratio was hypothesized to have a significant positive correlation to stock price. Only one of these ratios was supported, that is, a significant positive correlation between market to book and stock price. The hypothesized price to earnings ratio (calculated by dividing price per share by earnings per share) was not supported, so again, other factors might be industry, the economy, or news and rumors spread about the company or industry might better explain variations in the price of a stock.

Limitations of the Study

This study had certain limitations. These limitations are described below.

First of all, the companies included in this study were limited to large, well-established companies. Therefore, there was no representation from smaller or mid-size companies. Nor was there any representation from newly-established companies or growth companies.

Second, although the companies were randomly

selected from numerous larger companies, they were simply chosen by the author based on familiarity. They were not randomly selected to the extent that all companies in their size group had an equal chance of being selected.

Third, the data collected only takes into account historical financial information about these companies. It did not factor in any possible current market or economic information which could have an impact on the stock prices for each of the companies. In addition, the study did not take into account any news which was released or rumors spread at the time the year-end financial information was compiled.

Finally, the hypothesized relationships of each of the ratios to stock price were based on the positive nature of the ratios for use in other areas. For example, while an increasing current ratio might be a positive sign from a credit analyst's standpoint, it might not necessarily be a positive sign in terms of a corresponding increase in stock price. Therefore, the study was somewhat limited in terms of the original

hypothesized relationship.

Suggestions for Future Research

If this study were pursued again, there would be several areas where changes might improve the results. These suggested changes are discussed below.

Initially, the sample size could be larger in three respects. First of all, the number of companies included could be expanded. Only twelve companies were included in this particular study. Secondly, the type of companies included could be expanded. Only well-known, well-established companies were included in this study. Smaller and mid-size companies, as well as newly-established and " growth" -type companies, could also be included. Finally, additional years' data might help improve the reliability of the results.

Second, the companies should have been truly selected at random, such that each potential company would have an equal chance of being selected. In this particular study, name recognition was the primary determinant of the inclusion of the selected companies.

Third, the whole basis for determining stock price should include more current economic factors, such as trends in the market place. For example, inflation as defined by the Consumer Price Index (CPI) might be relevant. Economic factors having an impact on the various industries might also be relevant.

Finally, future studies should probably focus on specific financial analysis ratios which appear to support the hypothesized correlation. In this project, the hypotheses were only supported in three cases (that is, the stock prices in relationship to the inventory turnover ratio, the fixed asset turnover ratio, and the market to book ratio). It is quite possible, however, that future studies (with larger sample sizes, random selection and a greater amount of data) might not support those hypotheses which could not be rejected as a result of this study.

In summary, this study attempted to determine if the various financial ratios were correlated with stock price. A few of the calculated correlation coefficients appeared to support the hypothesis, but

most did not. Therefore, some of the hypotheses were supported, but most were rejected. Consequently, additional research would be needed to either reject all hypotheses or support these hypotheses.

Financial Ratio Analysis

Name of Company _____

Industry _____

Variable	1991	1992	1993	1994	1995	1996
Current Assets						
Inventory						
Current Liabilities						
Sales						
Receivables						
Fixed Assets						
Total Assets						
Total Debt						
Earnings before interest and taxes						
Interest Expense						
Net income before preferred dividends						
Net income available to common stockholders						
Common equity						
Price per share						
Earnings per share (Per						
Depreciation & amortization						
Book value per share						

Appendix B-1

Chevron's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	9,031	8,772	8,682	7,591	7,867	7,942
Inventory	2,465	2,135	1,801	1,710	1,598	1,431
Current Liabilities	9,480	9,835	10,606	9,392	9,445	8,907
Sales	38,118	38,212	36,191	35,130	36,310	42,782
Receivables	4,373	4,115	3,808	3,923	4,014	4,035
Fixed Assets	22,850	22,188	21,865	22,173	21,696	21,496
Total Assets	34,636	33,970	34,736	34,407	34,330	34,854
Total Debt	15,280	14,788	14,688	13,347	13,578	12,557
Earnings Before Interest & Taxes	2,252	3,463	2,426	2,803	1,789	4,740
Interest Expense	519	436	317	346	401	364
Net Income before pref. dividends	1,293	1,569	1,265	1,693	930	2,607
Net Income to common stckhldrs.	1,293	1,569	1,265	1,693	930	2,607
Common equity	14,739	13,728	13,997	14,596	14,355	15,623
Price per share	34 1/2	34 3/4	43 9/16	44 5/8	52 3/8	65
Earnings per share	1.85	2.35	2.80	2.60	3.01	4.06
Depreciation & Amortization	2,616	2,594	2,452	2,431	3,381	2,216
Book value per share	21.25	21.11	21.49	22.40	22.01	23.92

Appendix B-2

Exxon's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	17,012	16,424	14,859	16,460	17,318	19,910
Inventory	6,081	5,807	5,472	5,541	5,681	5,285
Current Liabilities	20,854	19,663	18,590	19,493	18,736	19,505
Sales	115,068	115,672	109,532	112,128	121,804	131,543
Receivables	8,540	8,079	6,860	8,073	8,925	10,499
Fixed Assets	63,864	61,799	61,962	63,425	65,446	66,607
Total Assets	87,560	85,030	84,145	87,862	91,296	95,527
Total Debt	29,436	28,300	27,096	28,324	26,514	26,741
Earnings Before Interest & Taxes	8,518	7,287	8,052	7,804	10,442	11,916
Interest Expense	810	784	681	773	571	464
Net Income before pref. dividends	5,600	4,770	5,280	5,100	6,470	7,510
Net Income to common stckhldrs.	5,600	4,770	5,280	5,100	6,470	7,510
Common equity	34,060	33,006	34,124	36,861	39,982	43,239
Price per share	30 7/16	30 9/16	31 9/16	30 3/8	40 1/4	49
Earnings per share	2.23	1.91	2.11	1.84	2.55	2.80
Depreciation & Amortization	4,824	5,044	4,884	5,015	5,386	5,329
Book value per share	14.06	13.29	13.74	14.84	16.10	17.41

Appendix B-3

Texaco's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	6,581	5,611	6,865	6,019	6,458	7,665
Inventory	1,503	1,461	1,298	1,358	1,357	1,460
Current Liabilities	6,290	4,225	4,756	5,015	5,206	6,184
Sales	36,112	35,687	33,245	32,540	35,551	44,561
Receivables	4,041	3,390	3,529	3,297	4,177	5,195
Fixed Assets	14,944	15,226	14,171	13,483	12,580	13,411
Total Assets	26,182	25,992	26,626	25,505	24,937	26,963
Total Debt	11,151	10,666	10,913	10,579	10,709	11,309
Earnings Before Interest & Taxes	1,422	1,349	1,172	1,204	986	2,983
Interest Expense	558	477	459	498	483	434
Net Income before pref. dividends	1,294	712	1,068	910	607	2,018
Net Income to common stckhldrs.	1,191	613	967	819	547	1,960
Common equity	8,633	8,482	8,795	8,934	8,724	9,598
Price per share	30 5/8	29 7/8	32 3/8	29 15/16	39 1/4	49 1/16
Earnings per share	2.18	1.98	1.99	1.60	2.10	3.02
Depreciation & Amortization	1,496	1,536	1,568	1,735	2,385	1,455
Book value per share	16.70	16.39	16.98	17.21	16.51	18.20

Appendix B-4
Ford's Financial Ratio Variables

	1991	1992	1993	1994	1995	1995
(in millions except share data)						
Current Assets	21,852	21,836	22,482	26,863	27,281	32,194
Inventory	6,215	5,451	5,538	6,487	7,162	6,656
Current Liabilities	21,817	21,125	22,652	25,471	28,776	33,170
Sales	72,051	84,407	91,568	107,137	110,496	118,023
Receivables	3,151	2,204	2,302	2,548	3,321	3,635
Fixed Assets	22,522	22,160	23,059	27,048	31,273	33,527
Total Assets	174,429	180,545	198,938	219,622	243,283	262,867
Total Debt	28,356	28,193	29,736	32,574	34,251	39,665
Earnings Before Interest & Taxes	(2,587)	(127)	4,003	8,789	6,705	6,793
Interest Expense	903	860	807	721	622	695
Net Income before pref. dividends	(2,258)	(7,385)	2,529	5,308	4,139	4,446
Net Income to common stckhldrs.	(2,280)	(7,594)	2,241	5,308	4,139	4,446
Common equity	22,690	14,753	15,574	21,659	24,547	26,762
Price per share	14 1/16	21 7/16	32 1/4	27 7/8	28 7/8	32 1/4
Earnings per share	(2.40)	(0.73)	2.28	4.97	3.58	3.58
Depreciation & Amortization	1,500	2,089	3,064	4,910	6,500	6,875
Book value per share	21.10	11.60	12.20	17.85	21.45	21.91

Appendix B-5

Walmart's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	6,415	8,575	10,198	12,114	15,338	17,331
Inventory	5,808	7,384	9,268	11,014	14,064	15,989
Current Liabilities	3,990	5,004	6,754	7,406	9,973	11,454
Sales	32,602	43,887	55,484	67,344	82,494	93,627
Receivables	305	419	525	690	900	853
Fixed Assets	3,724	5,079	8,254	11,627	14,308	17,098
Total Assets	11,389	15,443	20,565	26,441	32,819	37,541
Total Debt	4,730	6,726	9,827	13,562	17,844	19,962
Earnings Before Interest & Taxes	2,043	2,554	3,166	3,691	4,262	4,346
Interest Expense	169	266	323	517	706	888
Net Income before pref. dividends	1,291	1,609	1,995	2,333	2,681	2,740
Net Income to common stckhldrs.	1,291	1,609	1,995	2,333	2,681	2,740
Common equity	5,366	6,990	8,759	10,752	12,726	14,756
Price per share	16 1/2	26 15/16	32 9/16	26 1/2	22 7/8	20 3/8
Earnings per share	0.70	0.87	1.02	1.17	1.19	1.33
Depreciation & Amortization	347	475	649	849	1,070	1,304
Book value per share	3.04	3.81	4.68	5.54	6.44	7.48

Appendix B-6

Nike's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(In thousands except share data)						
Current Assets	1,280,260	1,387,758	1,620,647	1,770,431	2,045,928	2,726,940
Inventory	586,594	471,202	592,986	470,023	629,742	931,151
Current Liabilities	628,472	420,588	452,564	561,987	1,107,535	1,467,059
Sales	3,003,610	3,405,211	3,930,984	3,789,668	4,760,834	6,470,625
Receivables	521,588	596,018	667,547	703,682	1,053,237	1,346,125
Fixed Assets	292,463	346,037	377,995	405,845	554,879	643,459
Total Assets	1,708,430	1,872,861	2,187,463	2,373,815	3,142,745	3,951,628
Total Debt	658,464	490,064	467,597	574,351	1,118,100	1,476,643
Earnings Before Interest & Taxes	461,746	521,818	594,516	490,594	649,864	899,090
Interest Expense	27,316	30,665	25,739	15,282	24,208	39,498
Net Income before pref. dividends	287,046	329,218	365,016	298,794	399,664	553,190
Net Income to common stckhldrs.	287,046	329,218	365,016	298,794	399,664	553,190
Common equity	1,032,489	1,331,395	1,645,726	1,740,649	1,964,389	2,431,400
Price per share	9 15/16	14 1/2	18 1/8	14 3/4	19 23/32	50 9/50
Earnings per share	0.94	1.08	1.19	1.01	1.39	1.89
Depreciation & Amortization	34,473	47,665	60,393	64,531	71,113	97,179
Book value per share	3.43	4.41	5.43	5.71	6.87	8.46

Appendix B-7

Coca-Cola's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	4,144	4,248	4,434	5,205	5,450	5,910
Inventory	988	1,019	1,049	1,047	1,117	952
Current Liabilities	4,118	5,303	5,171	6,177	7,348	7,406
Sales	11,572	13,074	13,963	16,181	18,018	18,546
Receivables	933	1,055	1,210	1,470	1,695	1,641
Fixed Assets	2,890	3,526	3,729	4,080	4,336	3,550
Total Assets	10,222	11,052	12,021	13,873	15,041	16,161
Total Debt	5,103	6,423	6,599	7,603	8,489	8,522
Earnings Before Interest & Taxes	2,383	2,746	3,185	3,728	4,328	4,596
Interest Expense	192	171	168	199	272	286
Net Income before pref. dividends	1,618	1,664	2,176	2,554	2,986	3,492
Net Income to common stckhldrs.	1,617	1,664	2,176	2,554	2,986	3,492
Common equity	4,426	3,888	4,584	5,235	5,392	6,156
Price per share	20 1/16	20 15/16	22 5/16	25 3/4	37 1/8	52 5/8
Earnings per share	0.61	0.72	0.84	0.99	1.19	1.40
Depreciation & Amortization	261	322	360	411	454	479
Book value per share	1.67	1.49	1.77	2.05	2.15	2.48

Appendix B-8

McDonald's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	646	865	663	741	956	1,103
Inventory	43	44	44	51	58	70
Current Liabilities	1,288	1,545	1,102	2,451	1,795	2,135
Sales	6,695	7,133	7,408	8,321	9,795	10,687
Receivables	238	246	287	348	377	467
Fixed Assets	9,559	9,597	10,081	11,328	12,811	14,352
Total Assets	11,349	11,681	12,035	13,592	15,415	17,386
Total Debt	5,555	4,946	4,591	5,810	6,717	6,965
Earnings Before Interest & Taxes	1,299	1,448	1,676	1,887	2,169	2,251
Interest Expense	391	374	316	306	340	343
Net Income before pref. dividends	860	959	1,083	1,224	1,427	1,573
Net Income to common stckhldrs.	860	959	1,083	1,224	1,427	1,573
Common equity	4,537	5,212	5,597	6,211	7,503	8,360
Price per share	19	24 3/8	28 1/2	29 1/4	45 1/8	45 3/8
Earnings per share	1.18	1.30	1.46	1.68	1.97	2.21
Depreciation & Amortization	514	555	568.4	629	709	743
Book value per share	6.32	7.30	7.91	8.95	10.72	12.04

Appendix B-9

Pepsico's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	4,566	4,842	5,164	5,072	5,546	5,139
Inventory	662	769	925	970	1,051	1,038
Current Liabilities	3,722	4,558	6,575	5,270	5,230	5,139
Sales	19,292	21,970	25,021	28,472	30,421	31,645
Receivables	1,482	1,589	1,883	2,051	2,407	2,516
Fixed Assets	6,595	7,442	8,856	9,883	9,870	10,191
Total Assets	18,775	20,951	23,706	24,792	25,432	24,512
Total Debt	11,528	12,522	14,018	14,111	13,739	13,578
Earnings Before Interest & Taxes	1,660	1,899	2,423	2,664	2,432	2,047
Interest Expense	614	586	573	645	682	600
Net Income before pref. dividends	1,080	374	1,588	1,752	1,606	1,149
Net Income to common stckhldrs.	1,080	374	1,588	1,752	1,606	1,149
Common equity	5,545	5,356	6,339	6,856	7,313	6,623
Price per share	33 3/4	42 1/4	41 7/8	36 1/4	55 7/8	29 5/8
Earnings per share	0.75	0.81	0.98	1.11	1.24	1.17
Depreciation & Amortization	208	266	304	312	316	301
Book value per share	3.51	3.35	3.97	4.34	4.64	4.29

Appendix B-10

Compaq Computer's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	1,783	2,318	3,291	5,158	6,527	9,169
Inventory	437	834	1,123	2,005	2,156	1,152
Current Liabilities	638	960	1,244	2,013	2,680	3,852
Sales	3,271	4,100	7,191	10,866	14,755	18,109
Receivables	624	987	1,377	2,287	3,141	3,168
Fixed Assets	884	808	779	944	1,110	1,172
Total Assets	2,826	3,142	4,084	6,166	7,818	10,526
Total Debt	711	960	1,244	2,313	2,980	4,152
Earnings Before Interest & Taxes	154	295	616	1,172	1,188	1,876
Interest Expense	37	41	64	65	100	91
Net Income before pref. dividends	131	213	462	867	789	1,313
Net Income to common stckhldrs.	131	213	462	867	789	1,313
Common equity	1,931	2,007	2,654	3,674	4,614	6,144
Price per share	3 17/32	6 1/2	9 27/32	15 13/16	19 3/16	29 3/4
Earnings per share	0.35	0.39	0.73	1.28	1.50	1.86
Depreciation & Amortization	166	160	156	169	214	285
Book value per share	3.06	3.35	4.20	5.63	6.91	8.98

Appendix B-11

Intel's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	3,604	4,691	5,802	6,157	8,097	13,684
Inventory	422	535	838	1,169	2,004	1,293
Current Liabilities	1,228	1,842	2,433	3,024	3,619	4,863
Sales	4,779	5,844	8,782	11,521	16,202	20,847
Receivables	698	1,069	1,448	1,978	3,116	3,723
Fixed Assets	2,163	2,816	3,996	5,367	7,471	8,487
Total Assets	6,292	8,089	11,344	13,816	17,504	23,735
Total Debt	1,590	2,091	2,859	3,416	4,019	5,591
Earnings Before Interest & Taxes	1,195	1,569	3,530	3,603	5,638	7,934
Interest Expense	82	54	50	57	29	25
Net Income before pref. dividends	819	1,067	2,295	2,288	3,566	5,157
Net Income to common stckhldrs.	819	1,068	2,295	2,288	3,566	5,157
Common equity	4,418	5,445	7,500	9,267	12,140	16,872
Price per share	6 1/8	10 7/8	15 1/2	15 94/97	28 3/8	65 15/32
Earnings per share	0.48	0.63	1.29	1.47	1.98	2.91
Depreciation & Amortization	418	518	717	1,028	1,371	1,888
Book value per share	2.71	3.25	4.49	5.61	7.39	10.28

Appendix B-12

Microsoft's Financial Ratio Variables

	1991	1992	1993	1994	1995	1996
(in millions except share data)						
Current Assets	1,029	1,770	2,850	4,312	5,620	7,839
Inventory	47	86	127	102	88	79
Current Liabilities	293	447	563	913	1,347	2,425
Sales	1,843	2,759	3,753	4,649	5,937	8,671
Receivables	243	270	338	475	581	639
Fixed Assets	530	767	867	930	1,192	1,326
Total Assets	1,644	2,640	3,805	5,363	7,210	10,093
Total Debt	293	447	563	913	1,347	2,425
Earnings Before Interest & Taxes	671	1,041	1,401	1,722	2,167	3,379
Interest Expense	0	0	0	0	0	0
Net Income before pref. dividends	463	708	953	1,146	1,453	2,195
Net Income to common stckhldrs.	463	708	953	1,146	1,453	2,195
Common equity	1,351	2,193	3,242	4,450	5,333	6,908
Price per share	11 11/31	17 1/2	22	25 3/4	45 3/16	60 1/16
Earnings per share	0.41	0.60	0.79	0.99	1.16	1.70
Depreciation & Amortization	76	112	151	237	269	480
Book value per share	1.29	2.01	2.87	3.83	4.53	5.87

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